

เอกสารอ้างอิง

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จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก ก

ข้อมูลปริมาณน้ำฝนรายเดือนของสถานีต่าง ๆ



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

ตาราง ก - 1 ปริมาณน้ำฝนรายเดือนสถานีวัดฝนกรมอุตุนิยมวิทยา (41013)

Station - 41013 Bangkok Metropolis													
Monthly Rainfall in Millimeter													
Year	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Annual
1990	0.0	22.6	401.0	258.6	172.5	159.9	59.3	220.2	15.5	50.7	1.2	1.4	1,362.9
1989	0.0	33.7	315.5	410.1	181.1	176.8	86.5	178.2	2.4	82.0	0.9	29.2	1,496.4
1988	0.0	4.2	380.3	487.4	315.0	177.8	99.7	394.4	139.3	2.7	96.5	0.0	2,097.3
1987	0.0	109.2	217.2	433.5	49.9	31.9	286.4	145.7	54.4	41.4	0.0	0.7	1,370.3
1986	10.1	134.0	330.0	357.6	201.7	155.4	72.1	504.5	36.2	0.0	5.9	0.0	1,809.5
1985	0.0	17.1	375.8	337.6	134.6	143.0	90.5	174.0	60.6	11.3	5.5	18.7	1,368.7
1984	0.0	25.8	292.8	331.2	93.2	239.8	130.9	184.0	52.9	33.9	12.9	0.6	1,398.0
1983	13.6	131.8	487.2	453.8	574.5	230.2	161.4	47.7	0.0	29.0	0.0	0.3	2,129.5
1982	19.6	44.3	248.8	254.8	220.7	199.2	187.8	235.5	223.2	176.0	19.7	0.0	1,829.6
1981	0.0	156.3	257.2	178.5	144.5	157.1	101.1	417.2	153.5	16.7	10.6	0.0	1,592.7
1980	0.0	33.9	324.5	352.3	200.6	205.5	267.5	29.9	52.5	4.0	0.3	0.0	1,471.0
1979	0.2	13.3	22.3	295.9	130.4	101.7	373.8	141.6	10.7	0.0	6.8	36.7	1,133.4
1978	0.0	0.6	102.5	274.7	81.9	135.1	255.2	245.3	13.0	1.0	103.6	23.5	1,236.4
1977	3.9	59.8	135.9	358.5	120.7	113.3	61.3	101.3	28.4	4.2	25.7	27.1	1,040.1
1976	0.0	16.8	198.8	297.3	247.6	283.0	72.5	409.6	55.1	1.8	52.2	0.0	1,634.7
1975	9.0	35.0	261.5	211.5	323.7	174.8	100.7	186.2	3.9	32.4	1.0	38.1	1,377.8
1974	0.0	134.8	471.2	219.7	160.9	129.9	82.3	179.2	130.2	10.2	0.0	0.7	1,519.1
1973	11.2	36.8	113.8	364.7	97.3	68.5	131.9	157.5	5.6	102.6	0.0	0.0	1,089.9
1972	54.7	88.4	237.9	676.3	157.0	69.5	127.8	55.1	146.9	18.8	19.9	0.0	1,652.3
1971	0.8	2.8	177.4	383.2	352.1	178.9	82.2	236.3	31.1	11.0	28.1	0.0	1,483.9
1970	103.2	50.4	187.3	355.2	144.3	189.0	301.1	283.0	157.5	44.6	68.2	1.2	1,885.0
1969	1.6	93.6	159.0	292.8	95.6	78.0	280.0	68.6	12.0	15.2	0.1	38.5	1,135.0
1968	0.0	31.5	166.4	293.7	269.7	73.3	180.1	124.4	124.7	0.4	51.2	4.6	1,320.0
1967	0.0	36.2	96.5	165.1	121.0	114.7	28.0	235.9	67.6	4.2	0.0	6.3	875.5
1966	39.2	4.2	191.3	257.4	156.9	314.4	214.6	380.8	72.0	1.3	35.2	0.0	1,667.3
1965	18.3	26.3	277.5	553.4	188.7	83.1	96.0	264.7	66.2	2.6	125.4	0.4	1,702.6
1964	2.7	10.0	100.2	402.9	241.5	274.9	100.2	554.1	45.1	15.0	107.4	4.6	1,858.6
1963	2.3	56.0	333.4	386.3	318.3	132.4	122.0	83.8	55.5	40.5	10.0	0.0	1,540.5
1962	0.0	1.5	164.6	463.6	223.7	125.5	117.9	179.3	37.4	43.5	20.0	0.0	1,377.0
1961	1.7	31.4	219.3	219.7	180.0	119.1	208.6	194.3	87.7	60.0	88.1	39.3	1,449.2
1960	10.1	94.4	443.2	499.4	243.9	127.4	79.4	112.0	1.8	34.4	0.0	0.0	1,646.0
1959	0.0	20.9	224.6	210.7	102.5	237.9	138.5	218.7	60.6	20.8	38.6	0.0	1,273.8
1958	0.0	12.3	228.7	278.7	317.0	166.6	175.3	36.9	2.7	3.2	39.6	35.5	1,296.5
1957	0.0	68.8	490.1	448.4	302.6	165.0	244.3	36.1	150.7	47.5	2.2	1.0	1,956.7
1956	0.0	115.0	189.1	365.0	193.8	130.3	169.4	123.0	83.7	0.0	0.4	2.2	1,371.9
1955	3.8	43.1	164.8	485.3	189.9	244.7	102.6	207.1	46.2	5.7	15.5	0.1	1,508.8
1954	2.5	0.1	107.2	295.6	206.7	308.6	199.8	169.2	97.6	91.7	15.1	0.9	1,495.0
1953	2.3	114.7	113.6	316.3	158.3	365.6	144.5	213.8	30.6	36.1	52.7	35.5	1,584.0
1952	0.0	20.5	398.1	292.8	232.6	180.2	128.5	126.1	64.1	51.4	11.8	9.9	1,516.0
1951	0.1	66.8	338.2	239.5	186.3	229.4	206.8	205.2	162.6	7.6	1.0	3.5	1,647.0

จุฬาลงกรณ์มหาวิทยาลัย

ตาราง ก - 2 ปริมาณน้ำฝนรายเดือนสถานีวัดฝนสนามบินดอนเมือง (41063)

Station - 41063 Don Muang Airport													
Monthly Rainfall in Millimeter													
Year	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Annual
1990	0.0	47.6	474.3	247.8	101.1	86.3	87.2	186.9	37.6	24.7	0.0	1.1	1,294.6
1989	0.0	22.3	151.3	358.3	199.2	180.1	198.9	181.4	7.1	96.6	0.0	46.9	1,442.1
1988	0.0	0.0	341.7	378.4	185.4	144.4	253.9	163.3	108.1	0.0	12.7	0.0	1,587.9
1987	0.0	107.8	160.0	263.9	30.4	97.2	85.9	93.1	8.5	10.2	1.4	0.0	858.4
1986	34.2	26.1	128.0	249.2	132.0	157.9	88.6	225.2	134.7	0.0	0.0	0.0	1,175.9
1985	0.0	11.4	209.5	284.5	75.6	108.1	90.7	87.2	78.1	0.0	0.0	35.6	980.7
1984	0.0	2.0	111.8	208.9	150.4	103.4	100.6	24.9	149.0	119.4	46.9	2.1	1,019.4
1983	15.0	94.2	267.0	237.2	414.3	160.5	135.3	198.6	0.0	0.0	0.0	0.0	1,522.1
1982	1.4	30.7	172.1	156.4	93.9	95.6	198.9	153.7	157.6	27.5	0.0	0.0	1,087.8
1981	0.0	131.4	97.0	294.6	94.9	140.8	114.9	243.3	62.3	18.8	11.6	0.0	1,209.6
1980	0.0	56.6	224.3	394.3	196.6	89.2	238.4	96.9	22.5	12.7	0.0	0.0	1,331.5
1979	0.0	22.3	25.3	150.8	97.4	47.0	78.4	128.4	34.5	0.0	0.8	0.0	584.9
1978	0.0	3.1	117.6	289.9	96.1	294.7	79.7	237.7	18.0	0.0	103.3	6.1	1,246.2
1977	12.0	10.6	89.8	150.5	161.0	192.2	85.7	48.9	82.8	0.0	21.6	30.7	885.8
1976	14.7	25.1	110.9	186.5	262.7	288.5	60.3	163.2	33.9	3.0	28.8	0.0	1,177.6
1975	9.9	13.2	102.0	214.9	134.5	107.4	121.3	125.4	3.7	26.3	0.0	86.4	945.0
1974	0.0	42.0	267.5	115.1	120.1	186.4	95.1	117.5	120.3	61.3	2.1	0.3	1,127.7
1973	4.5	32.7	146.2	251.1	98.3	107.4	157.3	68.9	0.0	34.6	0.0	0.0	901.0
1972	106.4	71.5	173.8	551.6	60.6	102.7	158.4	62.2	96.9	84.9	9.8	0.0	1,478.8
1971	0.3	4.4	192.7	169.0	345.1	151.3	109.7	192.7	35.0	6.1	17.6	0.0	1,223.9
1970	134.1	41.2	148.4	308.9	238.2	176.6	316.2	301.1	109.4	80.1	27.7	20.3	1,902.2
1969	22.4	48.1	136.9	259.1	274.0	89.2	135.3	111.8	60.9	20.5	1.3	34.0	1,193.5
1968	0.7	50.5	84.8	253.9	342.1	121.2	130.1	147.3	45.4	26.3	43.8	4.8	1,250.9
1967	0.0	42.5	193.3	343.2	173.1	228.7	95.0	256.6	120.5	1.1	0.1	0.0	1,454.1
1966	50.7	8.8	208.3	117.8	192.1	135.4	123.8	355.3	21.2	13.8	33.4	0.1	1,260.7
1965	7.5	15.0	110.7	469.2	219.5	37.5	73.9	231.3	24.1	44.0	69.3	0.0	1,302.0
1964	15.9	6.7	164.3	223.0	239.6	257.9	102.2	302.6	54.5	22.0	15.3	0.8	1,404.8
1963	26.2	85.2	244.0	467.3	175.0	164.7	162.3	132.5	30.8	10.4	14.6	0.0	1,513.0
1962	1.0	12.2	304.2	335.7	375.3	161.7	185.8	100.8	46.3	13.1	8.9	0.0	1,545.0
1961	17.1	25.9	320.0	76.1	243.2	100.7	228.4	135.8	149.6	26.2	93.5	2.1	1,418.6
1960	4.5	42.9	353.8	429.4	266.6	175.3	50.0	85.2	20.7	8.4	0.0	0.0	1,436.8
1959	0.8	47.4	243.9	335.6	211.6	246.2	155.4	204.8	31.0	31.0	36.4	0.0	1,544.1
1958	0.0	5.0	177.3	317.7	239.6	101.4	227.4	75.0	14.6	7.9	35.0	0.3	1,201.2
1957	0.1	50.0	727.6	489.5	295.8	139.9	174.9	18.5	100.1	53.2	3.0	1.1	2,053.7
1956	0.8	49.3	204.0	462.0	365.8	164.7	223.2	251.6	180.8	46.9	0.0	5.6	1,954.7
1955	1.1	54.6	243.5	195.2	112.4	200.3	223.5	219.7	80.0	14.0	8.0	2.2	1,354.5
1954	8.2	0.0	71.8	206.6	236.8	262.8	174.7	140.8	86.4	72.3	25.0	5.3	1,290.7
1953	0.0	77.6	159.3	361.9	115.9	263.8	257.1	177.0	35.8	88.4	29.6	20.3	1,586.7
1952	2.7	8.4	413.1	273.1	296.4	197.3	232.9	169.1	70.1	155.1	8.9	0.0	1,827.1
1951	11.2	84.6	581.4	337.5	211.0	232.8	168.6	154.0	43.5	2.2	0.0	0.2	1,827.0

จุฬาลงกรณ์มหาวิทยาลัย

ตาราง ก - 3 ปริมาณน้ำฝนรายเดือนสถานีวัดฝนเขตนินบุรี (41052)

Station - 41052 A. Min Buri Bangkok													
Monthly Rainfall in Millimeter													
Year	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Annual
1990													0.0
1989	0.0	12.5	239.0	296.3	247.6	170.1	125.8	183.1	35.5	13.4	0.0	0.9	1,324.2
1988	0.0	0.3	208.8	343.4	384.5	268.0	253.9	225.8	154.1	16.8	11.9	24.5	1,892.0
1987	0.0	211.2	210.1	331.8	80.2	150.1	96.8	148.5	38.7	4.5	6.5	0.0	1,278.4
1986	12.1	9.6	179.6	235.9	243.0	269.4	95.2	304.7	56.2	1.2	0.0	0.0	1,406.9
1985	0.0	23.0	203.6	367.2	220.5	197.6	119.1	277.1	99.9	0.0	5.0	0.0	1,513.0
1984	0.0	14.2	131.3	301.7	130.9	202.7	95.2	89.9	58.5	0.0	7.3	87.3	1,119.0
1983	26.1	81.0	204.2	379.6	590.9	171.6	137.7	165.4	0.2	19.7	0.0	12.7	1,789.1
1982	0.0	29.6	162.8	312.2	206.4	178.2	194.6	188.3	136.7	28.8	0.0	0.0	1,437.6
1981	0.0	100.6	136.5	311.6	141.6	159.9	165.1	301.8	69.7	34.6	0.0	0.0	1,421.4
1980	0.0	13.8	335.4	315.2	143.0	202.7	165.8	133.9	85.7	31.7	20.8	0.0	1,448.0
1979	0.0	39.8	0.0	227.2	74.7	127.9	164.3	168.8	73.8	20.9	0.0	0.0	897.4
1978	0.0	25.4	121.4	376.2	110.9	170.0	76.6	239.7	96.2	0.0	0.9	38.6	1,255.9
1977	0.0	44.5	33.2	206.3	126.6	228.6	20.4	189.4	13.9	0.0	129.4	15.9	1,008.2
1976	0.0	30.3	184.3	342.6	190.5	216.7	117.0	314.4	87.0	0.0	2.6	38.9	1,524.3
1975	0.0	4.1	267.7	192.5	245.6	217.2	227.6	176.8	49.7	2.6	36.0	0.0	1,419.8
1974	1.0	50.0	328.7	167.0	178.8	131.0	75.0	94.6	126.3	22.8	20.5	127.6	1,323.3
1973	4.9	38.8	96.8	310.5	186.3	134.4	149.8	232.3	7.6	8.6	0.0	0.0	1,170.0
1972	70.5	115.7	158.1	709.0	100.1	92.4	139.6	33.6	114.8	61.1	0.0	3.4	1,598.3
1971	0.0	0.0	130.9	209.2	260.2	136.8	130.7	260.3	118.5	65.3	27.3	0.0	1,339.2
1970	115.2	64.0	98.6	246.9	205.6	194.9	274.9	133.0	155.2	5.3	7.6	0.0	1,501.2
1969	7.4	31.0	103.7	152.5	70.4	221.2	218.4	76.6	10.0	29.0	0.0	0.0	920.2
1968	0.0	53.2	197.2	183.3	271.6	90.5	313.8	256.8	148.5	2.6	1.6	16.5	1,535.6
1967	0.0	20.3	126.5	229.5	116.9	152.1	36.9	113.2	157.4	1.6	31.1	0.0	985.5
1966	63.4	6.0	232.9	76.9	79.4	103.8	38.4	265.4	3.7	0.2	5.4	2.6	878.1
1965	0.0	12.4	122.0	483.6	154.3	115.6	110.1	120.1	26.8	4.6	21.7	19.2	1,190.4
1964	0.0	42.8	231.8	335.9	194.4	154.4	77.7	484.2	82.2	8.7	176.2	0.0	1,788.3
1963	5.2	43.2	374.1	452.1	125.0	173.1	186.5	126.6	19.3	0.0	0.0	0.0	1,505.1
1962	0.0	0.0	167.1	475.6	230.2	120.2	85.3	189.8	46.6	0.0	0.0	0.0	1,314.8
1961	0.0	2.2	176.0	134.3	132.8	114.2	226.3	175.5	74.0	0.0	0.0	0.0	1,035.3
1960	0.0	111.5	255.5	329.4	254.6	127.8	121.4	148.5	47.2	64.7	66.1	0.0	1,526.7
1959	0.0	19.3	223.6	283.2	130.2	259.5	171.1	204.3	0.0	19.2	0.0	0.0	1,310.4
1958	0.0	18.6	260.5	150.1	300.8	164.8	181.1	133.1	80.7	0.0	0.0	0.0	1,289.7
1957	0.0	81.0	438.4	418.0	294.6	154.6	317.5	62.8	227.8	17.9	29.4	0.0	2,042.0
1956	0.0	56.4	165.7	403.1	253.4	92.0	378.8	242.9	248.7	15.6	0.0	0.0	1,856.6
1955	0.0	0.0	162.7	290.1	124.4	213.1	289.9	298.9	117.6	0.0	0.0	30.1	1,526.8
1954	30.4	0.0	164.2	204.7	264.6	173.5	0.0	151.0	85.2	23.8	11.6	0.0	1,109.0
1953	0.0	0.0	140.0	278.2	139.2	337.5	347.8	0.0	0.0	38.7	8.1	0.0	1,289.5
1952	0.0	8.5	566.0	360.8	471.9	340.9	198.1	0.0	0.0	0.0	35.7	26.0	2,007.9
1951	0.0	84.7	497.3	446.3	284.9	0.0	0.0	200.0	0.0	0.0	0.0	0.0	1,513.2

จุฬาลงกรณ์มหาวิทยาลัย

ตาราง ก - 4 ปริมาณน้ำฝนรายเดือนสถานีวัดฝนเขตหนองแวม (41202)

Station - 41202 A. Nong Khaem													
Monthly Rainfall in Millimeter													
Year	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Annual
1990	0.0	87.7	302.7	397.8	42.2	158.0	81.1	153.1	10.6	52.6	0.0	0.0	1,285.8
1989	0.0	14.1	255.7	363.1	162.6	139.4	73.6	80.5	10.0	33.1	0.8	32.5	1,165.4
1988	0.0	0.0	283.4	228.1	285.8	154.5	74.8	230.4	36.6	15.6	28.7	0.0	1,337.9
1987	0.0	328.4	311.9	279.2	112.9	9.8	151.4	115.5	35.5	5.0	0.0	0.0	1,349.6
1986	9.2	0.0	0.0	283.0	118.4	106.3	105.5	162.6	46.0	5.0	0.0	0.0	836.0
1985	0.0	7.2	179.0	301.3	65.6	101.7	34.5	152.3	63.8	24.6	0.0	26.5	956.5
1984	0.0	12.2	163.1	214.7	67.2	114.7	57.8	69.6	18.3	24.6	0.0	26.5	768.7
1983	13.0	181.2	186.0	248.2	487.2	174.0	147.3	40.0	0.0	40.0	0.0	3.5	1,520.4
1982	0.0	37.2	132.1	175.3	103.1	146.0	106.1	104.0	74.8	19.8	0.0	0.0	898.4
1981	0.0	33.1	32.5	189.1	145.6	126.0	75.9	306.4	48.9	19.8	4.5	0.0	981.8
1980	8.5	40.1	276.3	294.0	97.6	85.5	257.0	34.4	62.0	5.3	3.4	0.0	1,164.1
1979	3.5	15.1	25.8	308.7	41.6	232.6	55.5	172.0	30.9	43.7	26.7	0.0	956.1
1978	0.0	38.5	409.3	522.0	216.0	161.0	297.0	292.0	3.0	0.0	7.4	3.2	1,949.4
1977	37.0	105.0	250.5	407.0	120.0	132.0	79.0	111.3	14.2	0.0	85.5	13.5	1,355.0
1976	5.0	133.0	258.0	152.8	201.0	220.0	118.0	191.8	85.8	11.5	17.0	0.0	1,393.9
1975	47.8	45.9	250.4	205.6	222.9	122.5	157.0	243.7	10.7	80.7	35.4	114.3	1,536.9
1974	0.0	72.6	375.8	207.8	149.9	130.5	71.6	48.1	148.3	0.0	0.0	3.5	1,208.1
1973	5.3	83.4	99.8	229.6	231.4	86.9	157.4	59.0	7.2	18.6	0.0	3.2	981.8
1972	53.8	174.9	132.8	441.4	122.7	94.9	153.2	10.3	238.4	58.5	0.0	0.0	1,480.9
1971	5.6	0.0	188.8	269.8	243.6	135.7	55.6	151.4	163.1	56.3	0.0	0.0	1,269.9
1970	54.3	94.9	102.7	282.0	109.0	186.7	184.3	218.7	149.6	12.2	25.8	23.2	1,443.4
1969	0.0	95.0	88.0	301.2	234.1	42.4	256.0	56.0	48.9	10.5	0.0	32.1	1,164.2
1968	0.0	122.7	101.6	237.5	108.3	86.8	186.8	83.9	92.7	0.0	51.5	31.0	1,102.8
1967	0.0	56.7	170.1	86.9	117.9	100.1	28.3	231.7	80.7	0.0	0.0	0.0	872.4
1966	13.4	17.3	155.1	173.6	199.7	372.4	156.1	290.4	19.2	0.0	16.9	33.2	1,447.3
1965	24.0	27.9	257.7	347.5	104.1	123.6	71.1	156.8	85.8	8.7	157.0	0.0	1,364.2
1964	36.2	13.4	223.6	204.3	119.0	42.3	115.7	371.5	0.0	0.0	34.5	6.3	1,166.8
1963	0.0	68.9	435.5	430.6	113.7	84.0	73.3	223.4	0.0	0.0	0.0	0.0	1,429.4
1962	0.0	0.0	0.0	252.8	185.6	131.6	101.6	57.8	35.5	17.7	33.5	0.0	816.1
1961	3.0	23.4	155.2	87.1	90.8	169.8	185.1	102.3	78.3	34.2	78.8	8.9	1,016.9
1960	0.0	88.3	288.0	307.8	184.6	0.0	153.5	74.6	0.0	0.0	0.0	0.0	1,096.8
1959	0.0	7.2	288.4	255.1	142.8	184.1	87.7	251.9	0.0	49.6	0.0	0.0	1,266.8
1958	0.0	0.0	177.9	247.6	382.5	116.6	218.2	59.9	21.6	0.0	11.6	76.1	1,312.0
1957	0.0	162.3	555.9	254.0	154.8	190.6	209.1	20.1	89.4	25.0	12.8	0.0	1,674.0
1956	0.0	107.7	734.6	327.5	218.7	116.9	209.1	306.8	93.4	0.0	0.0	0.0	2,114.7
1955	0.0	62.3	222.8	391.0	198.6	208.2	129.0	136.5	107.2	0.0	0.0	0.0	1,455.6
1954	0.0	0.0	96.3	225.6	181.5	231.5	202.7	280.9	215.8	14.5	23.2	0.0	1,472.0
1953	0.0	221.8	238.6	241.1	95.5	348.0	151.8	115.1	49.6	87.2	23.3	0.0	1,572.0
1952	0.0	14.3	291.9	305.9	124.7	187.2	131.2	107.2	63.2	24.8	57.7	48.8	1,356.9
1951	0.0	107.7	219.3	174.7	82.7	0.0	0.0	0.0	0.0	35.4	0.0	8.2	628.0

ภาคผนวก ข

กราฟผลการทดสอบส่วนแนวโน้ม



ศูนย์วิจัยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

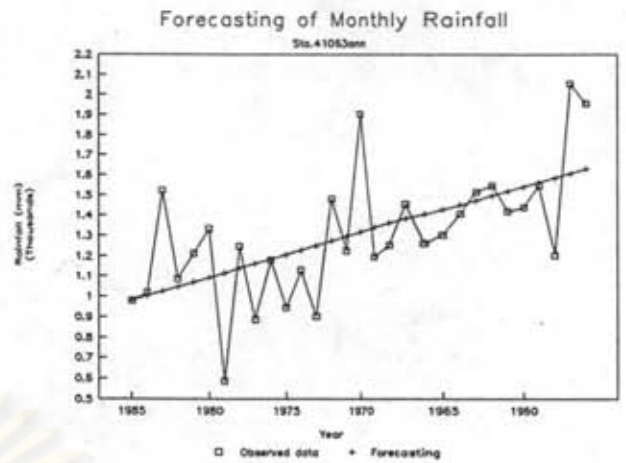
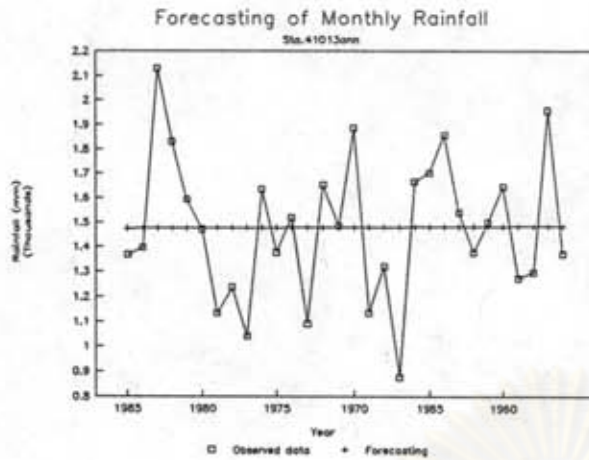


Table of Forecasting

year	period	rainfall	forecast
1985	1	1368.7	1474.193
1984	2	1398.0	1474.508
1983	3	2129.5	1474.823
1982	4	1829.6	1475.137
1981	5	1592.7	1475.452
1980	6	1471.0	1475.767
1979	7	1133.4	1476.081
1978	8	1236.4	1476.396
1977	9	1040.1	1476.711
1976	10	1634.7	1477.025
1975	11	1377.8	1477.340
1974	12	1519.1	1477.655
1973	13	1089.9	1477.969
1972	14	1652.3	1478.284
1971	15	1483.9	1478.599
1970	16	1885.0	1478.914
1969	17	1135.0	1479.228
1968	18	1320.0	1479.543
1967	19	875.5	1479.858
1966	20	1667.3	1480.172
1965	21	1702.6	1480.487
1964	22	1858.6	1480.802
1963	23	1540.5	1481.116
1962	24	1377.0	1481.431
1961	25	1499.2	1481.746
1960	26	1646.0	1482.060
1959	27	1273.8	1482.375
1958	28	1296.5	1482.690
1957	29	1956.7	1483.004
1956	30	1371.9	1483.319

Table of Forecasting

year	period	rainfall	forecast
1985	1	980.7	981.9926
1984	2	1019.4	1004.285
1983	3	1522.1	1026.578
1982	4	1087.8	1048.872
1981	5	1209.6	1071.165
1980	6	1331.5	1093.458
1979	7	584.9	1115.751
1978	8	1246.2	1138.044
1977	9	885.8	1160.337
1976	10	1177.6	1182.631
1975	11	945.0	1204.924
1974	12	1127.7	1227.217
1973	13	901.0	1249.510
1972	14	1478.8	1271.803
1971	15	1223.9	1294.096
1970	16	1902.2	1316.389
1969	17	1193.5	1338.683
1968	18	1250.9	1360.976
1967	19	1454.1	1383.269
1966	20	1260.7	1405.562
1965	21	1302.0	1427.855
1964	22	1404.8	1450.148
1963	23	1513.0	1472.441
1962	24	1545.0	1494.735
1961	25	1418.6	1517.028
1960	26	1436.8	1539.321
1959	27	1544.1	1561.614
1958	28	1201.2	1583.907
1957	29	2053.7	1606.200
1956	30	1954.7	1628.493

Regression Output:

Constant	1473.879
Std Err of Y Est	294.3406
R Squared	0.000091
No. of Observations	30
Degrees of Freedom	28
X Coefficient(s)	0.314682
Std Err of Coef.	6.208695

Regression Output:

Constant	959.6995
Std Err of Y Est	256.1239
R Squared	0.378153
No. of Observations	30
Degrees of Freedom	28
X Coefficient(s)	22.29314
Std Err of Coef.	5.402569

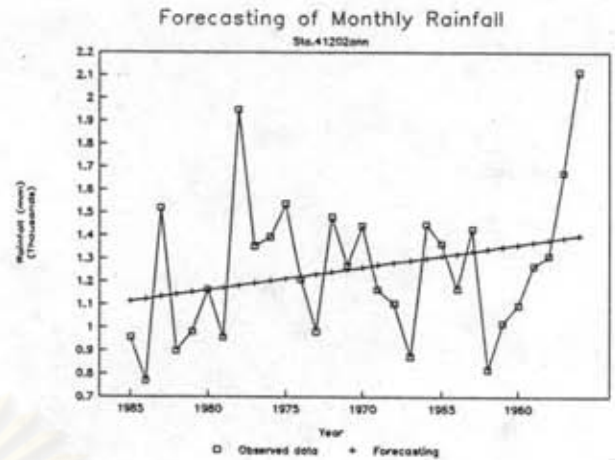
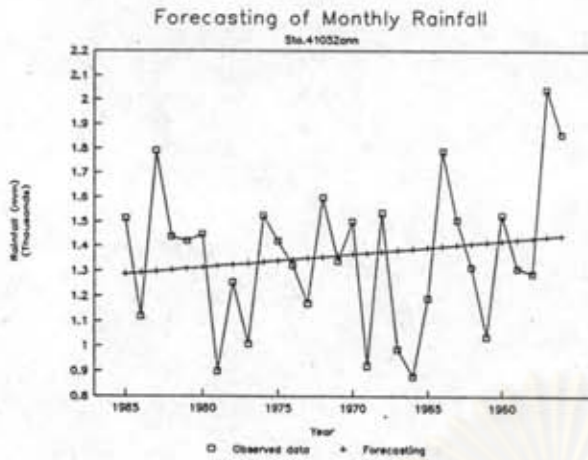


Table of Forecasting

year	period	rainfall	forecast
1985	1	1513.0	1287.836
1984	2	1119.0	1293.145
1983	3	1789.1	1298.454
1982	4	1437.6	1303.762
1981	5	1421.4	1309.071
1980	6	1448.0	1314.380
1979	7	897.4	1319.689
1978	8	1255.9	1324.997
1977	9	1008.2	1330.306
1976	10	1524.3	1335.615
1975	11	1419.8	1340.923
1974	12	1323.3	1346.232
1973	13	1170.0	1351.541
1972	14	1598.3	1356.850
1971	15	1339.2	1362.158
1970	16	1501.2	1367.467
1969	17	920.2	1372.776
1968	18	1535.6	1378.085
1967	19	985.5	1383.393
1966	20	878.1	1388.702
1965	21	1190.4	1394.011
1964	22	1788.3	1399.320
1963	23	1505.1	1404.628
1962	24	1314.8	1409.937
1961	25	1035.3	1415.246
1960	26	1526.7	1420.555
1959	27	1310.4	1425.863
1958	28	1289.7	1431.172
1957	29	2042.0	1436.481
1956	30	1856.6	1441.790

Table of Forecasting

year	period	rainfall	forecast
1985	1	956.5	1113.018
1984	2	768.7	1122.947
1983	3	1520.4	1132.876
1982	4	898.4	1142.805
1981	5	981.8	1152.734
1980	6	1164.1	1162.663
1979	7	956.1	1172.593
1978	8	1949.4	1182.522
1977	9	1355.0	1192.451
1976	10	1393.9	1202.380
1975	11	1536.9	1212.309
1974	12	1208.1	1222.238
1973	13	981.8	1232.167
1972	14	1480.9	1242.096
1971	15	1269.9	1252.025
1970	16	1443.4	1261.954
1969	17	1164.2	1271.883
1968	18	1102.8	1281.812
1967	19	872.4	1291.741
1966	20	1447.3	1301.670
1965	21	1364.2	1311.599
1964	22	1166.8	1321.528
1963	23	1429.4	1331.457
1962	24	816.1	1341.386
1961	25	1016.9	1351.316
1960	26	1096.8	1361.245
1959	27	1266.8	1371.174
1958	28	1312.0	1381.103
1957	29	1674.0	1391.032
1956	30	2114.7	1400.961

Regression Output:

Constant	1282.527
Std Err of Y Est	292.6044
R Squared	0.025741
No. of Observations	30
Degrees of Freedom	28

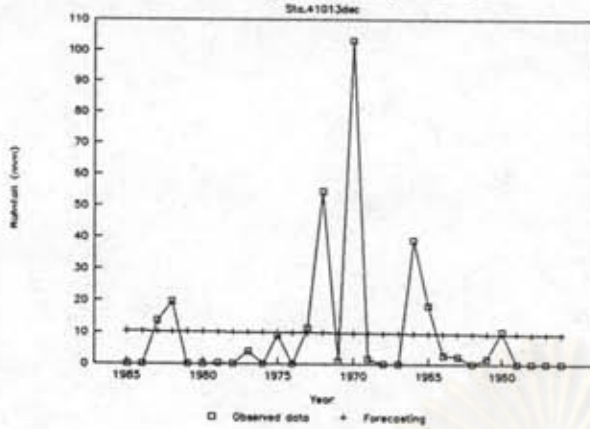
X Coefficient(s)	5.308743
Std Err of Coef.	6.172073

Regression Output:

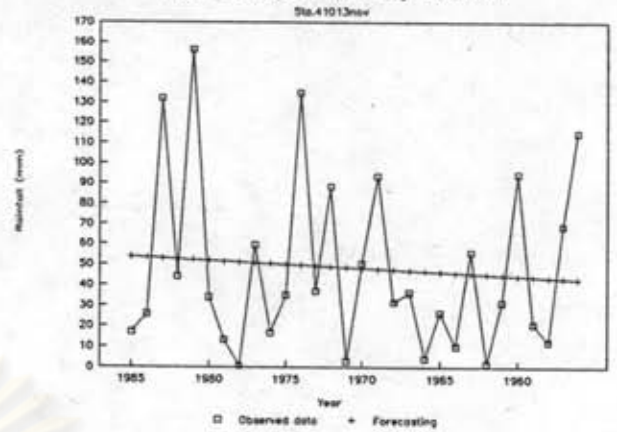
Constant	1103.089
Std Err of Y Est	309.6977
R Squared	0.076216
No. of Observations	30
Degrees of Freedom	28

X Coefficient(s)	9.929054
Std Err of Coef.	6.532631

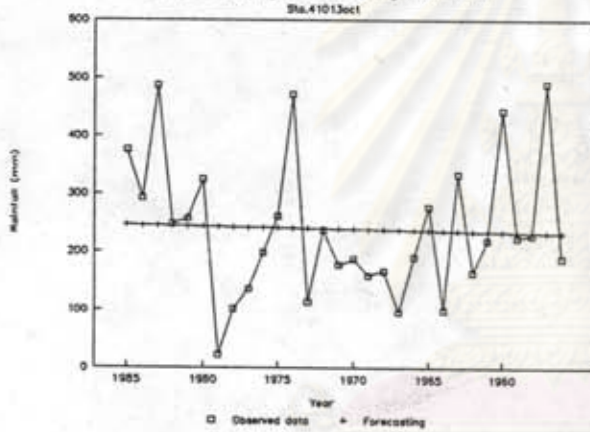
Forecasting of Monthly Rainfall



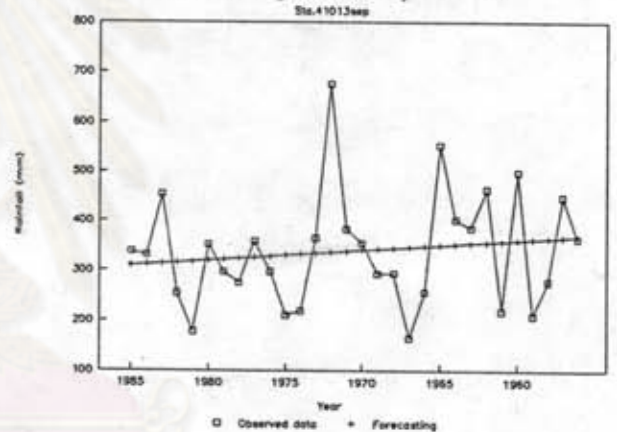
Forecasting of Monthly Rainfall



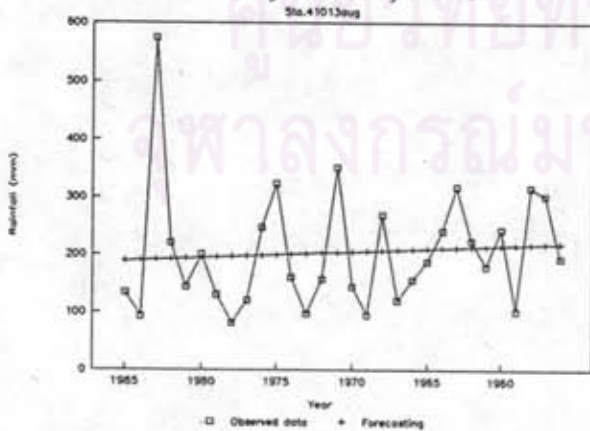
Forecasting of Monthly Rainfall



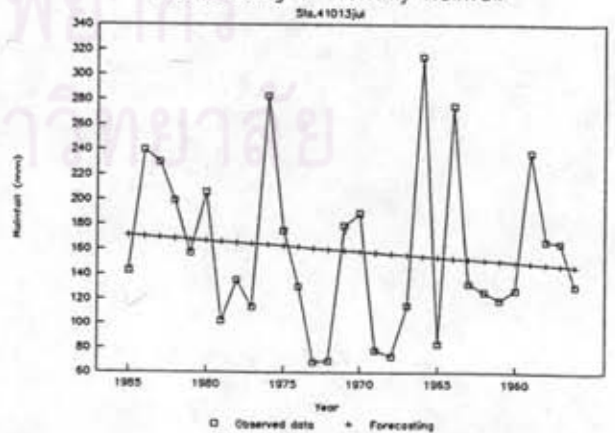
Forecasting of Monthly Rainfall



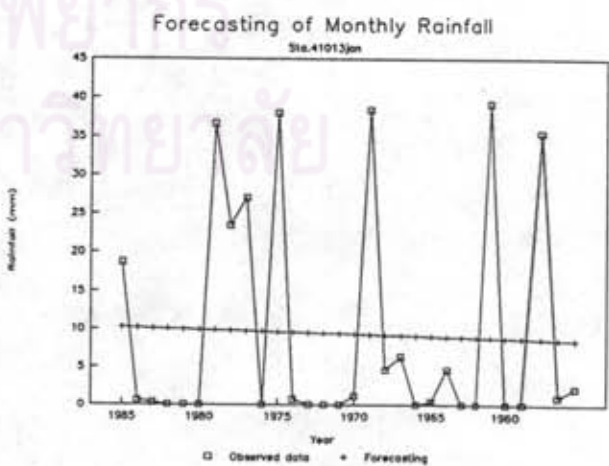
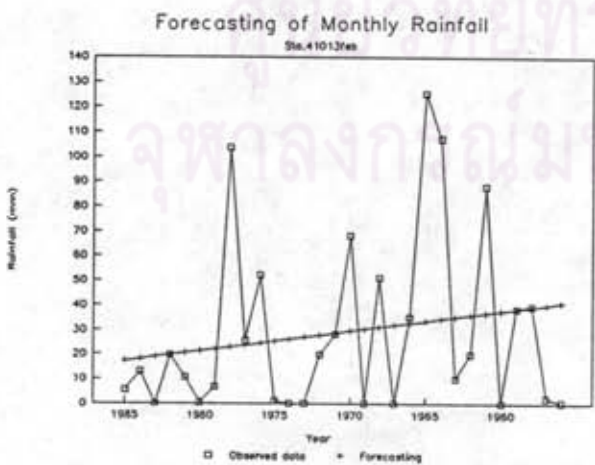
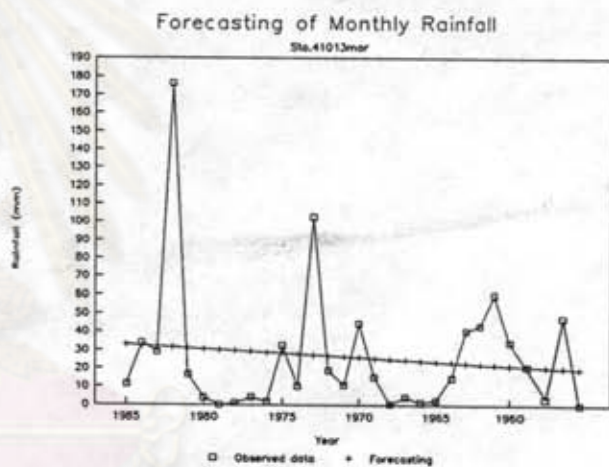
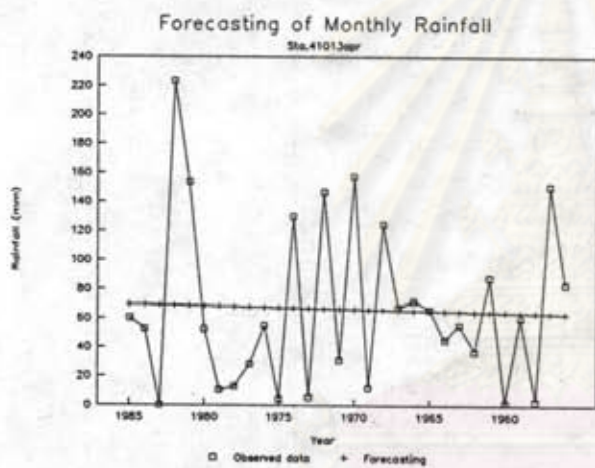
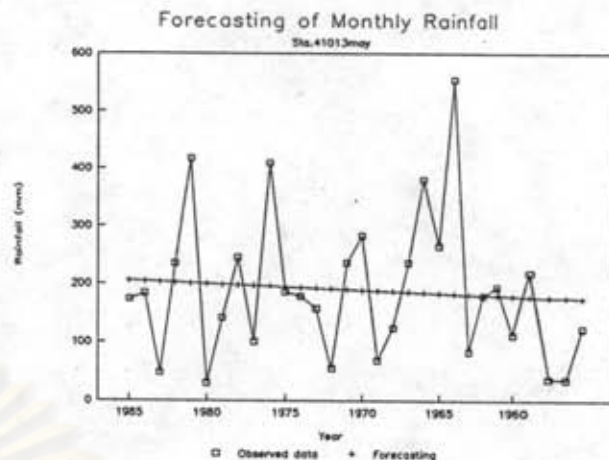
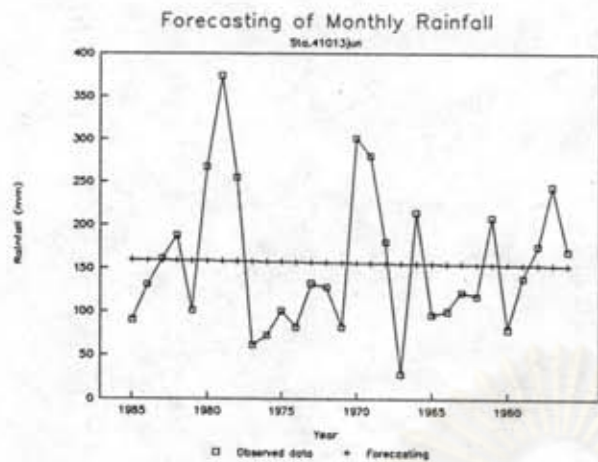
Forecasting of Monthly Rainfall



Forecasting of Monthly Rainfall

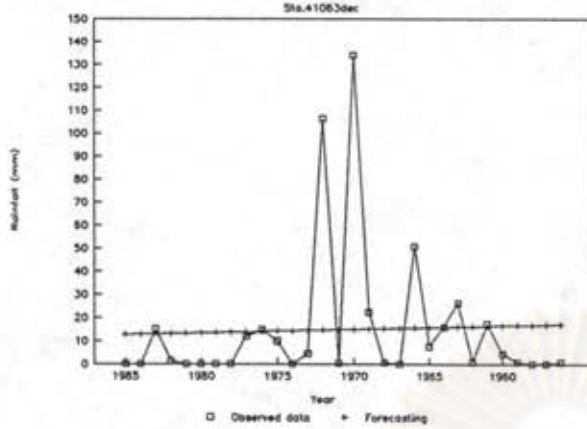


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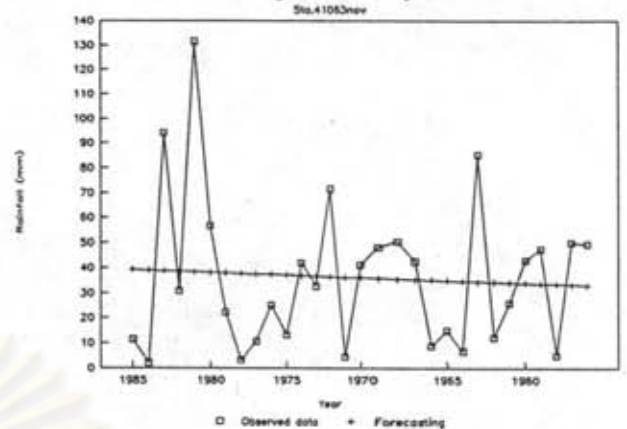


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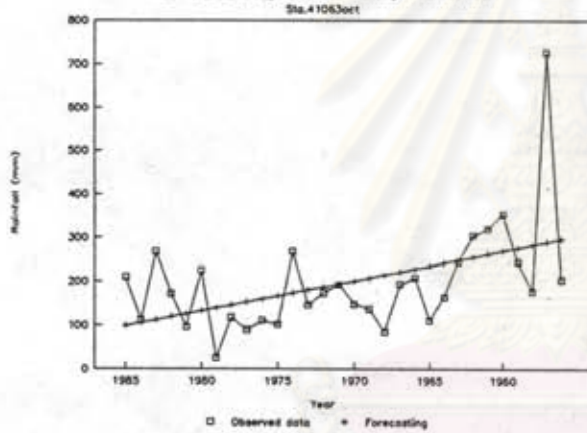
Forecasting of Monthly Rainfall



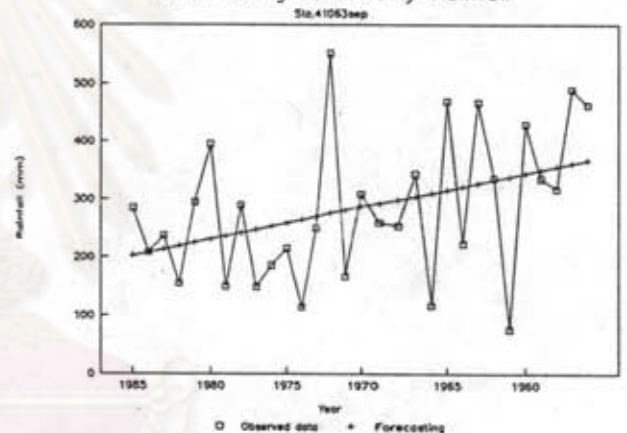
Forecasting of Monthly Rainfall



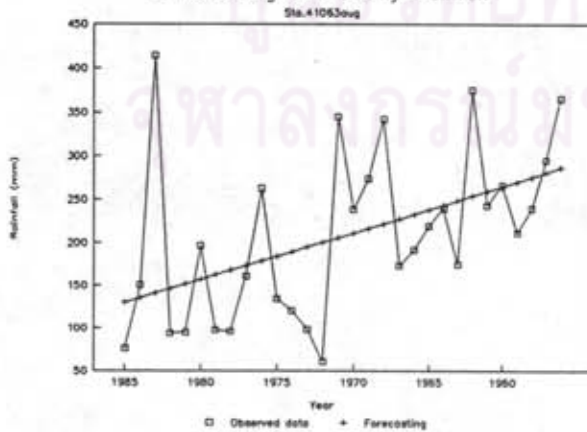
Forecasting of Monthly Rainfall



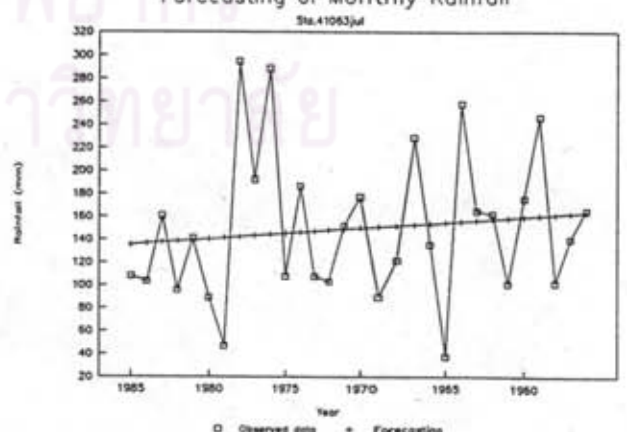
Forecasting of Monthly Rainfall



Forecasting of Monthly Rainfall

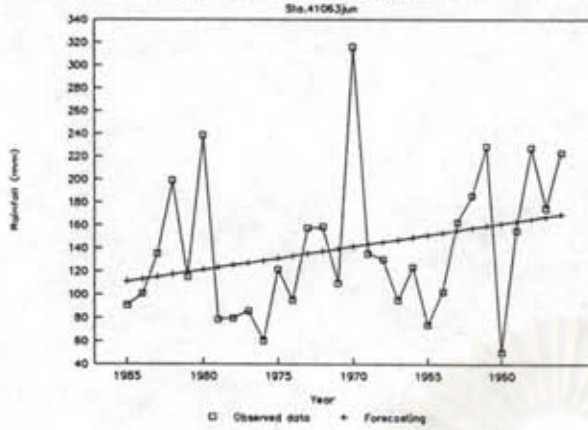


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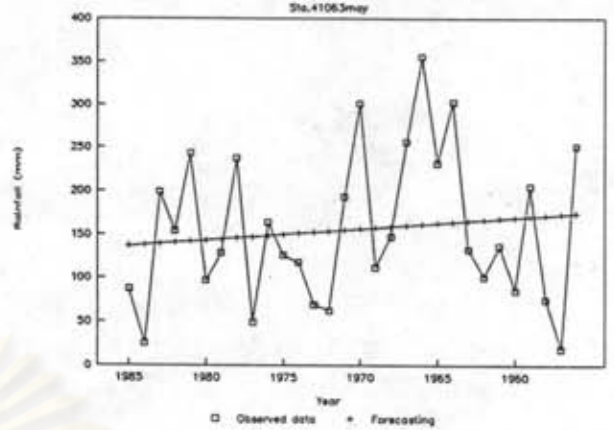


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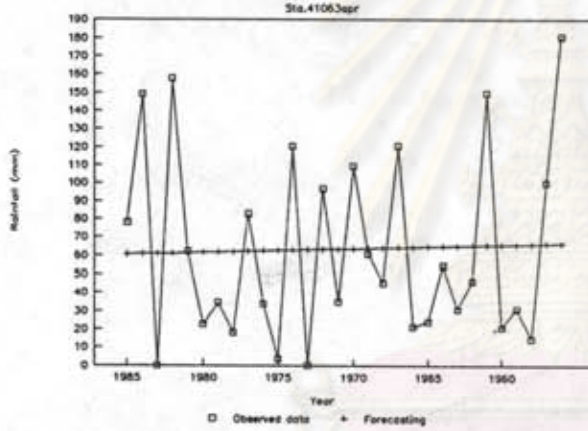
Forecasting of Monthly Rainfall



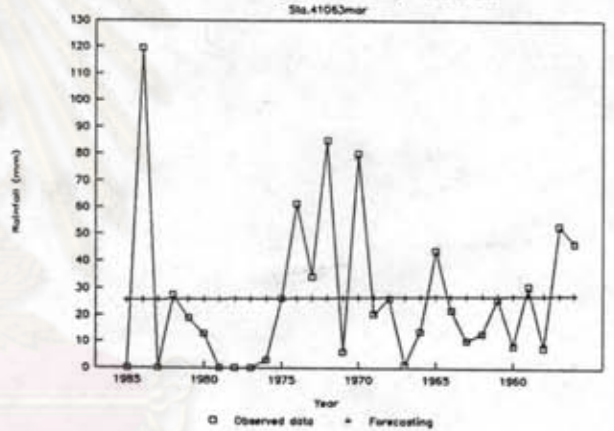
Forecasting of Monthly Rainfall



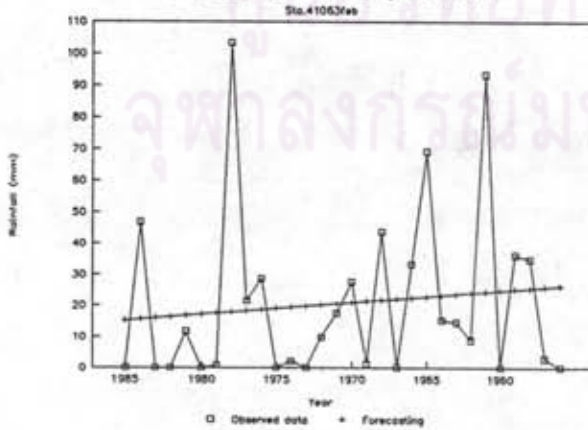
Forecasting of Monthly Rainfall



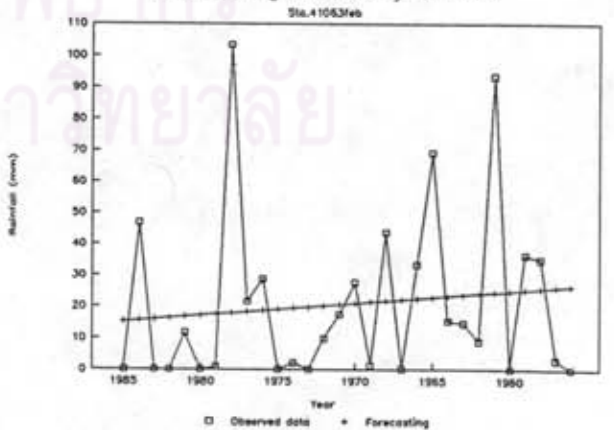
Forecasting of Monthly Rainfall



Forecasting of Monthly Rainfall

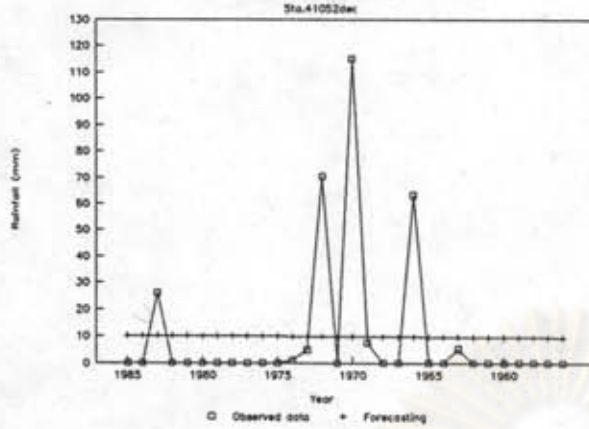


Forecasting of Monthly Rainfall

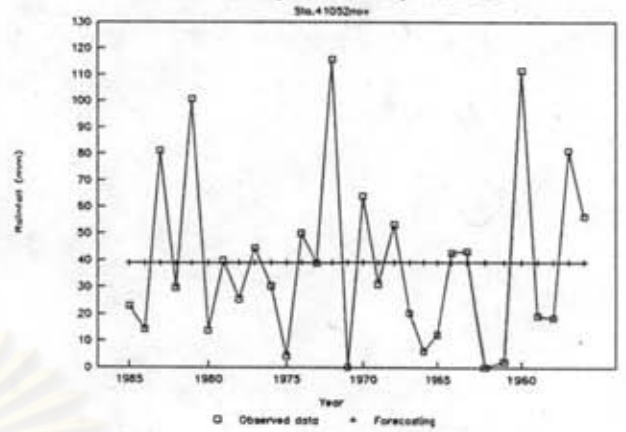


รูป ข - 3 (ต่อ) ผลการวิเคราะห์ส่วนแนวโน้มฝนรายเดือน

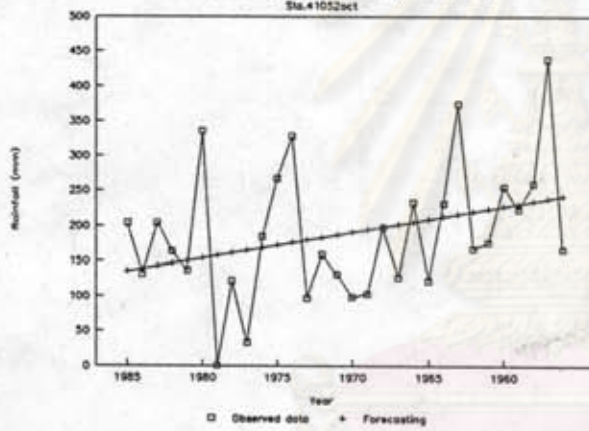
Forecasting of Monthly Rainfall



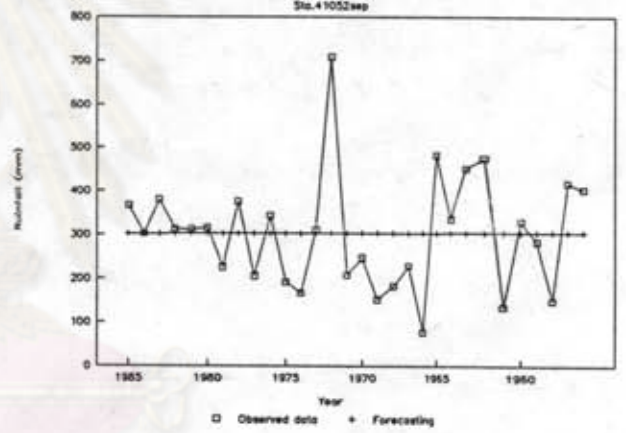
Forecasting of Monthly Rainfall



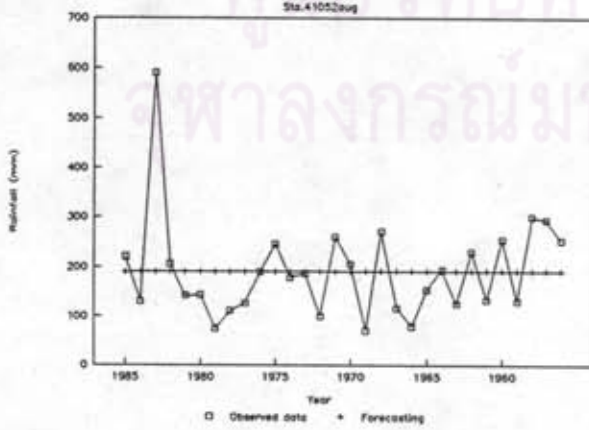
Forecasting of Monthly Rainfall



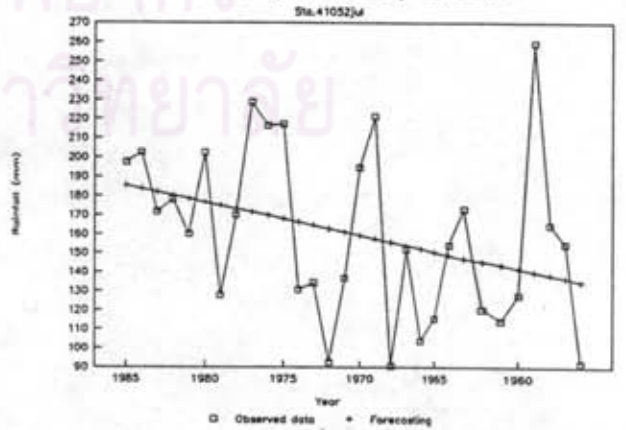
Forecasting of Monthly Rainfall



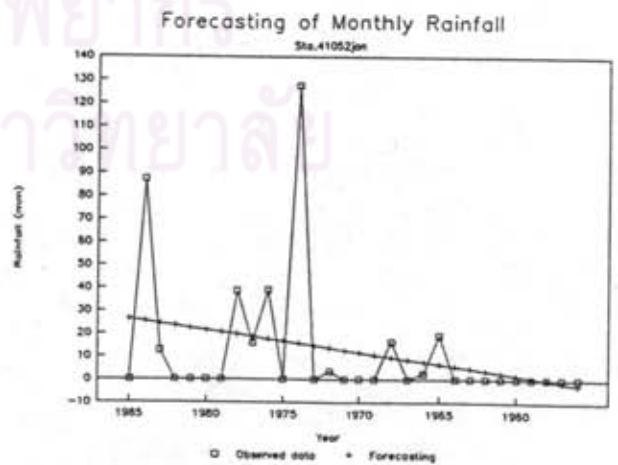
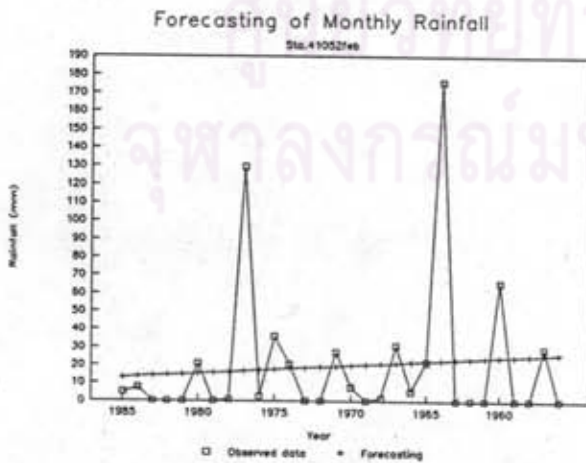
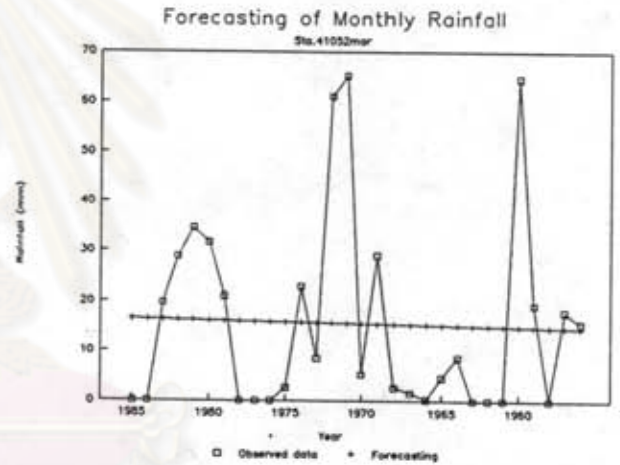
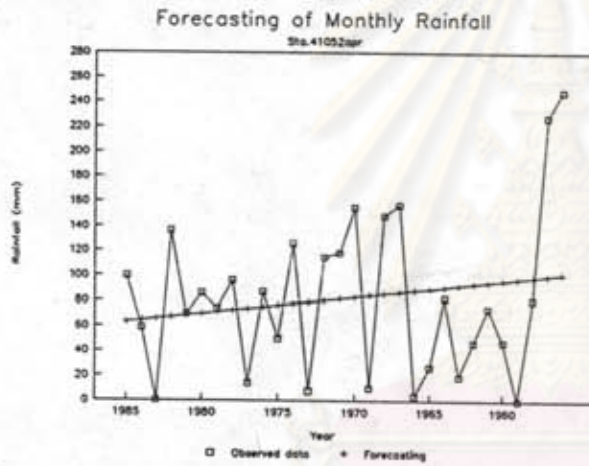
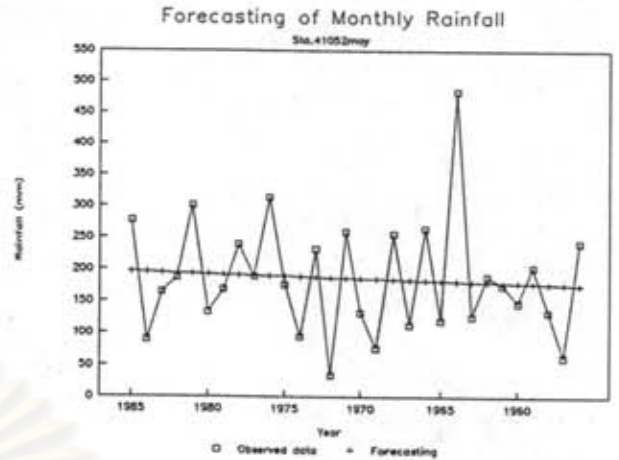
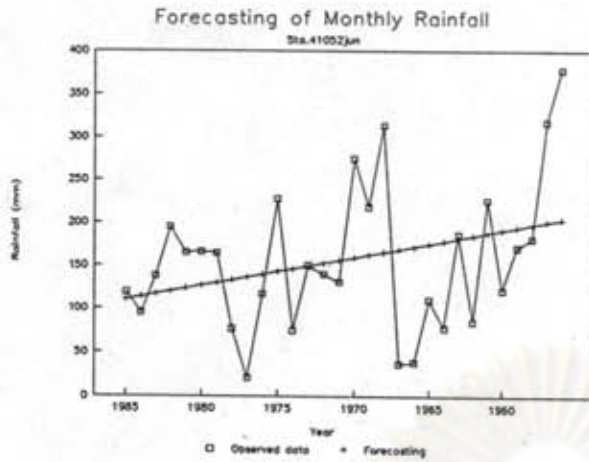
Forecasting of Monthly Rainfall



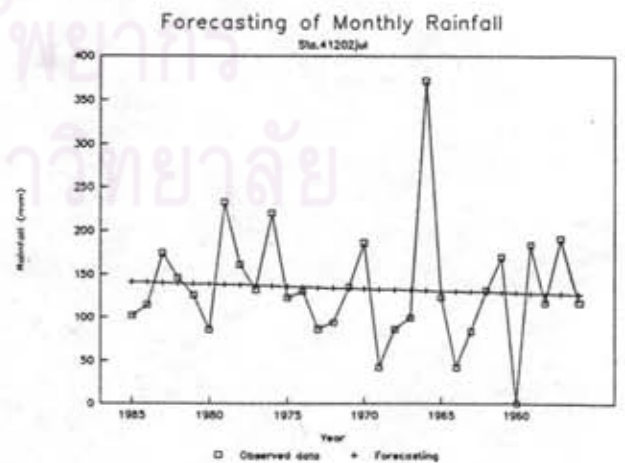
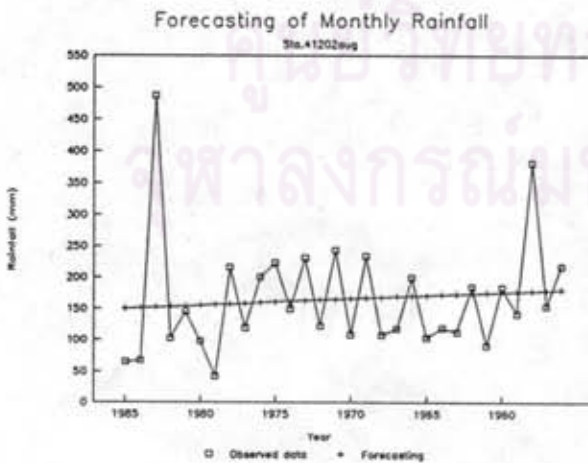
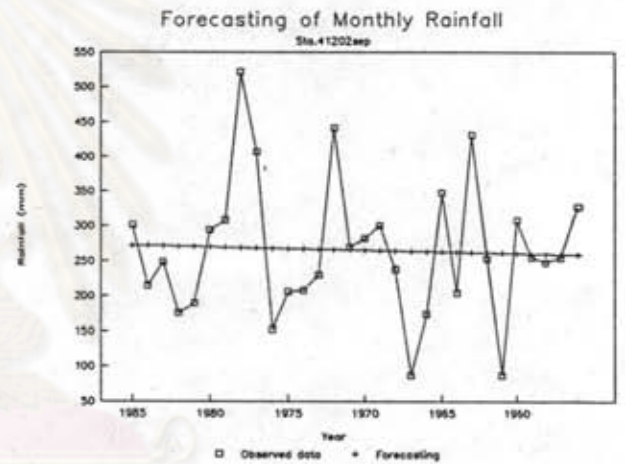
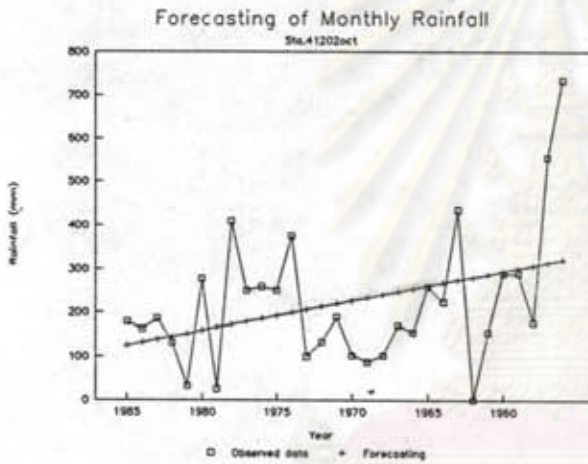
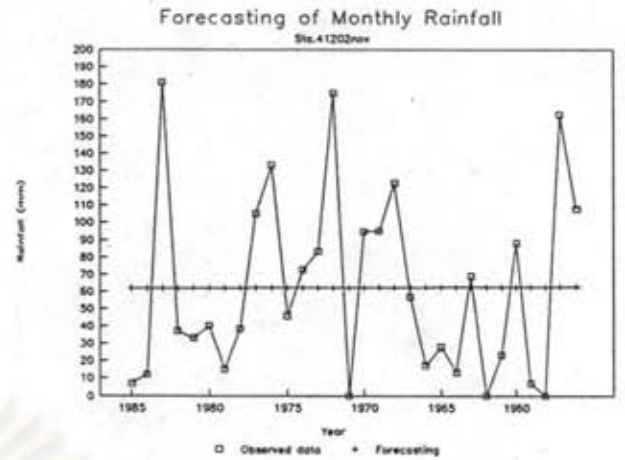
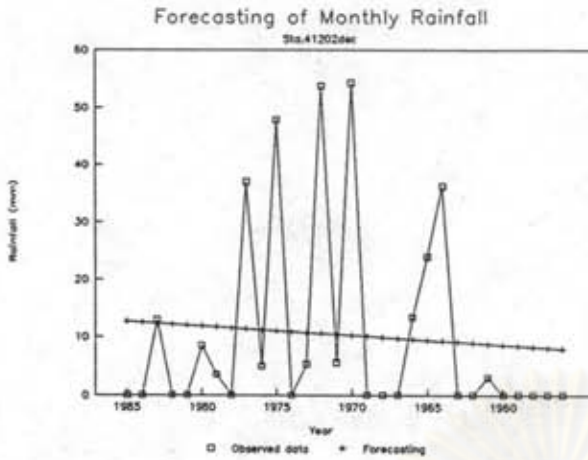
Forecasting of Monthly Rainfall



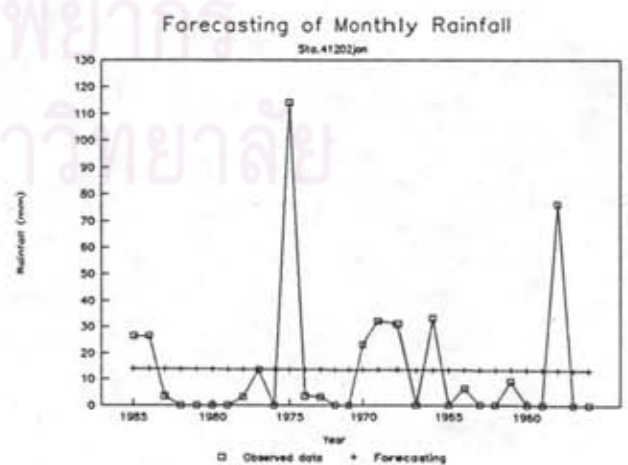
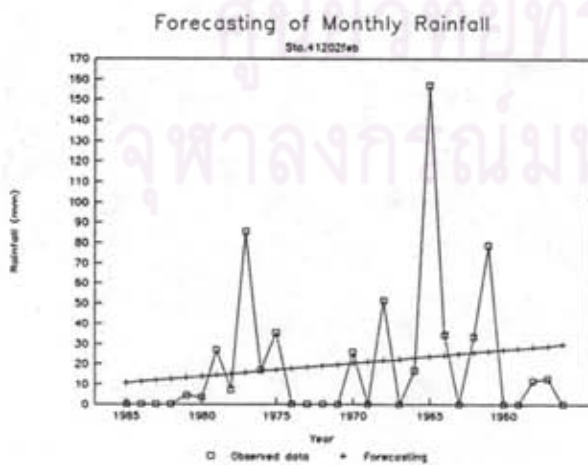
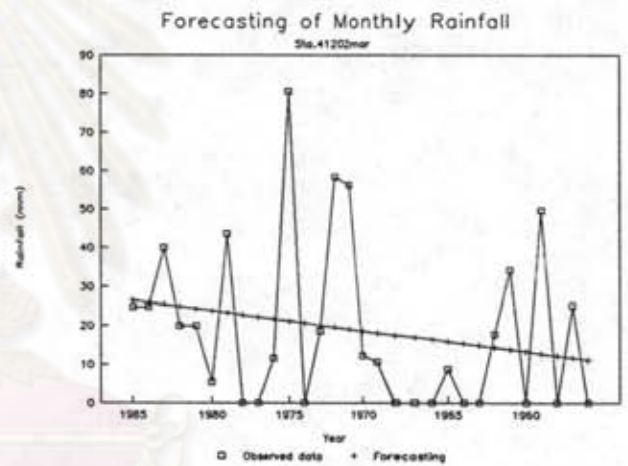
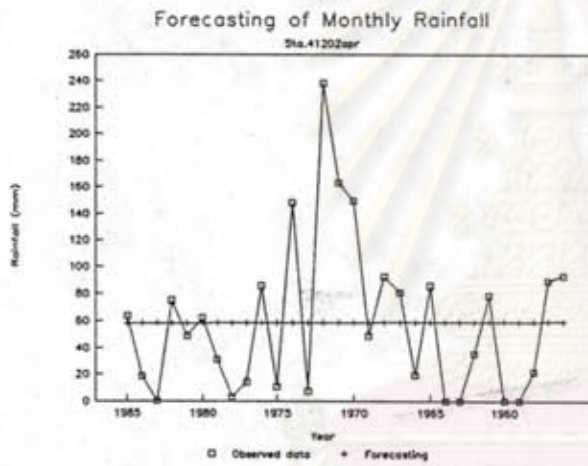
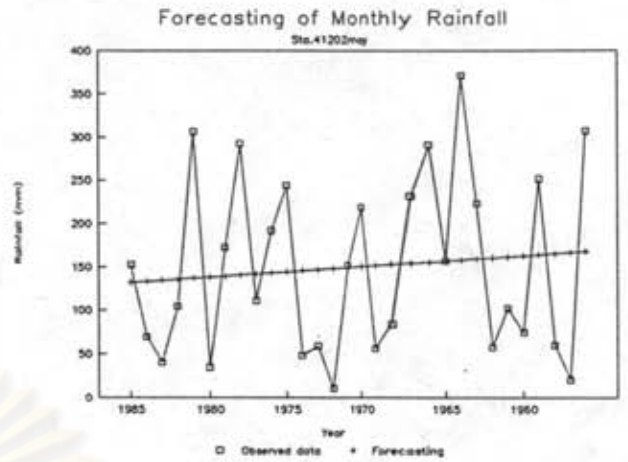
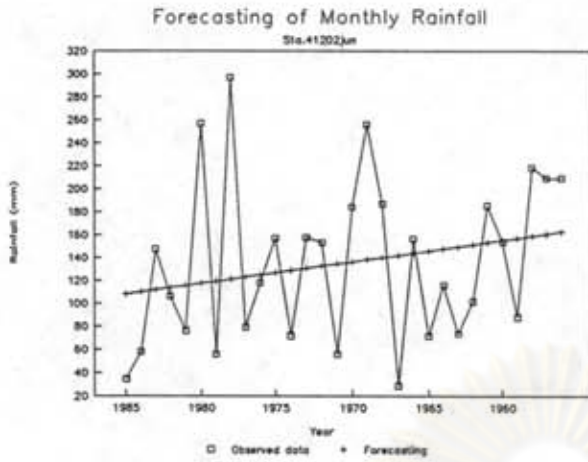
รูป ข - 3 (ต่อ) ผลการวิเคราะห์ส่วนแนวโน้มฝนรายเดือน



รูป ข - 3 (ต่อ) ผลการวิเคราะห์ส่วนแนวโน้มฝนรายเดือน

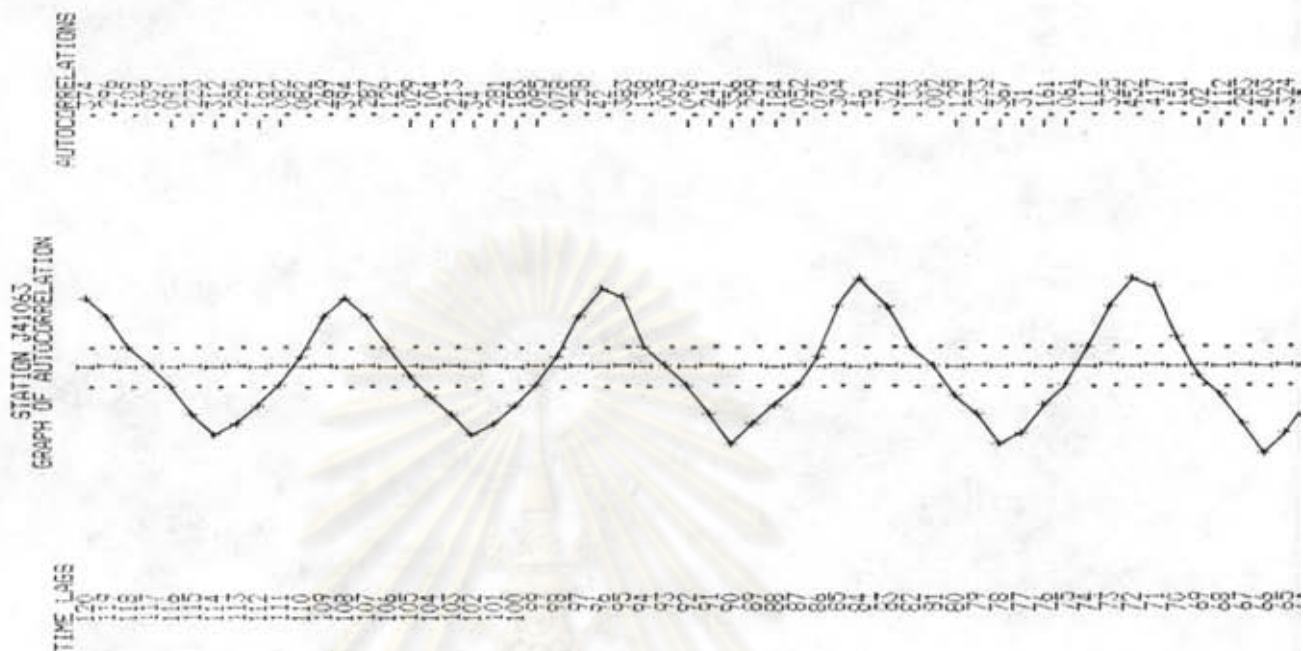


รูป ข - 3 (ต่อ) ผลการวิเคราะห์ส่วนแนวโน้มฝนรายเดือน

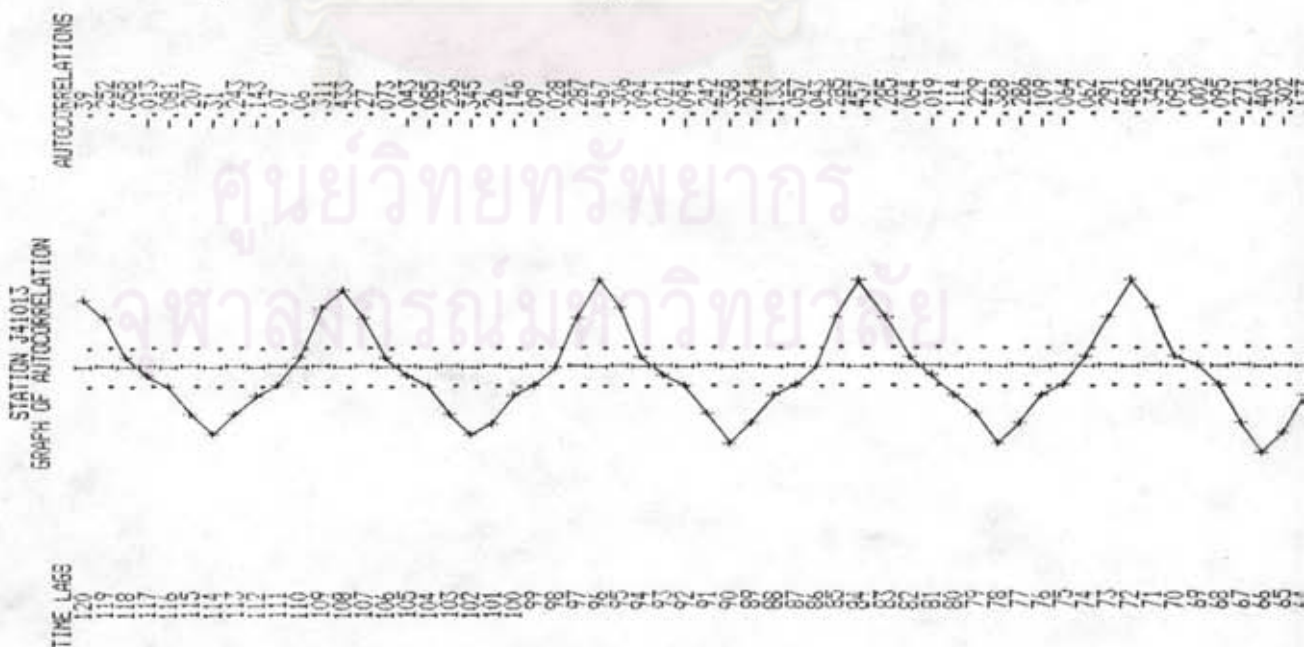


รูป ข - 3 (ต่อ) ผลการวิเคราะห์ส่วนแนวโน้มฝนรายเดือน

รูป ข-4ข กราฟความสัมพันธ์ช่วงเวลาถัดไป กับความสัมพันธ์ในตัวเอง เพื่อดูความสัมพันธ์
ของฤดูกาลของฝนรายเดือน สถานีสนามบินดอนเมือง(41063)



รูป ข-4ก กราฟความสัมพันธ์ช่วงเวลาถัดไป กับความสัมพันธ์ในตัวเอง เพื่อดูความสัมพันธ์
ของฤดูกาลของฝนรายเดือน สถานีกรมอุตุณิคมวิทยา(41013)

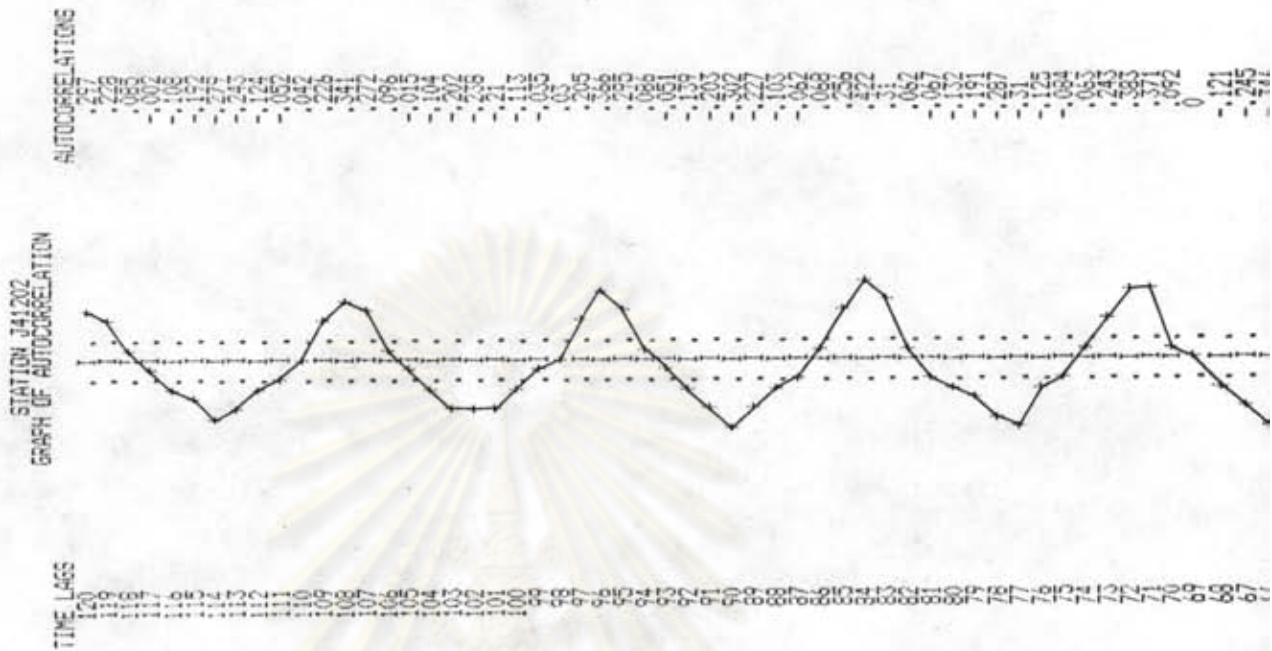


หมายเหตุ

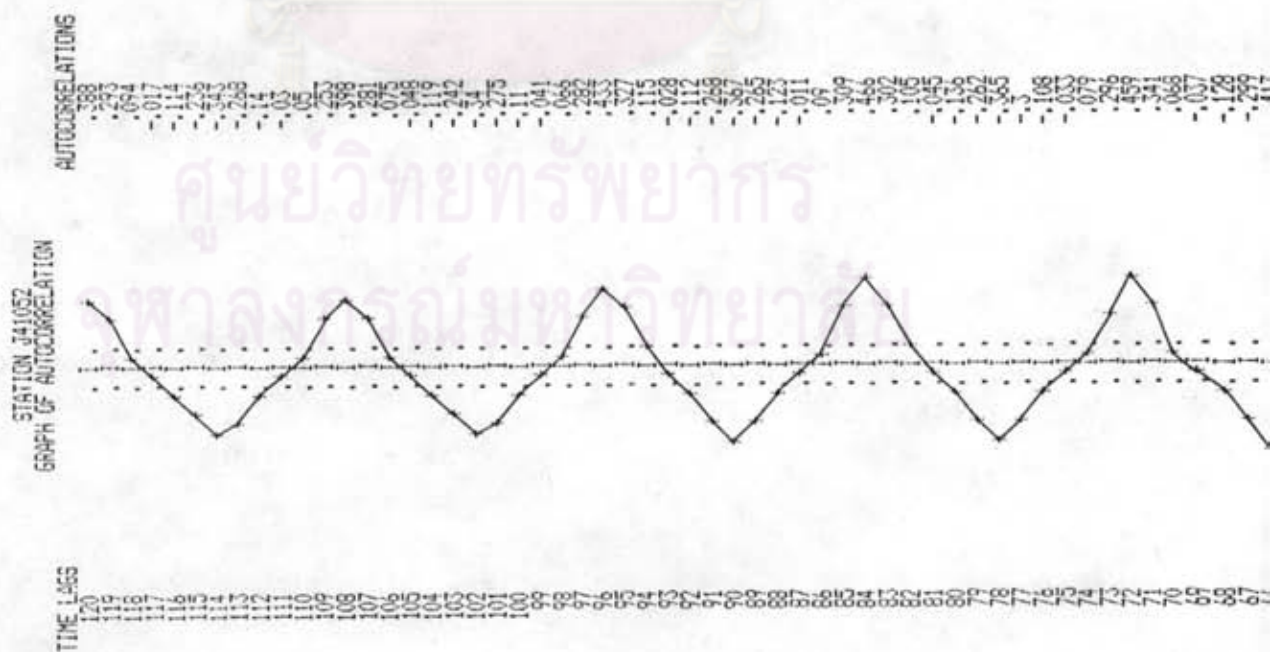
J41013 หมายถึง อนุกรมที่เริ่มต้นตั้งแต่เดือนมกราคม ปี 1956 ถึง ธันวาคม

ปี 1985 รวม 360 เดือน ใช้ค่า Maximum lag ที่ $N=120$

รูป ข-4ง กราฟความสัมพันธ์ช่วงเวลาถัดไป กับความสัมพันธ์ในตัวเอง เพื่อดูความสัมพันธ์
ของฤดูกาลของฝนรายเดือน สถานีเขตนองแวม(41202)



รูป ข-4ค กราฟความสัมพันธ์ช่วงเวลาถัดไป กับความสัมพันธ์ในตัวเอง เพื่อดูความสัมพันธ์
ของฤดูกาลของฝนรายเดือน สถานีเขตนินบุรี(41052)



หมายเหตุ

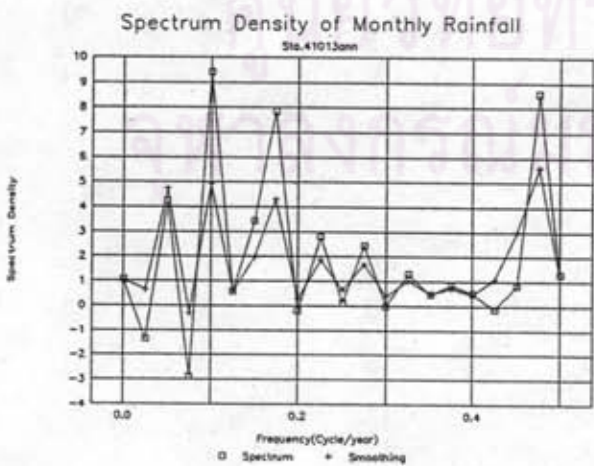
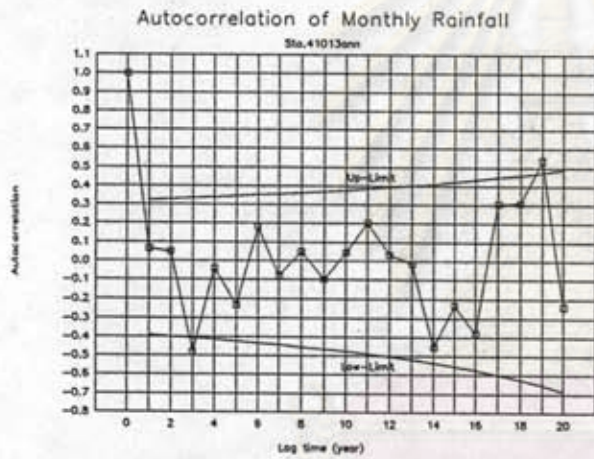
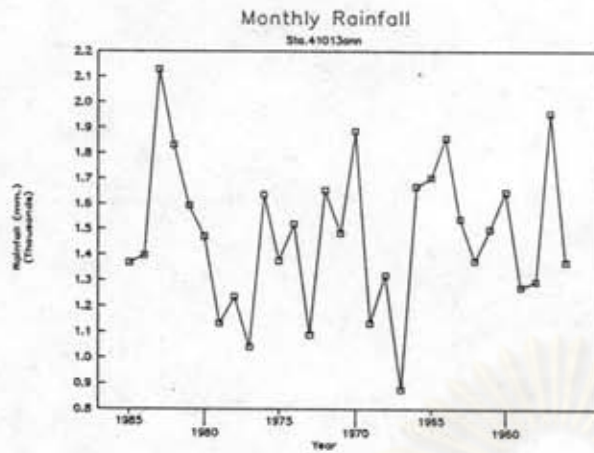
J41052 หมายถึง อนุกรมที่เริ่มต้นตั้งแต่เดือนมกราคม ปี 1956 ถึง ธันวาคม
ปี 1985 รวม 360 เดือน ใช้ค่า Maximum lag ที่ N=120

ภาคผนวก ค

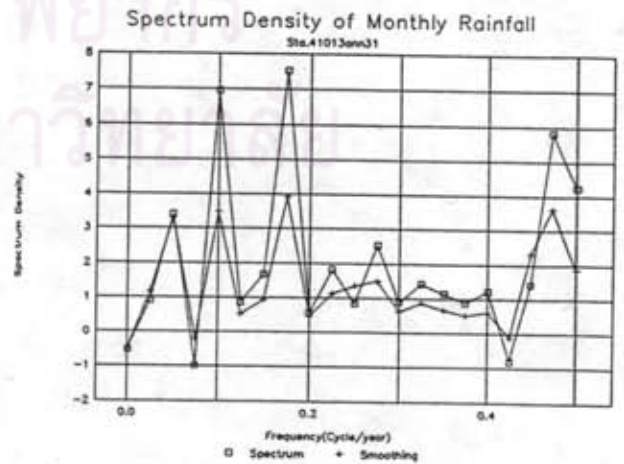
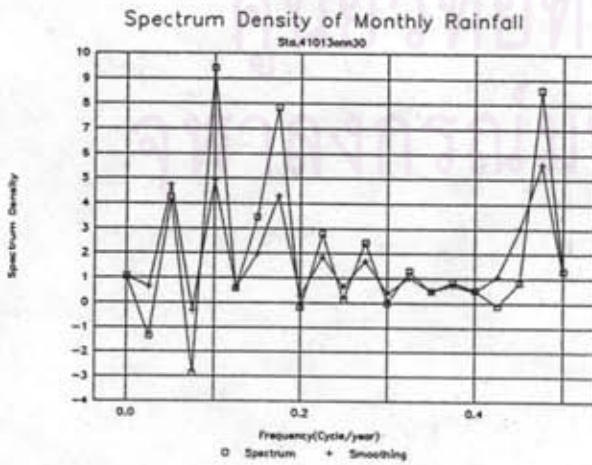
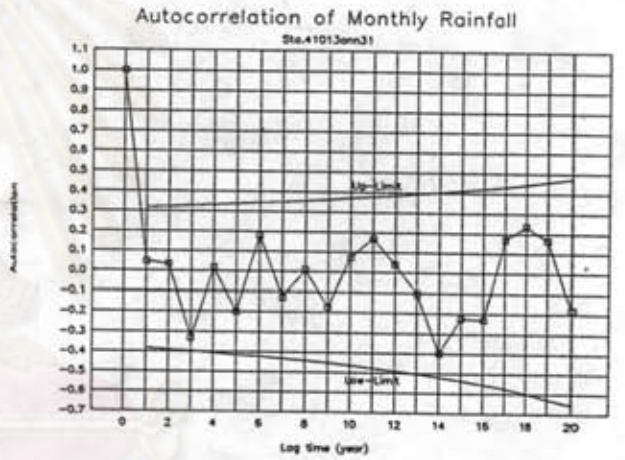
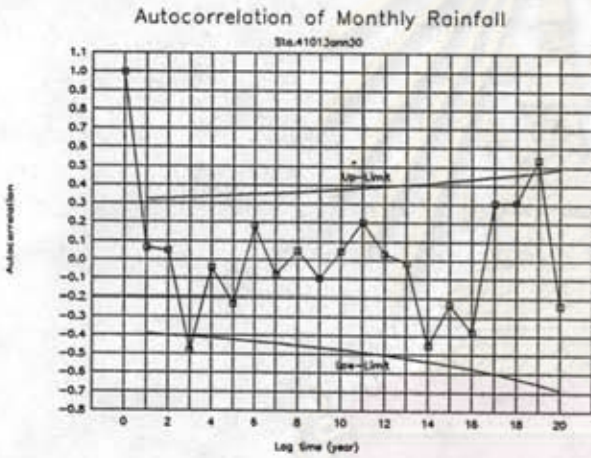
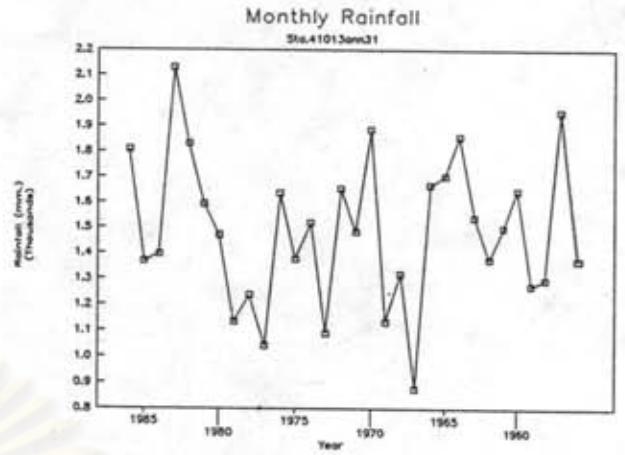
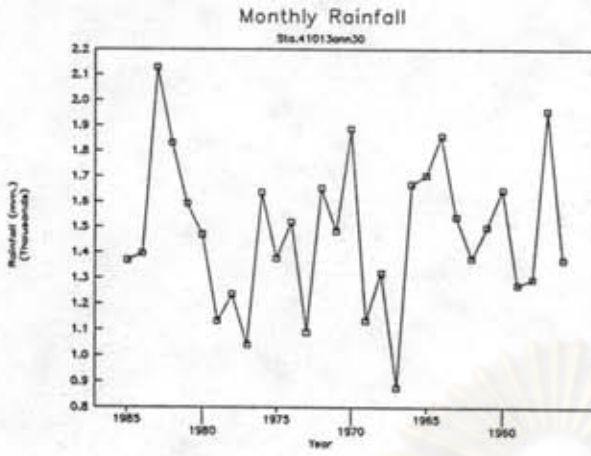
กราฟผลการวิเคราะห์อนุกรมฝนชุดต่าง ๆ

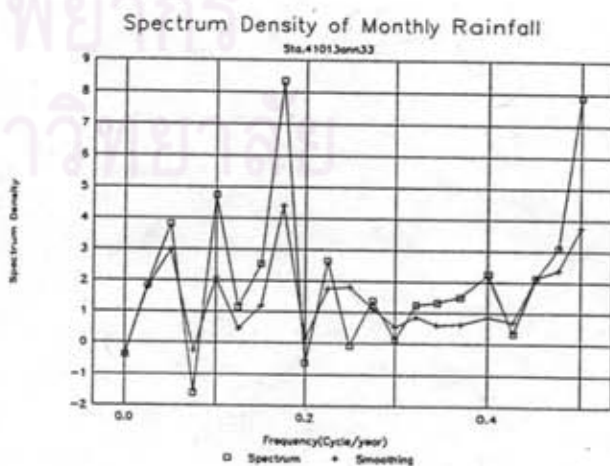
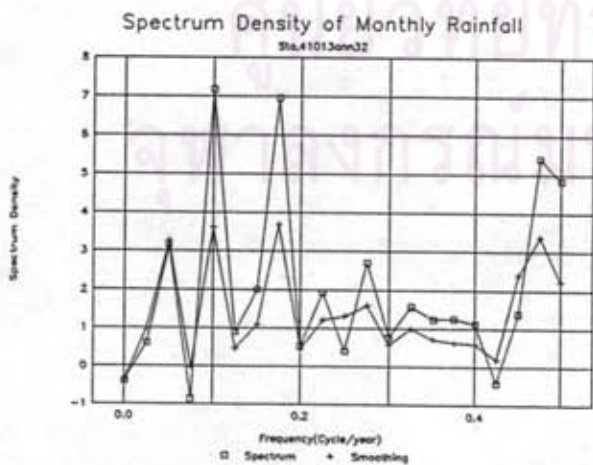
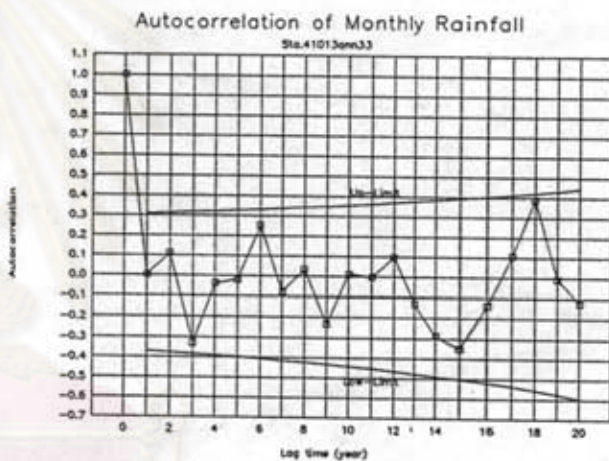
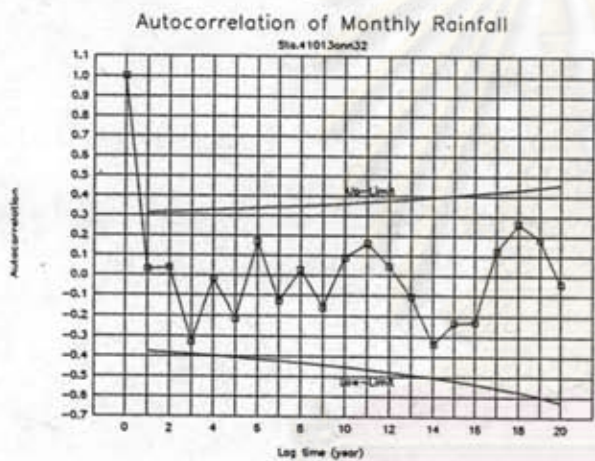
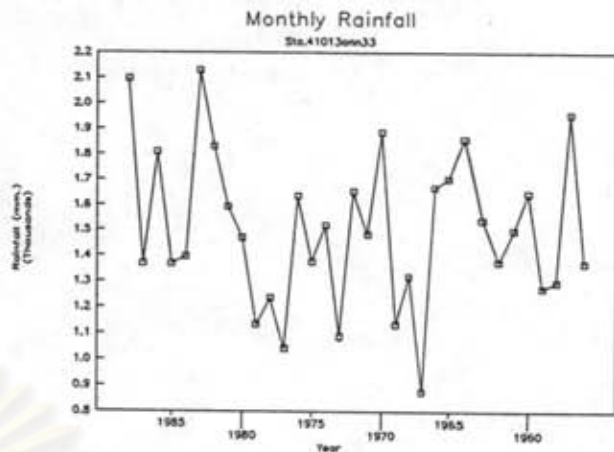
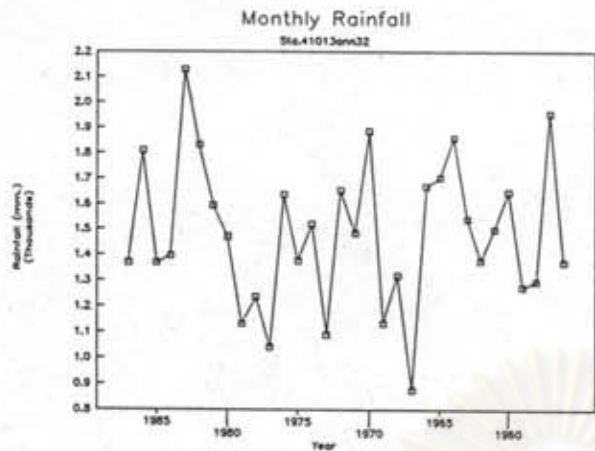


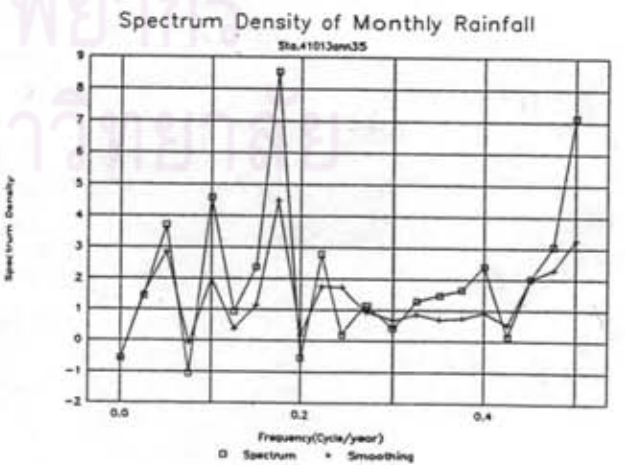
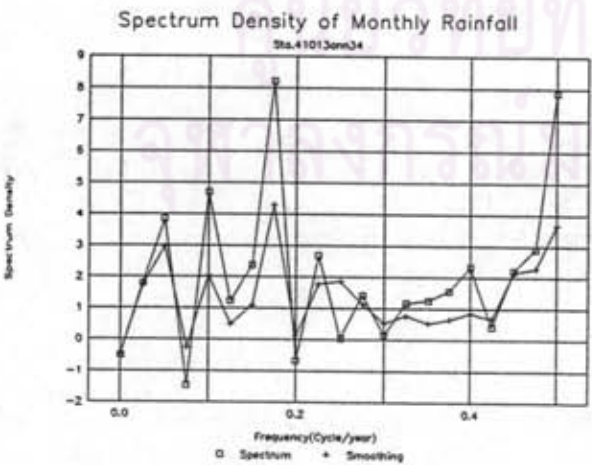
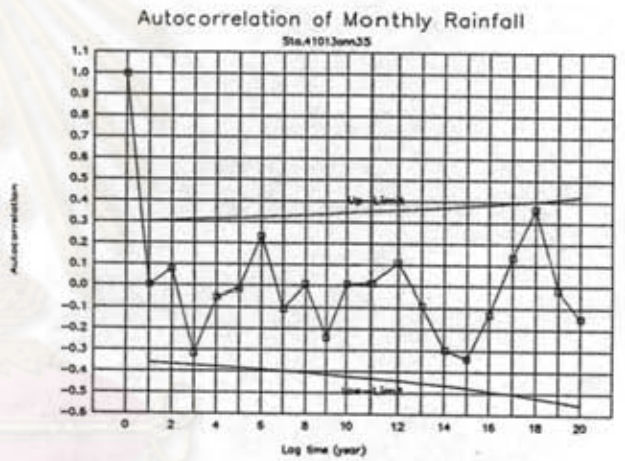
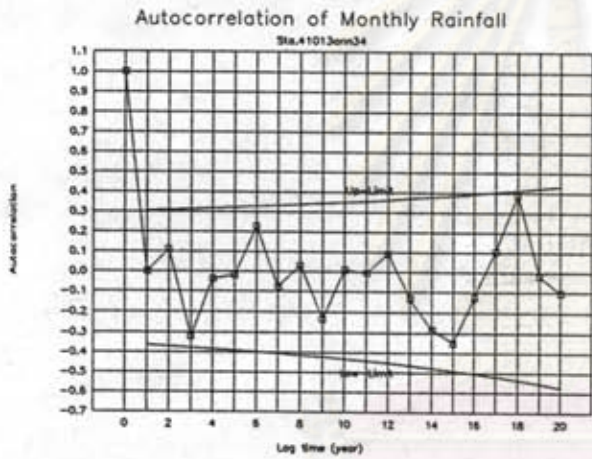
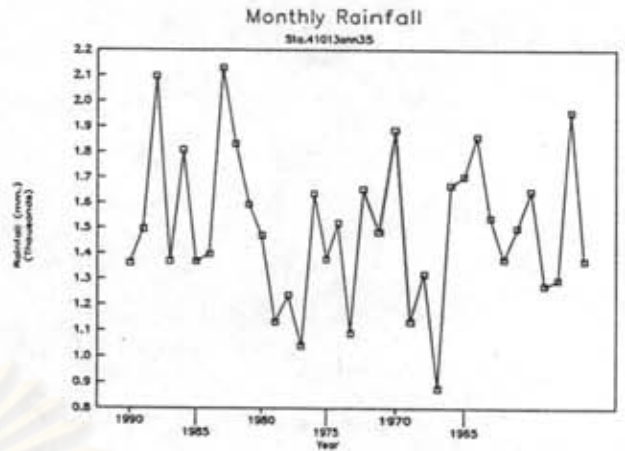
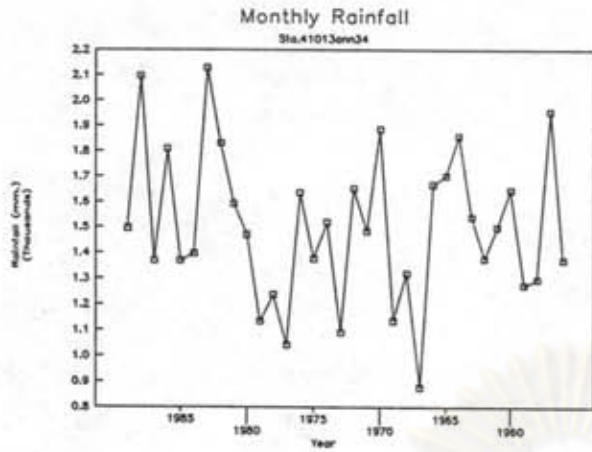
ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

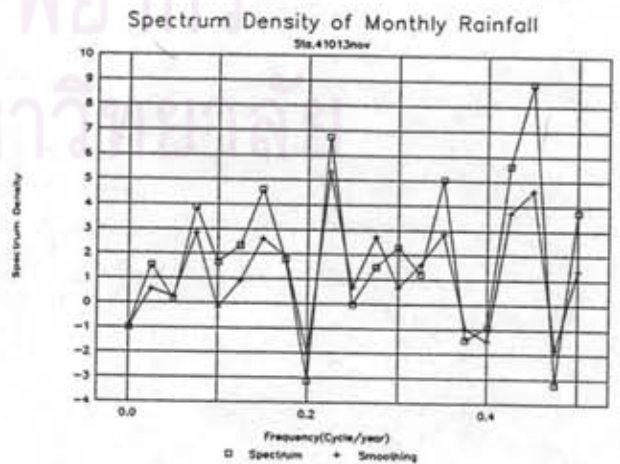
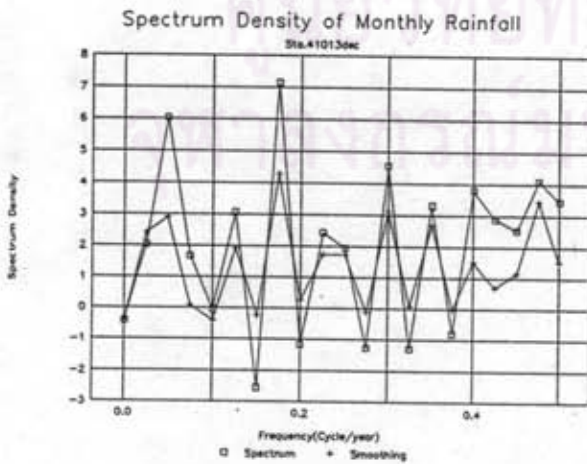
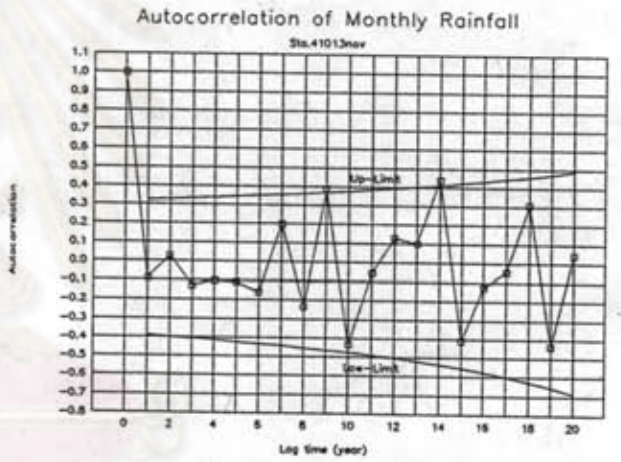
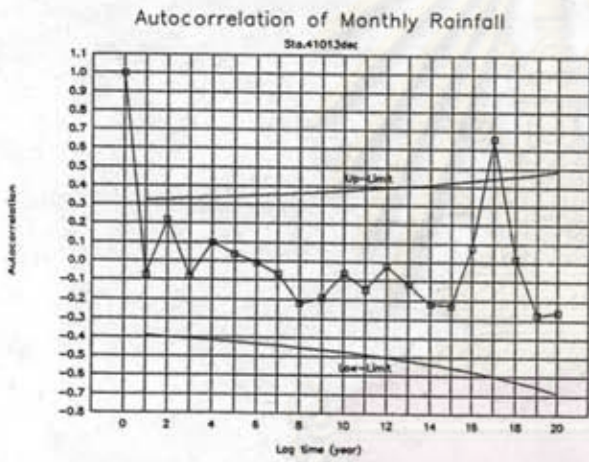
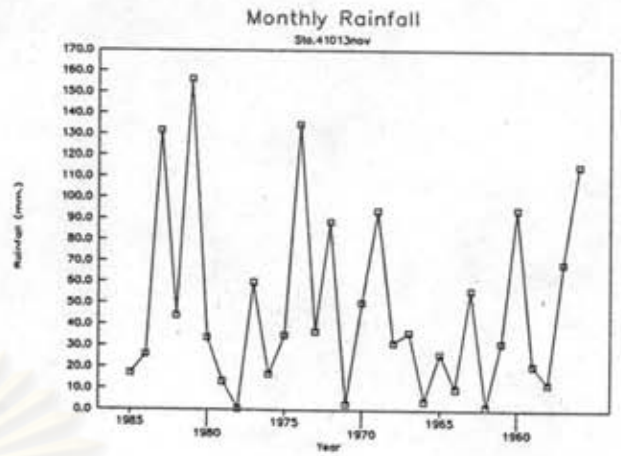
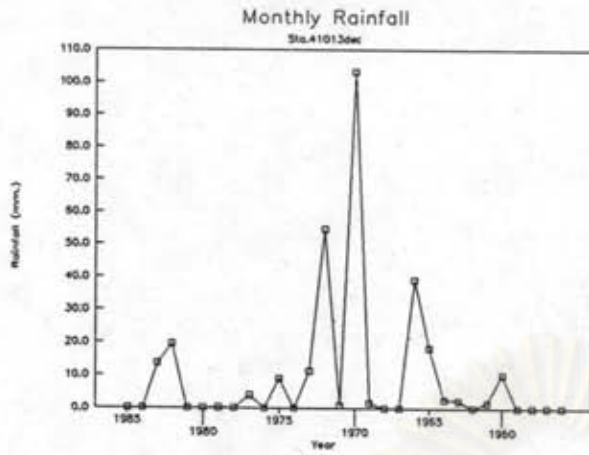


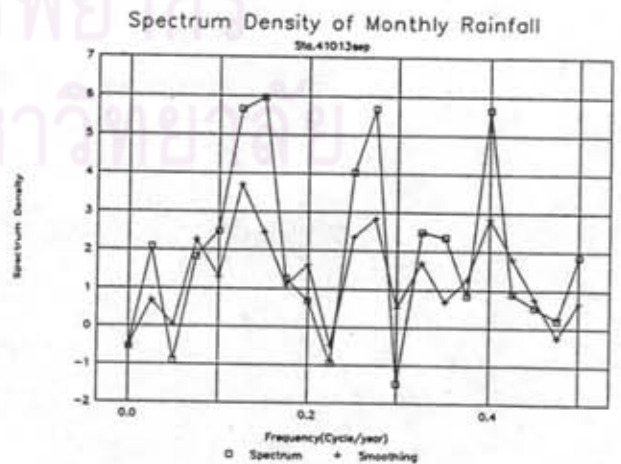
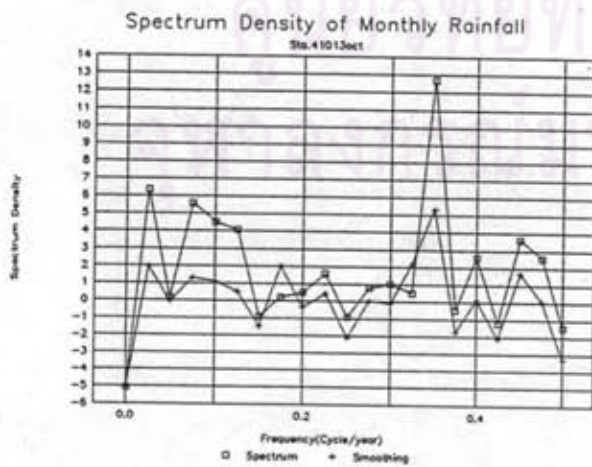
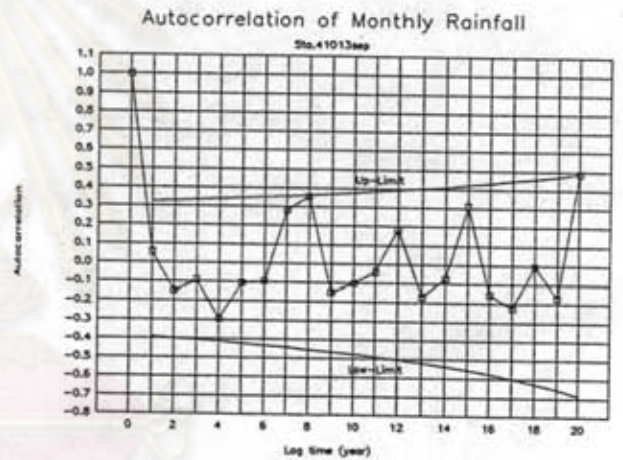
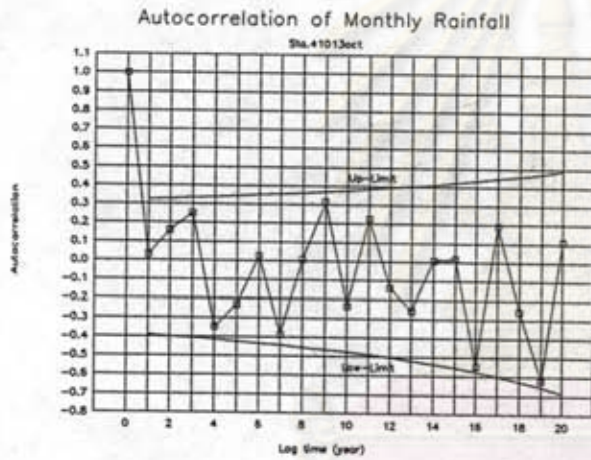
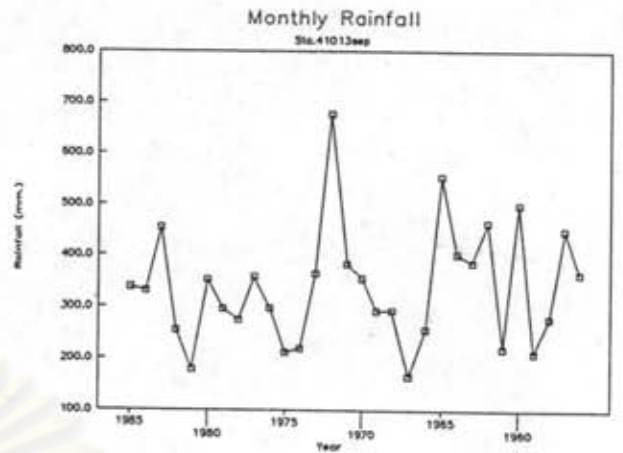
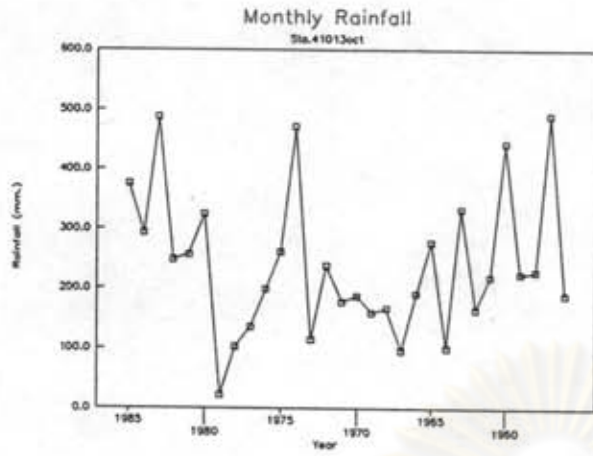
รูป ค - 1 ผลการวิเคราะห์อนุกรมชุดต่าง ๆ ของสถานีฝนกรมอุตุนิยมวิทยา (41013)

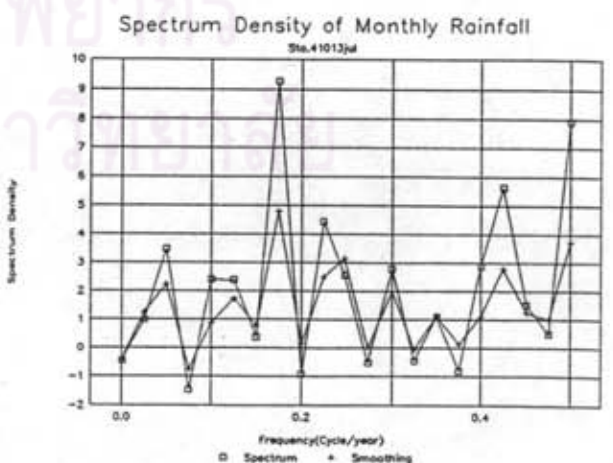
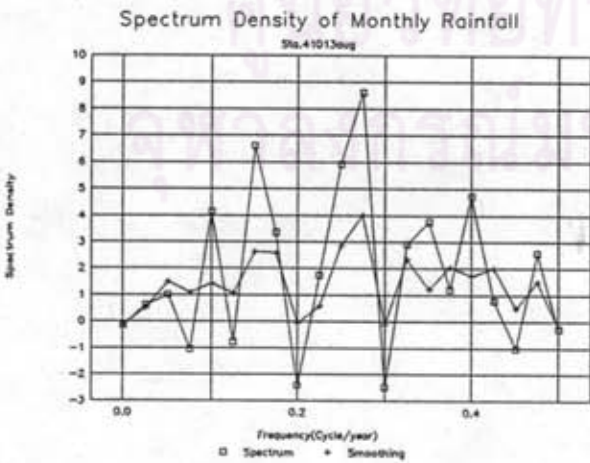
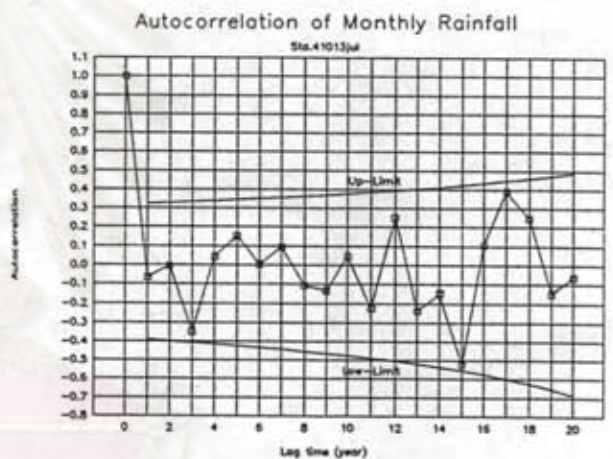
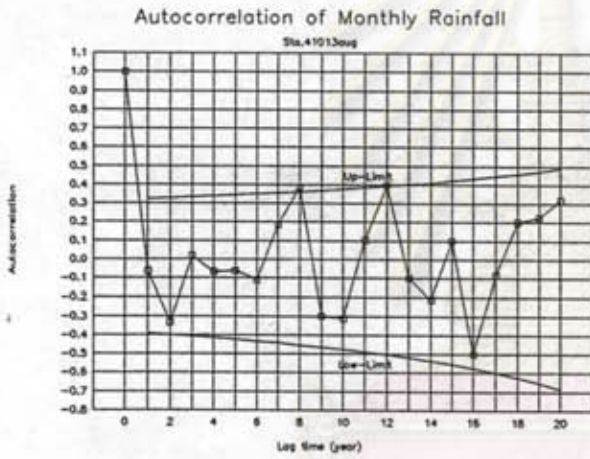
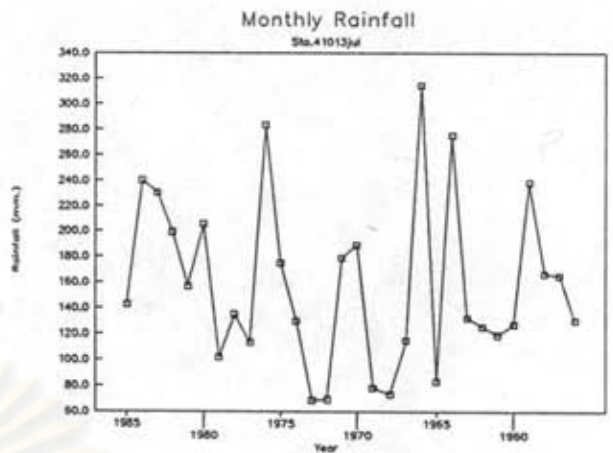
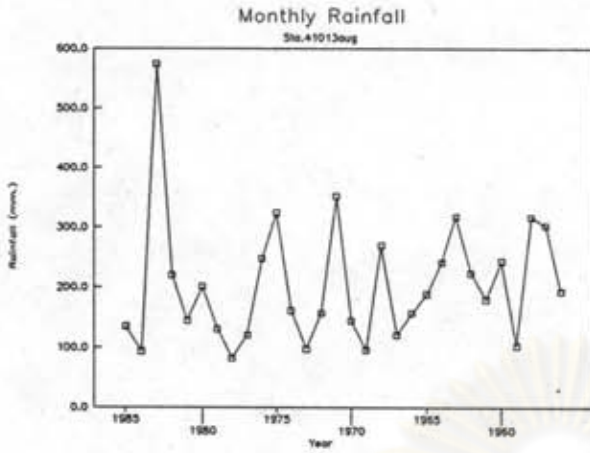


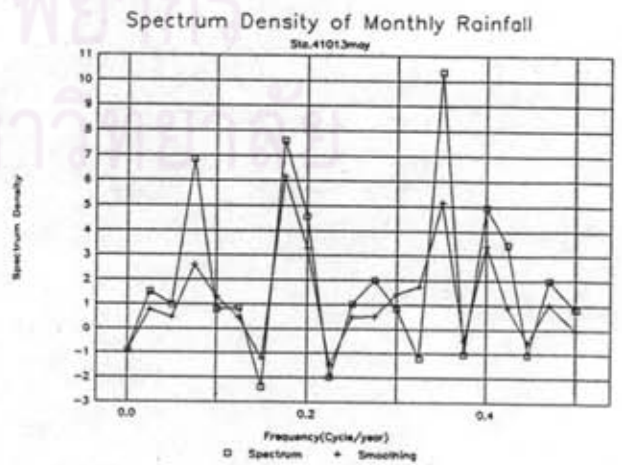
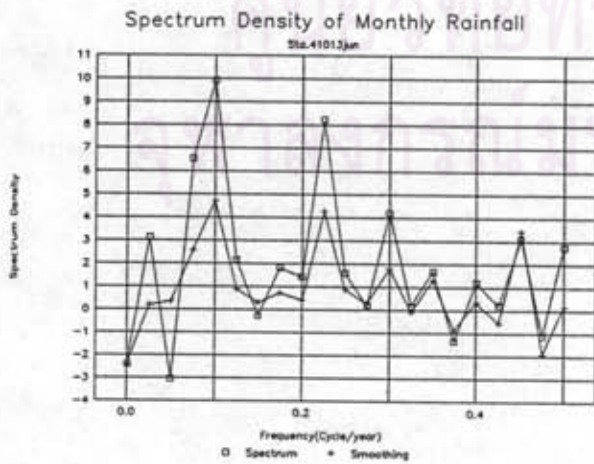
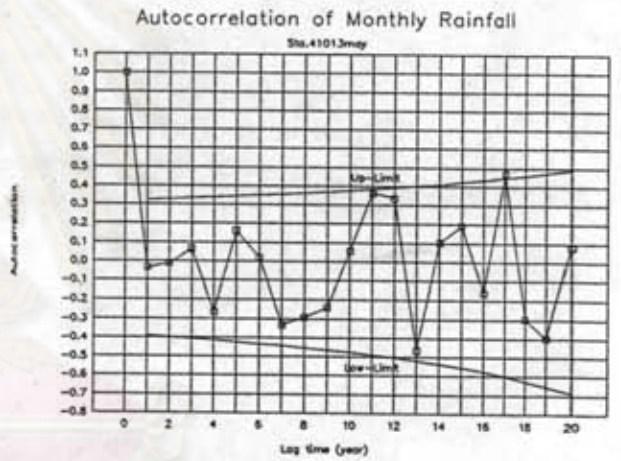
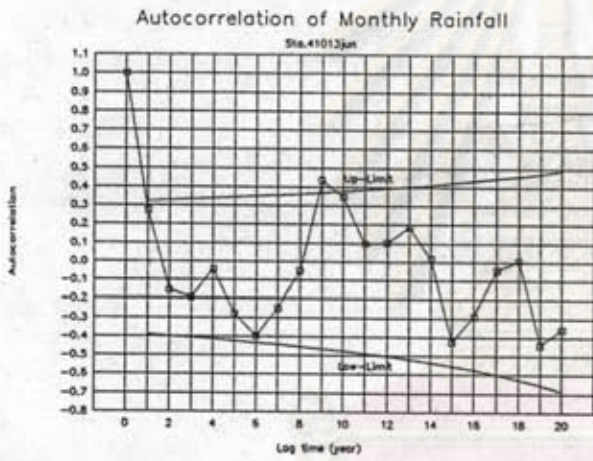
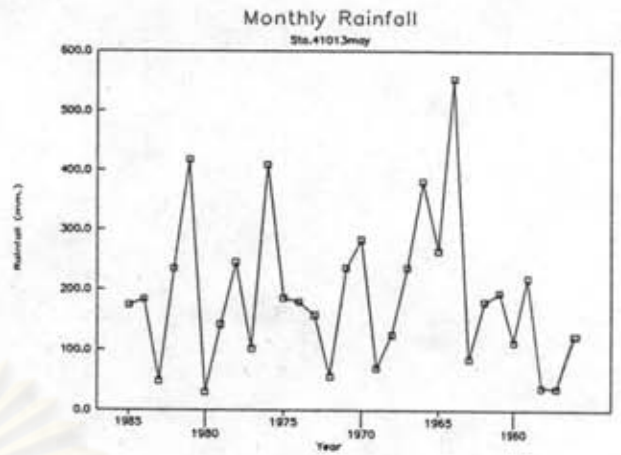
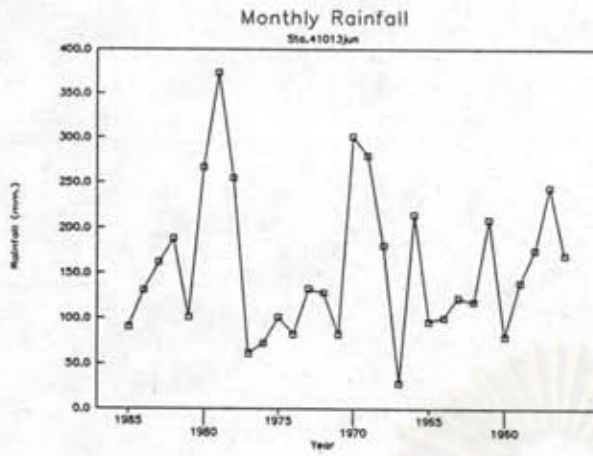


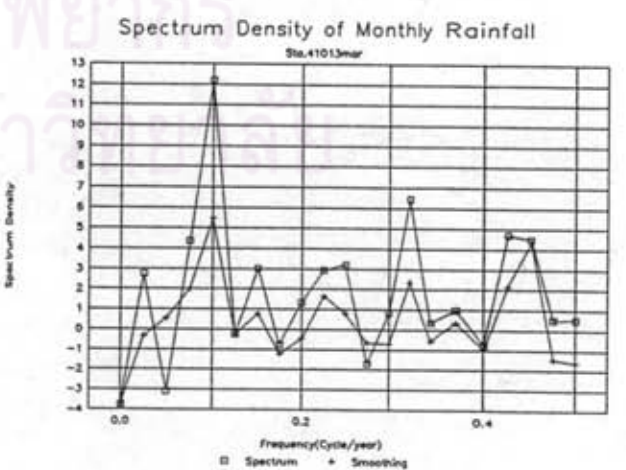
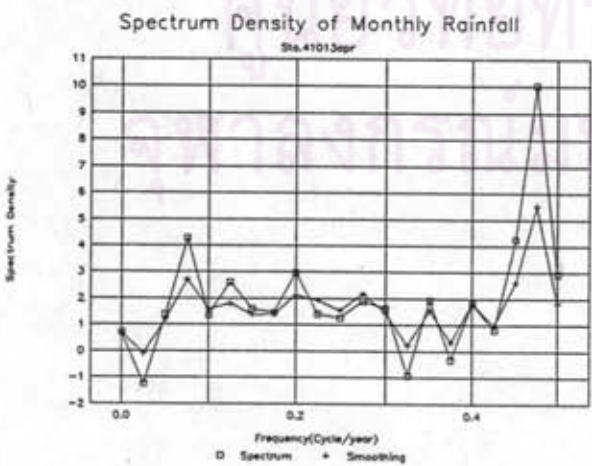
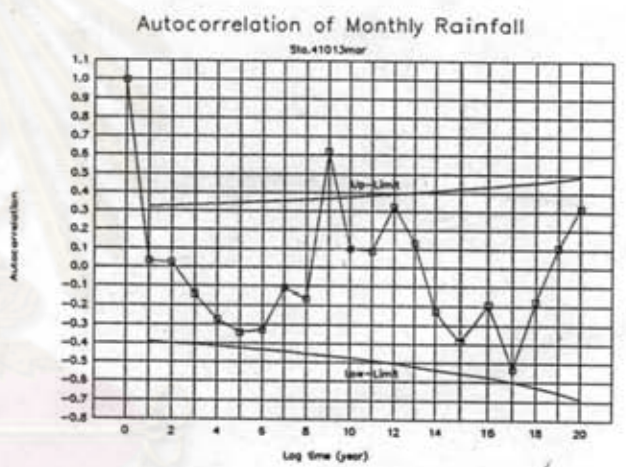
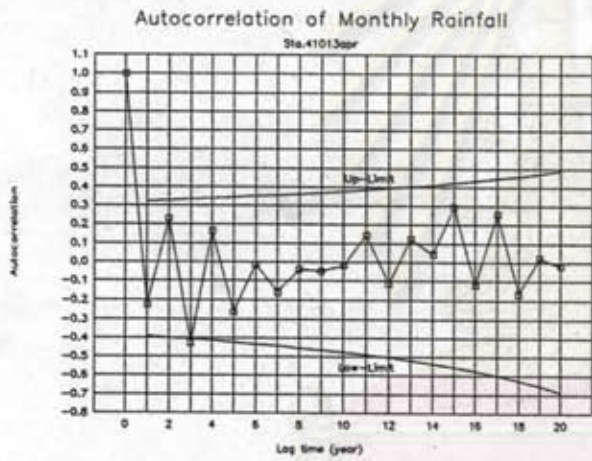
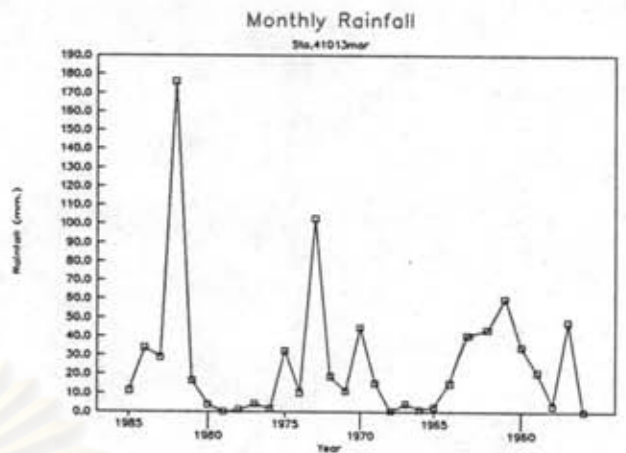
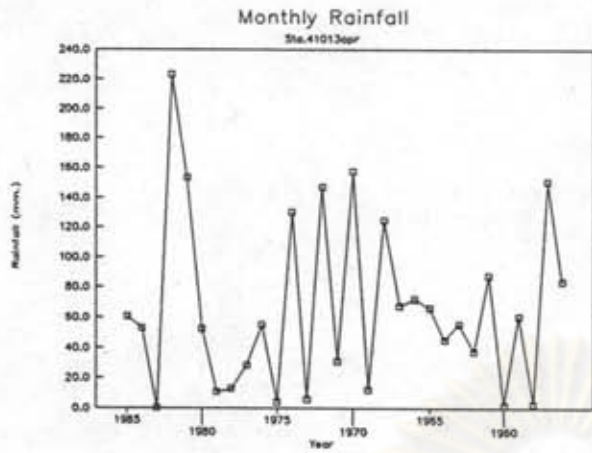


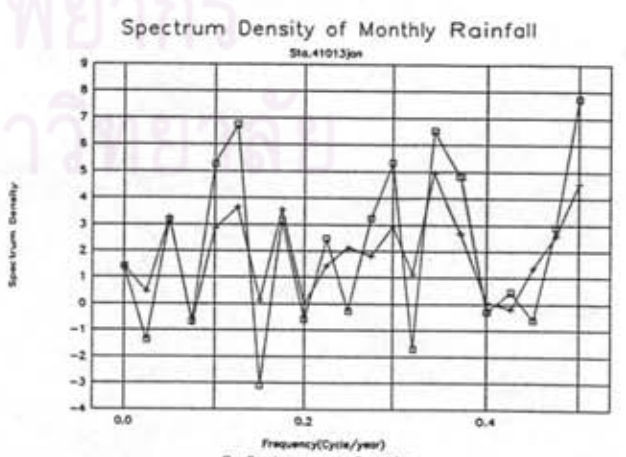
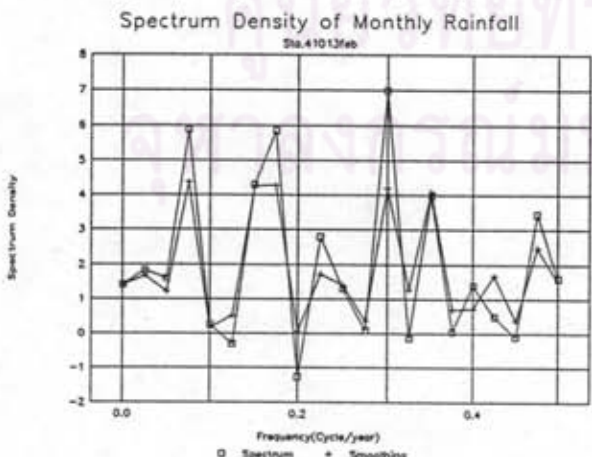
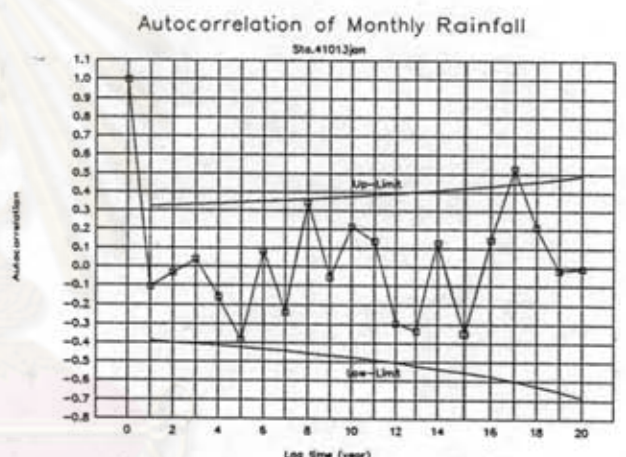
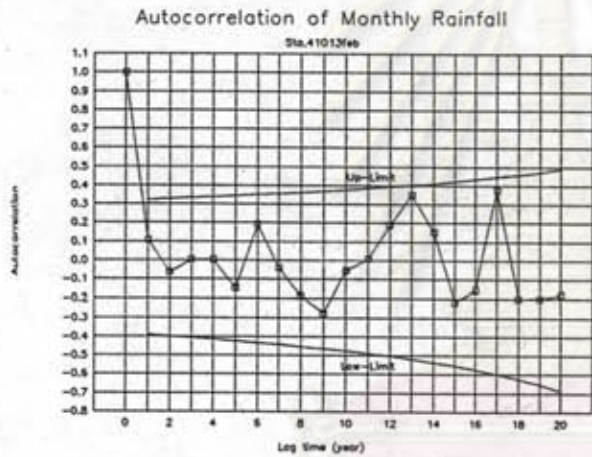
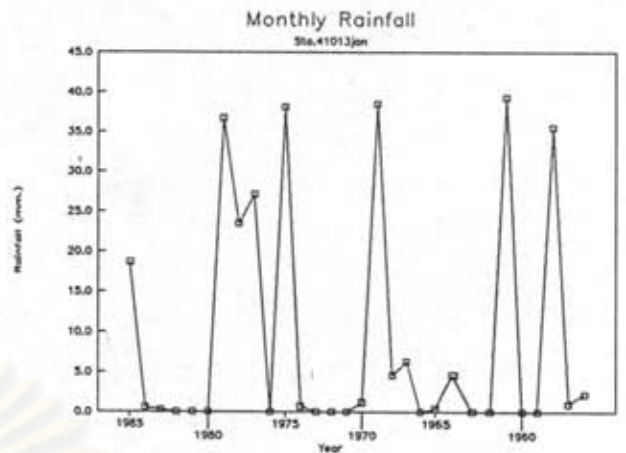
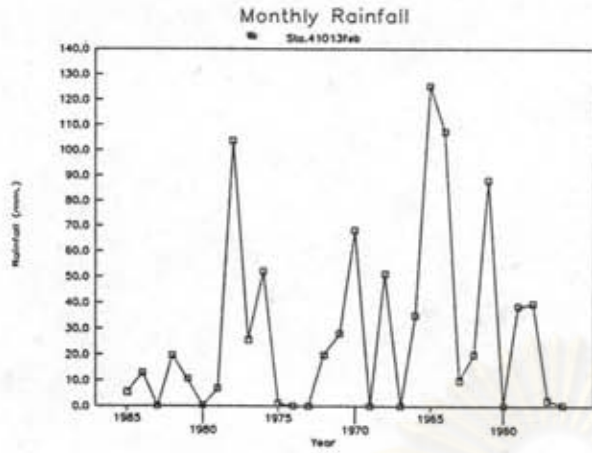


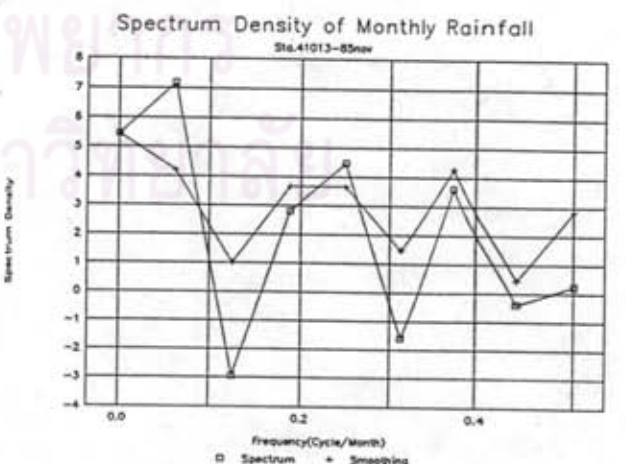
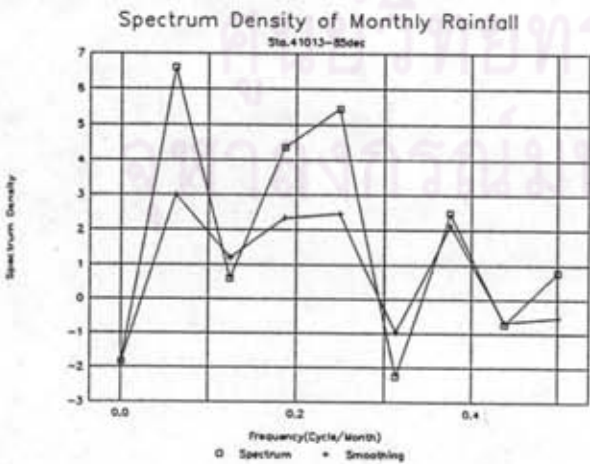
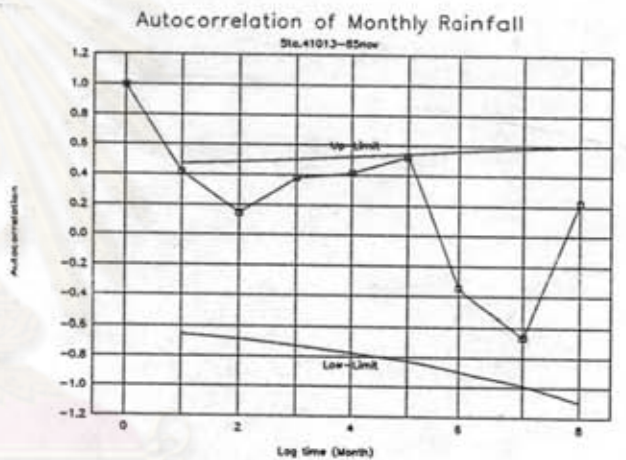
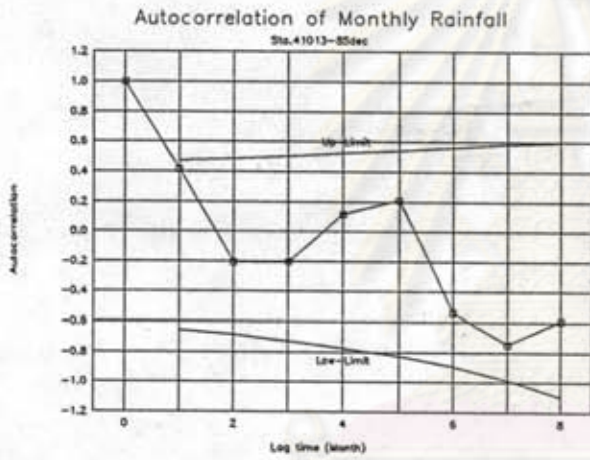
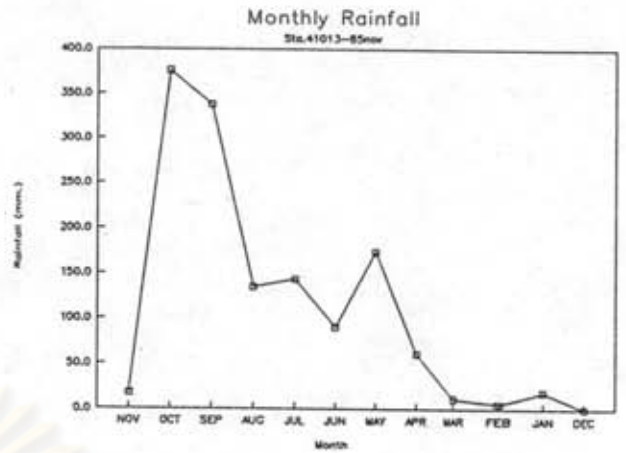
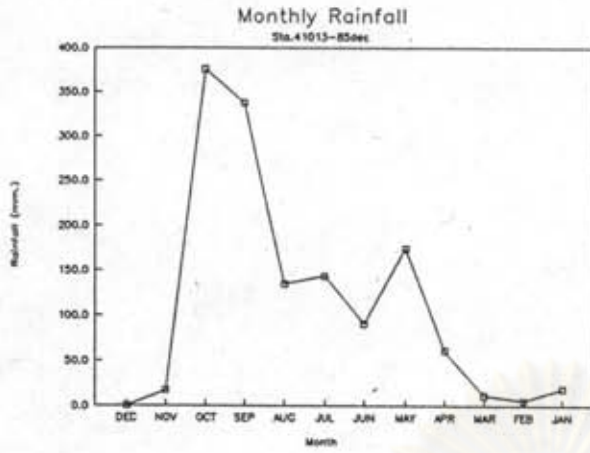


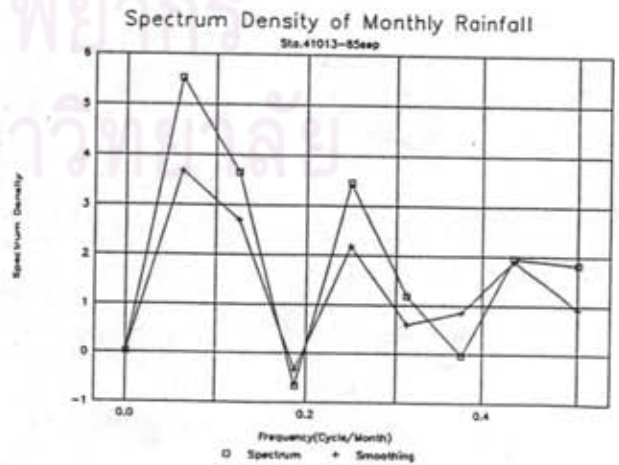
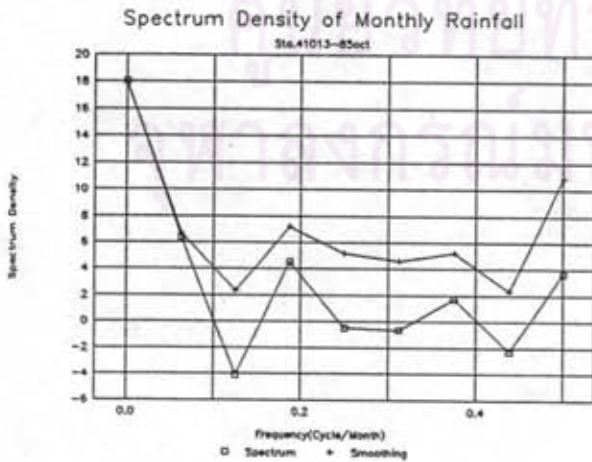
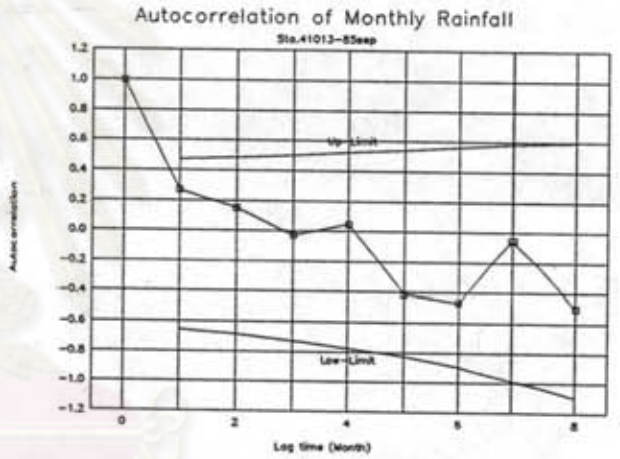
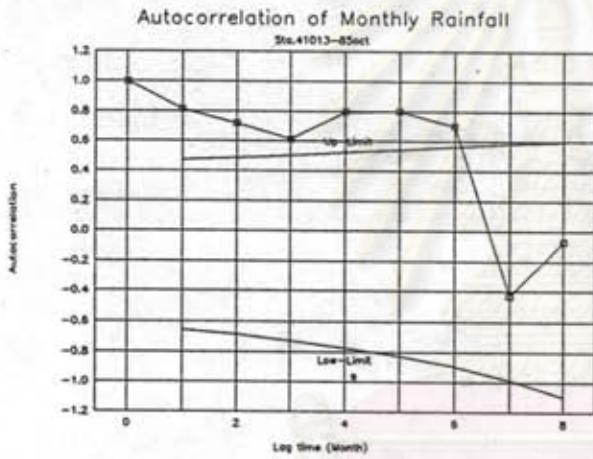
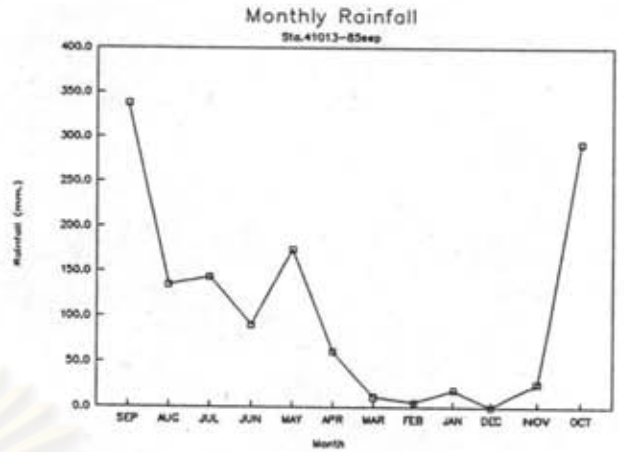
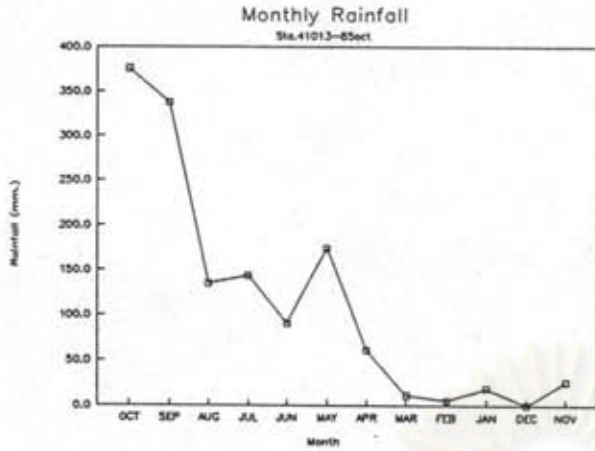


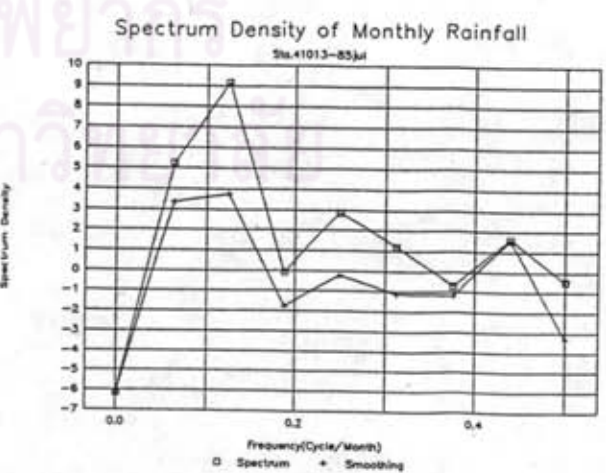
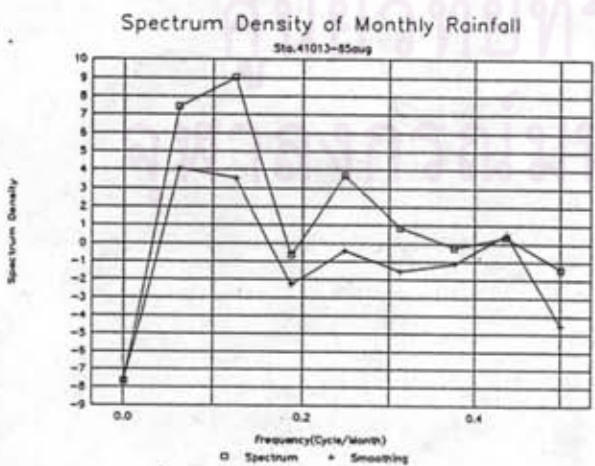
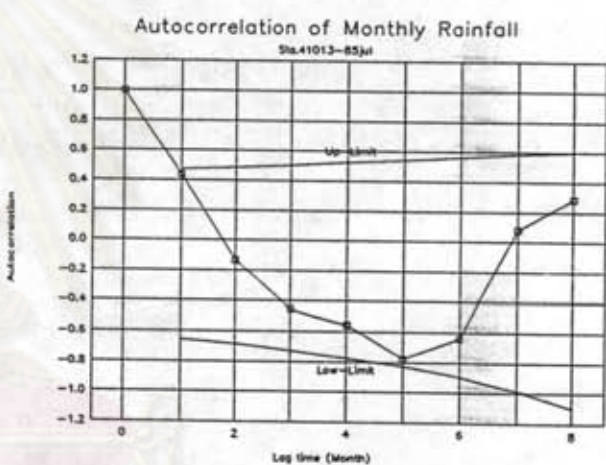
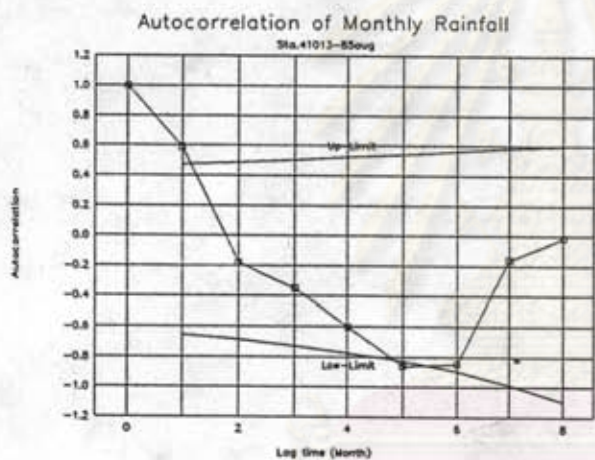
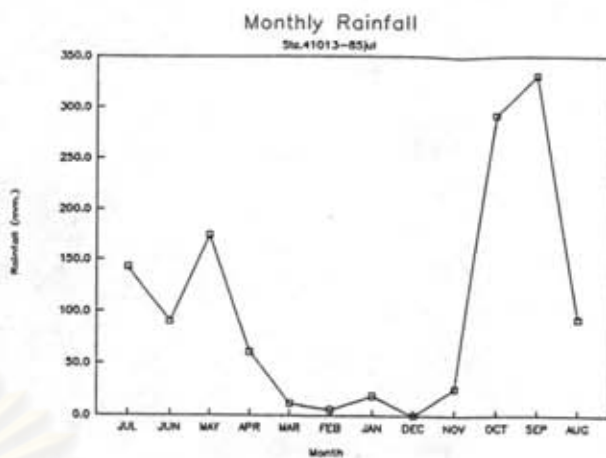
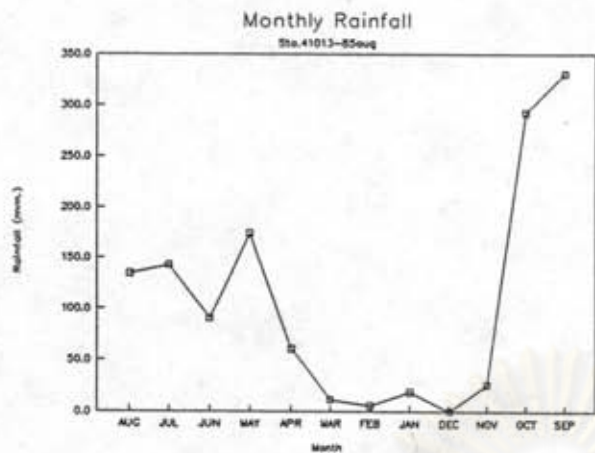


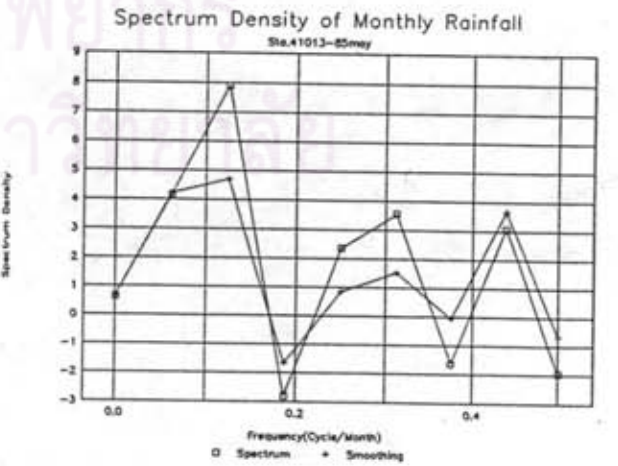
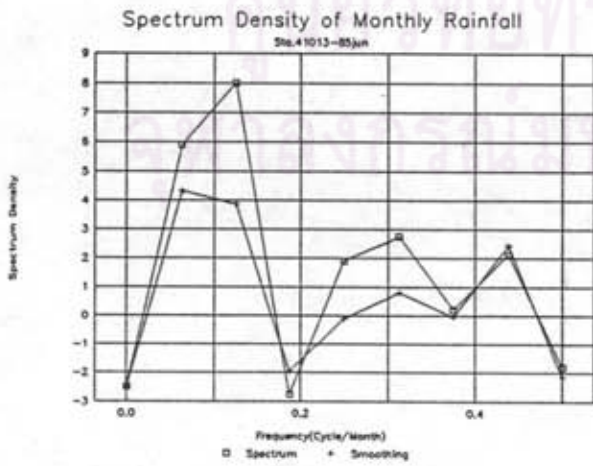
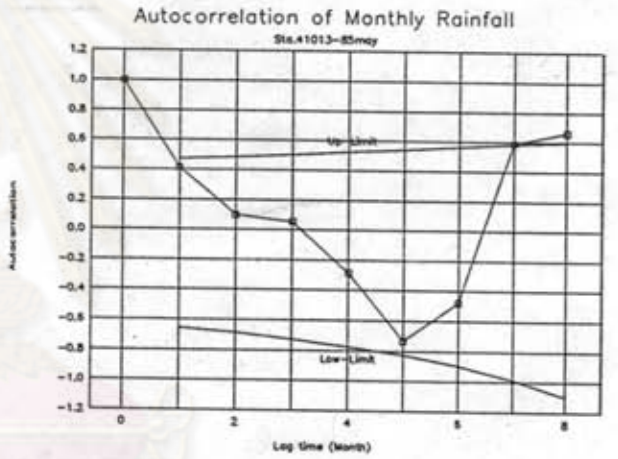
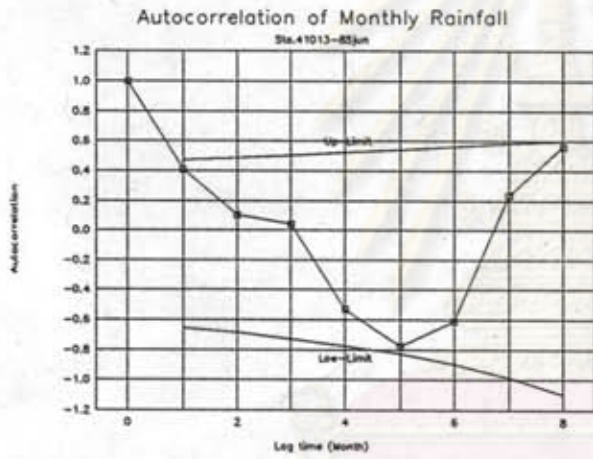
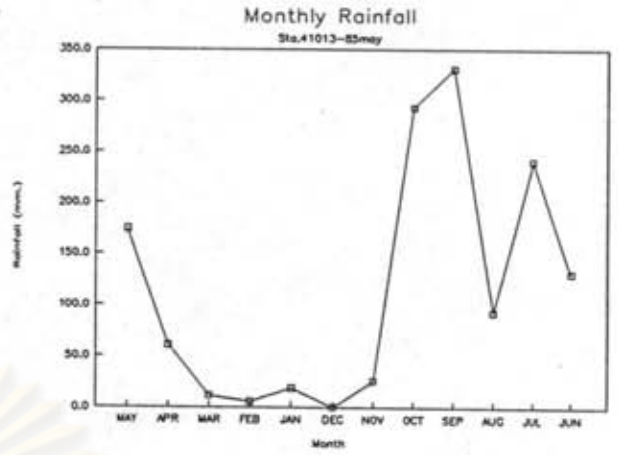
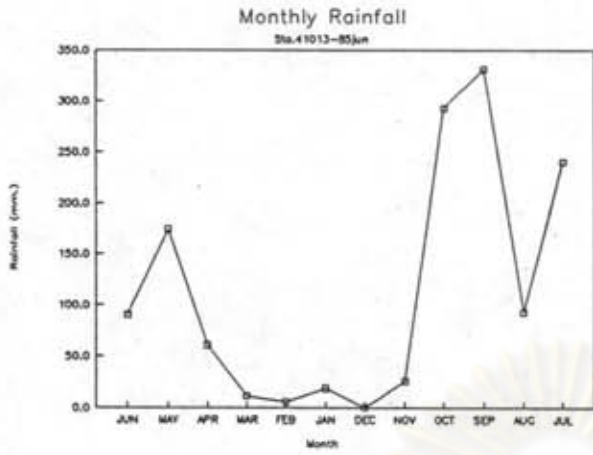


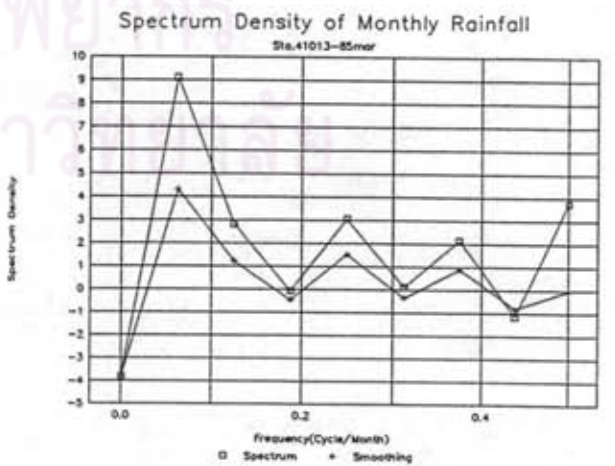
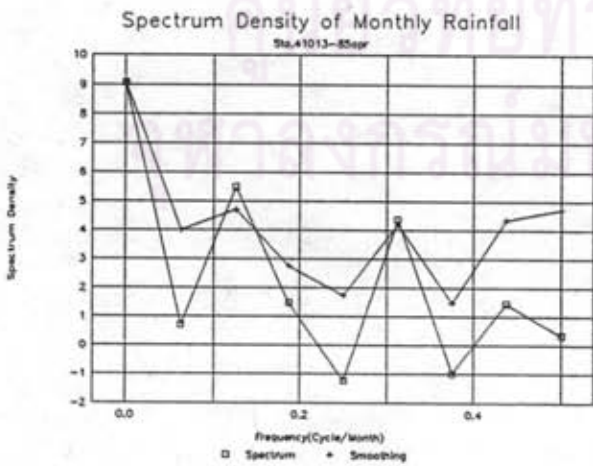
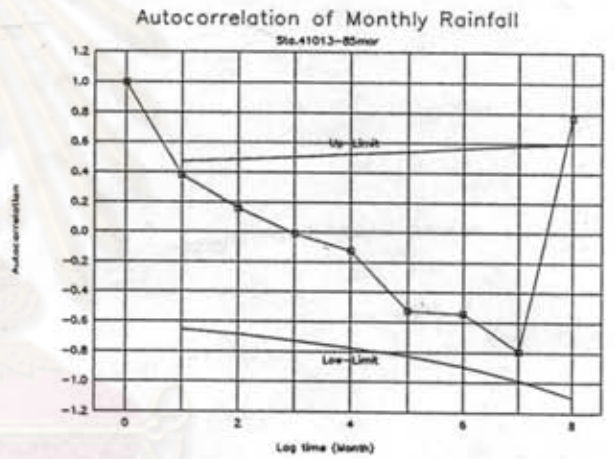
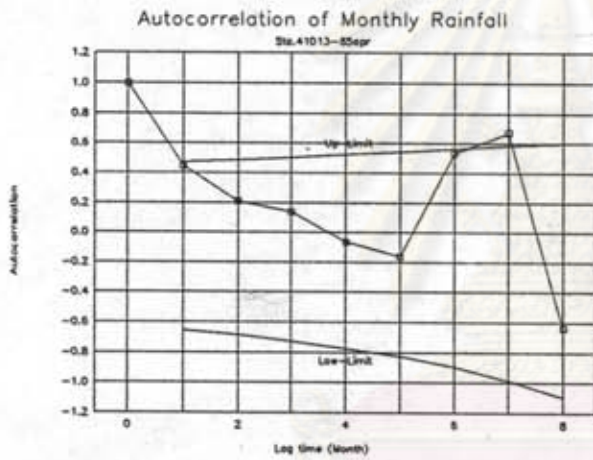
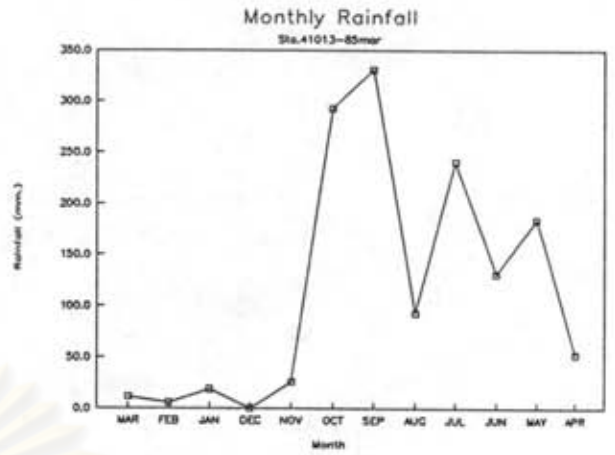
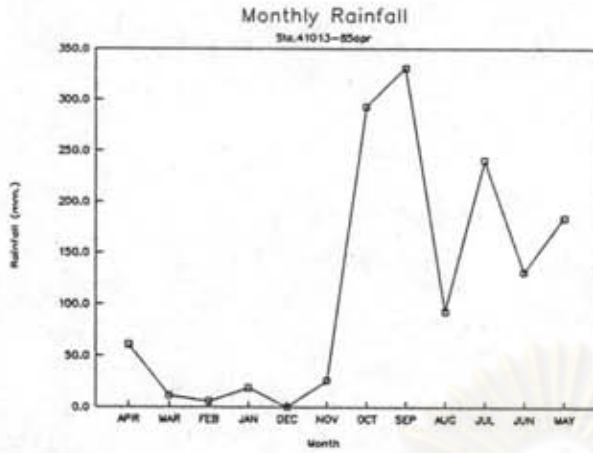


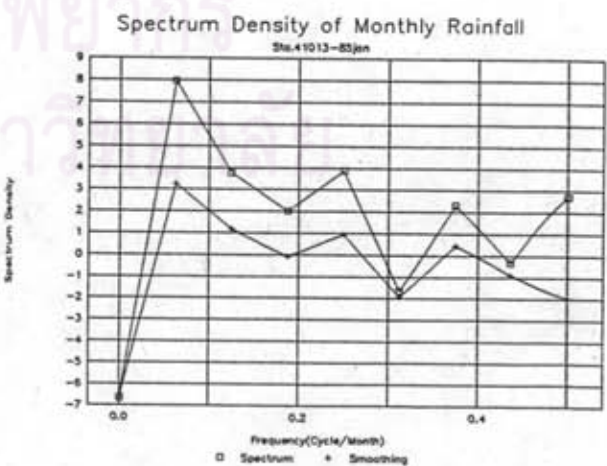
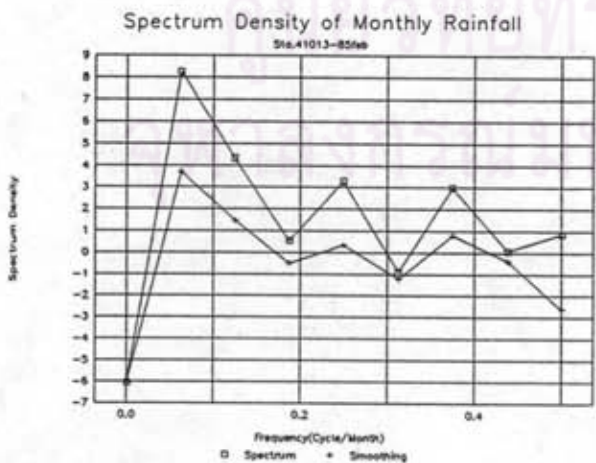
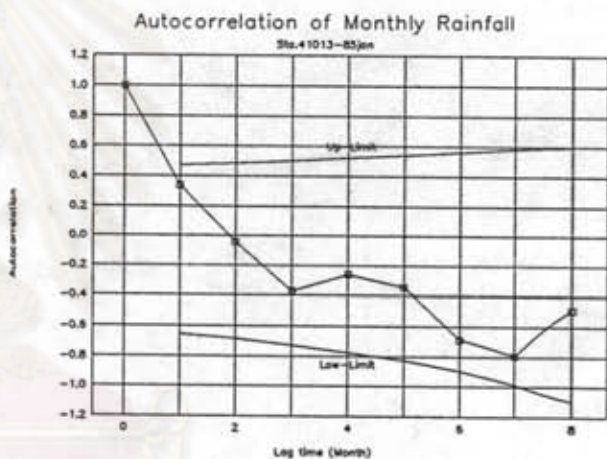
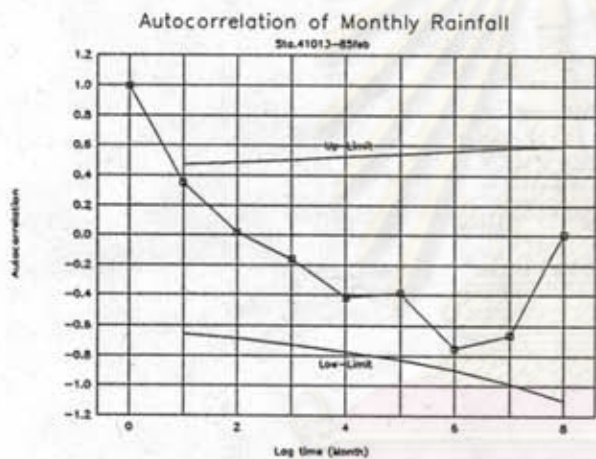
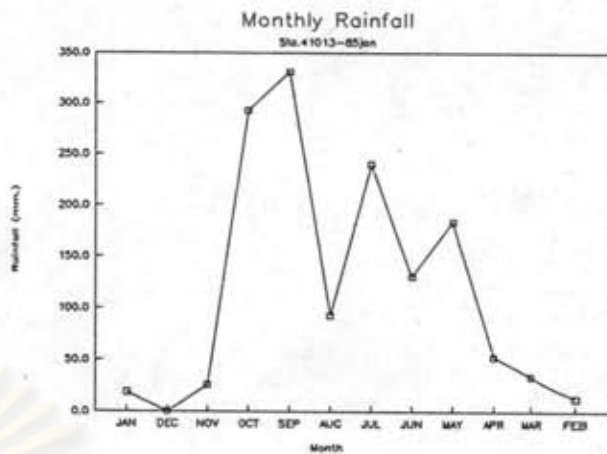
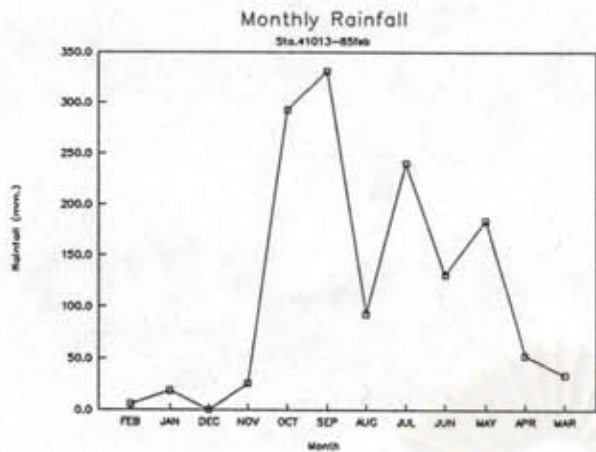


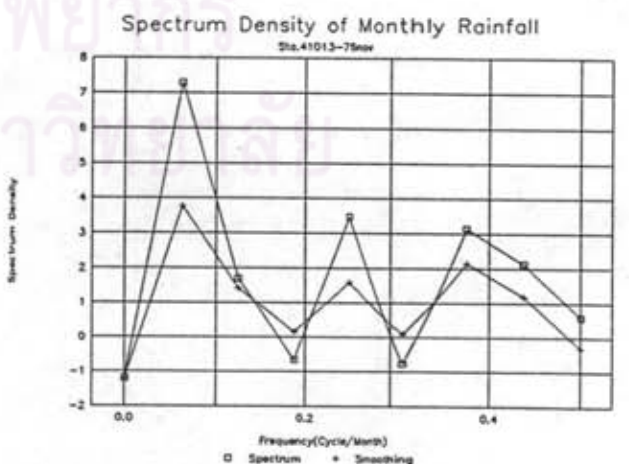
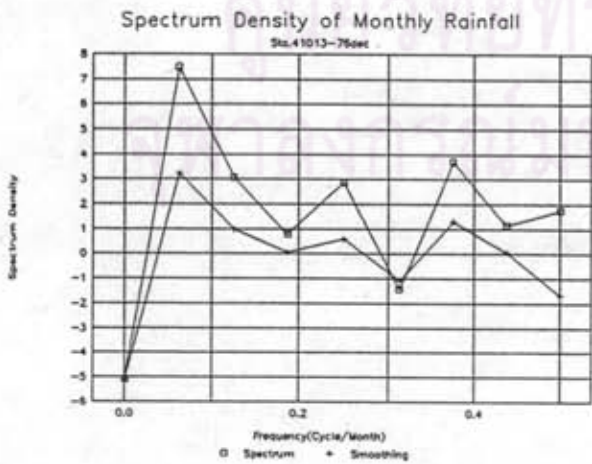
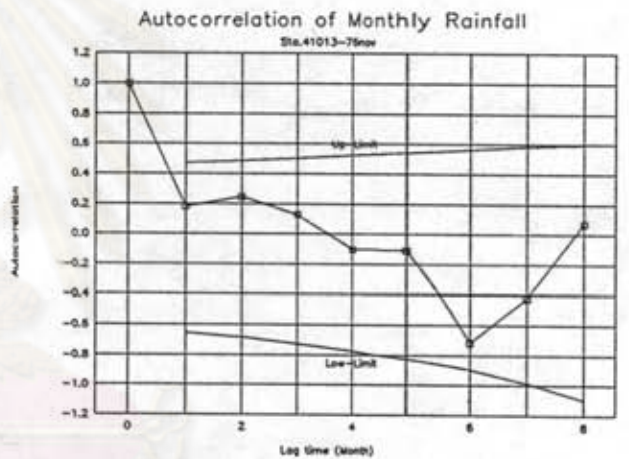
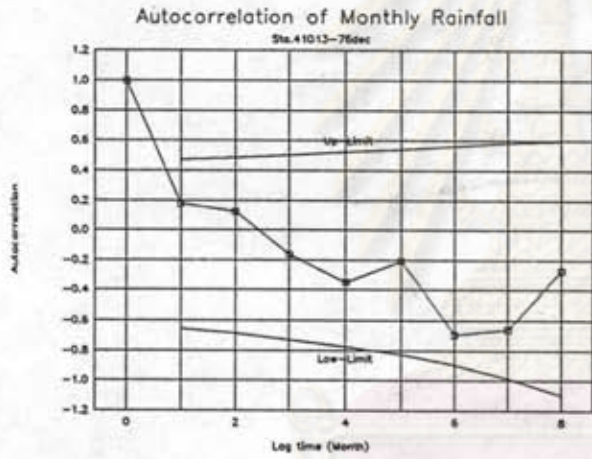
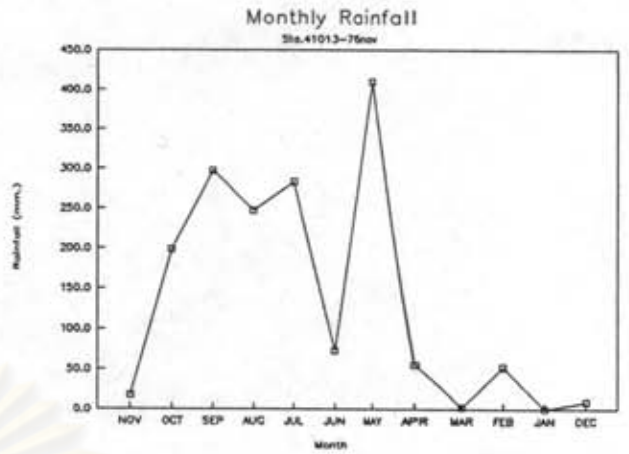
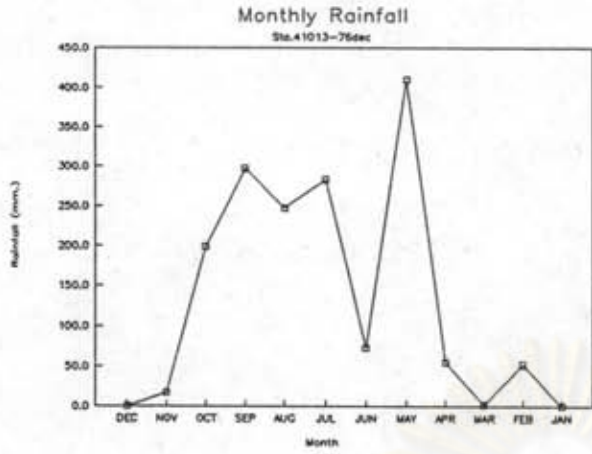


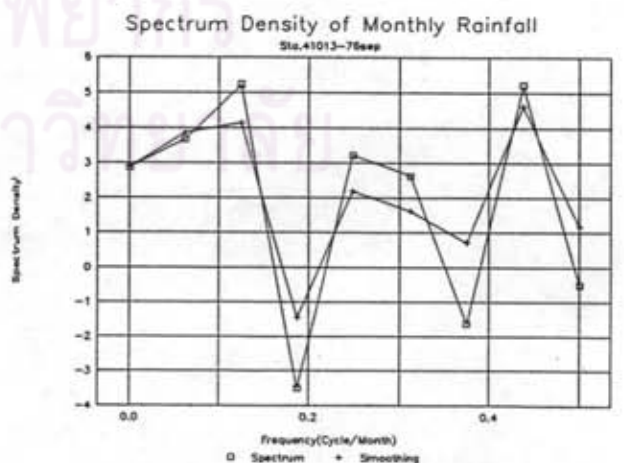
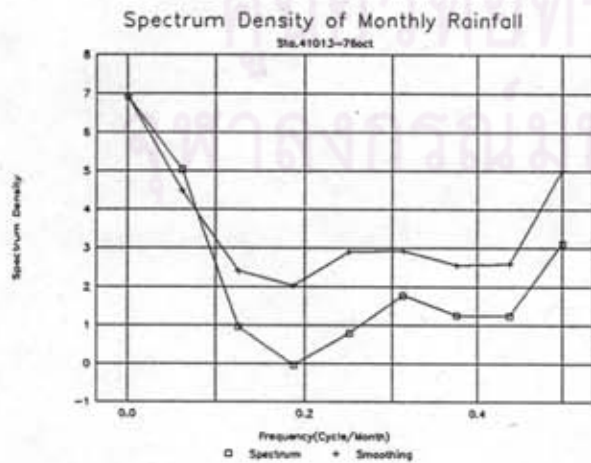
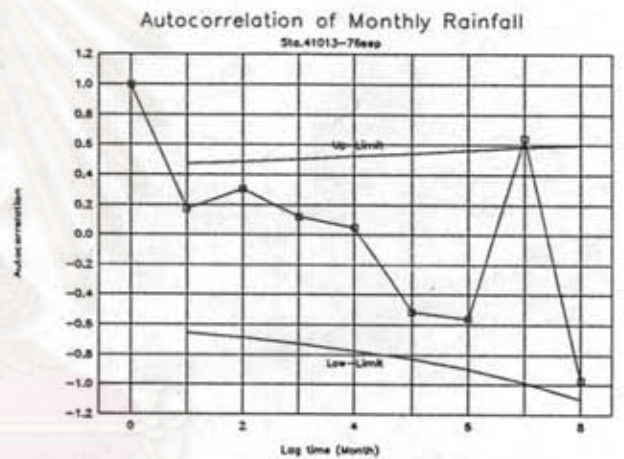
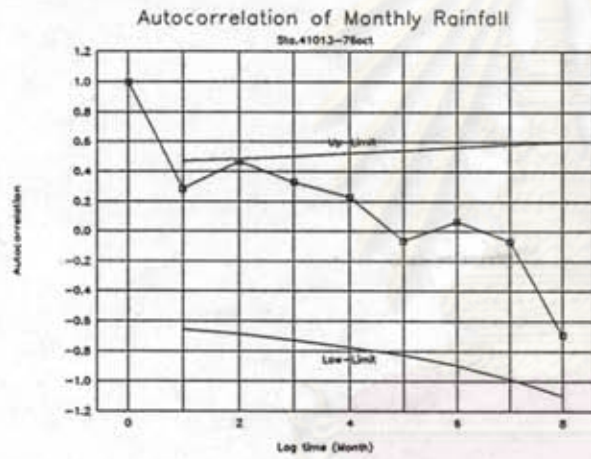
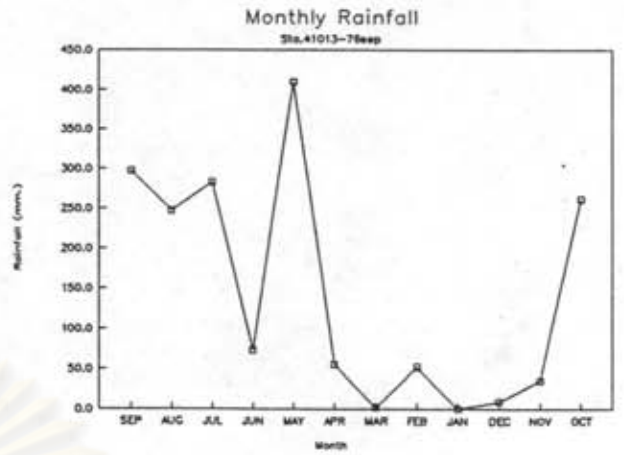
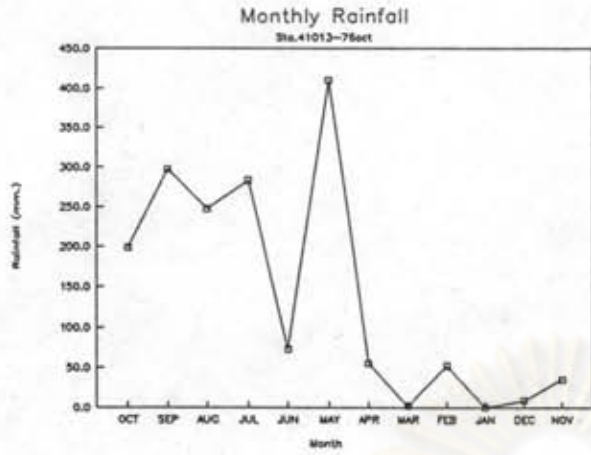


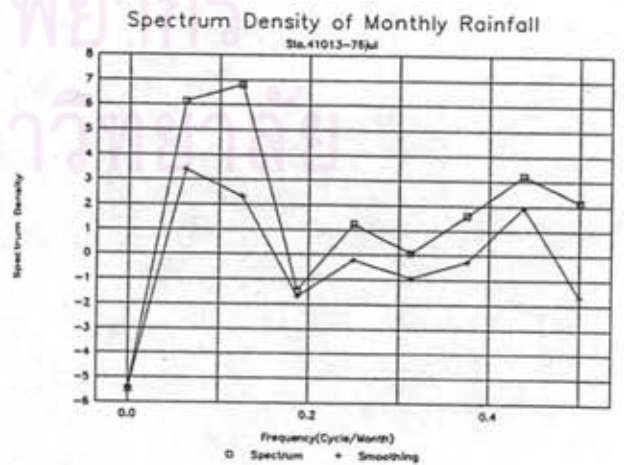
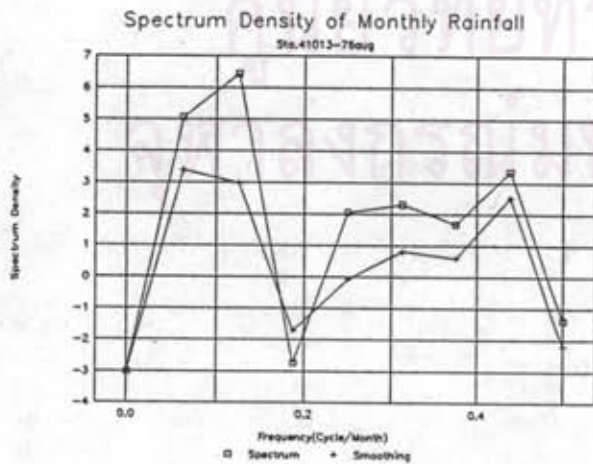
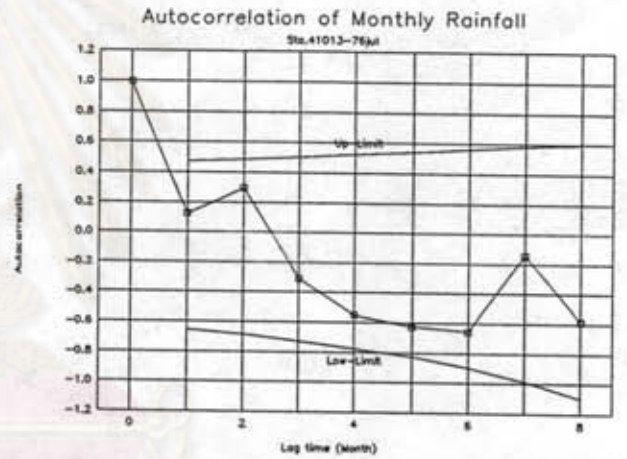
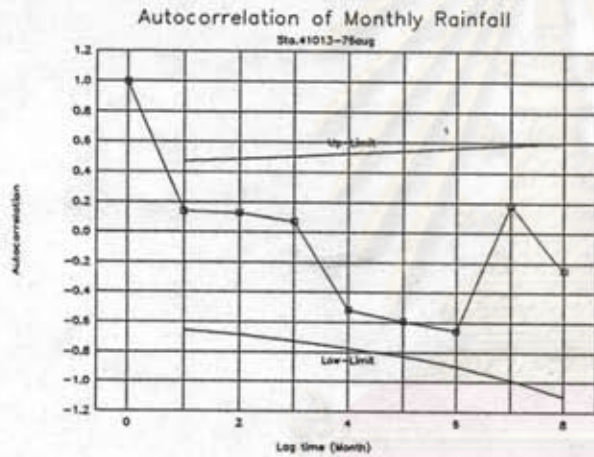
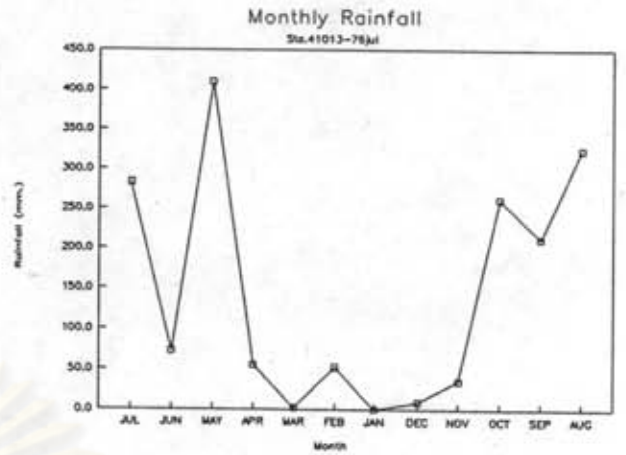
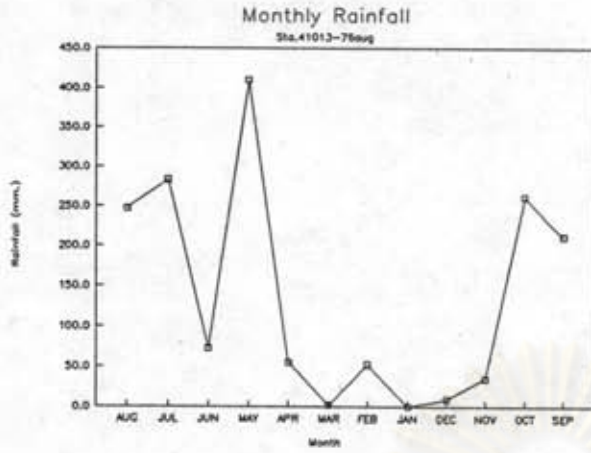


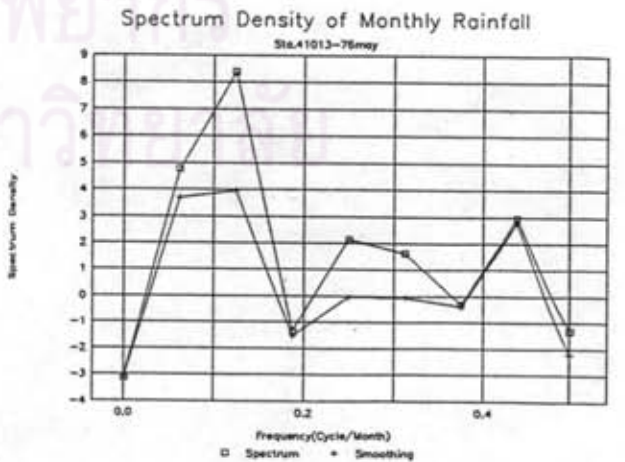
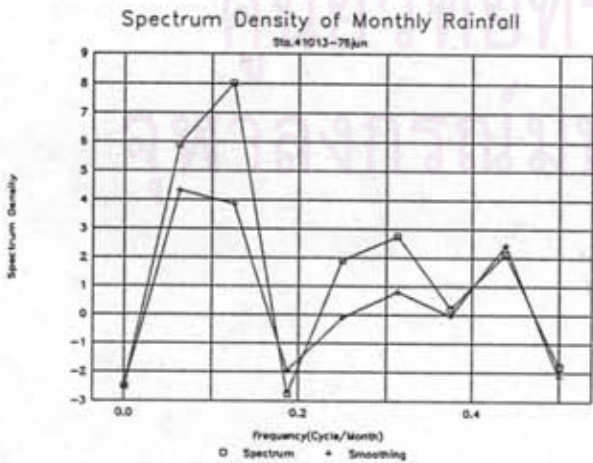
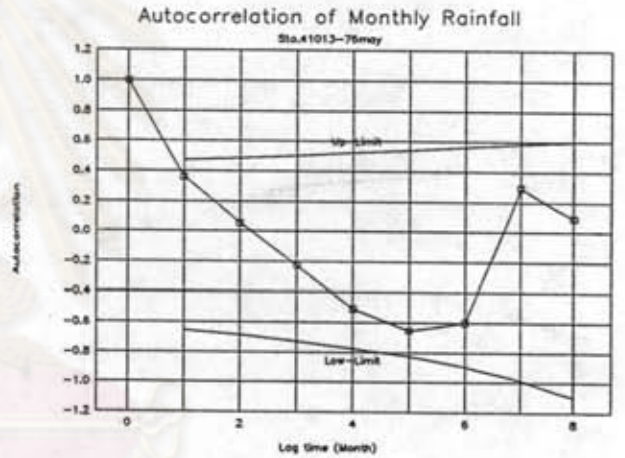
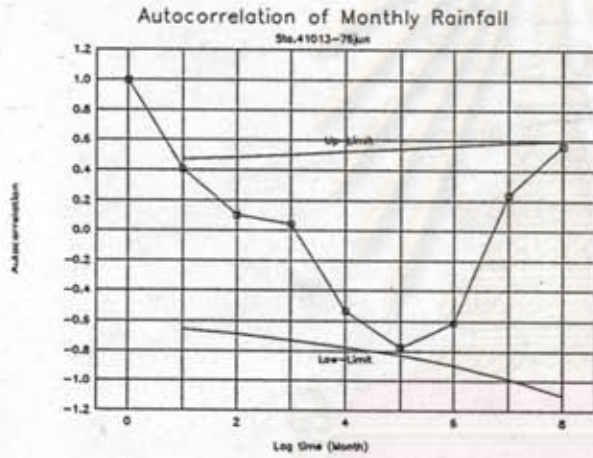
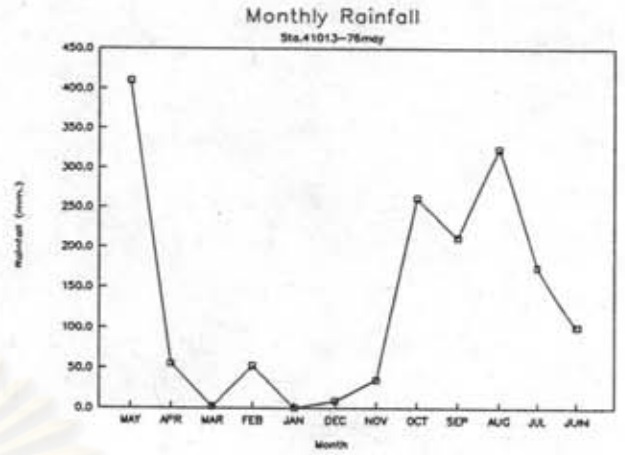
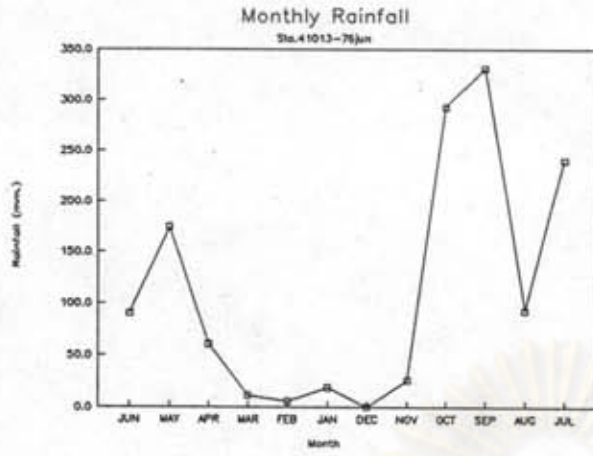


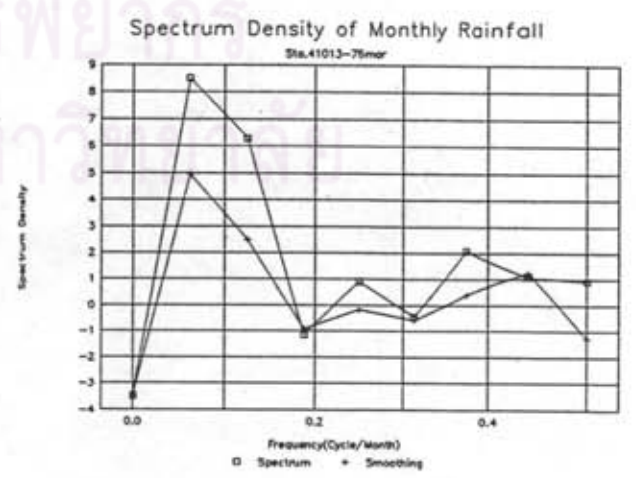
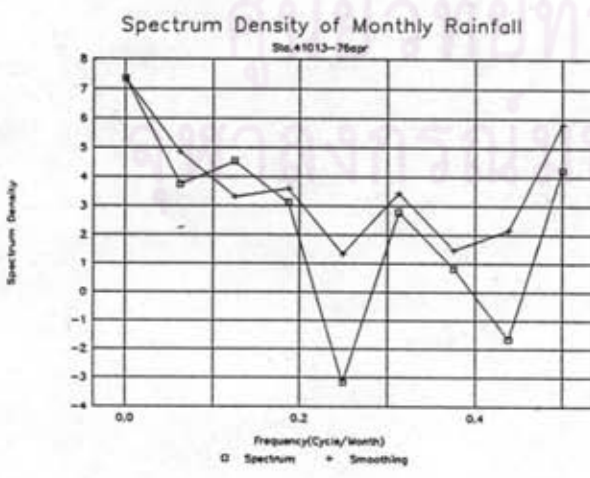
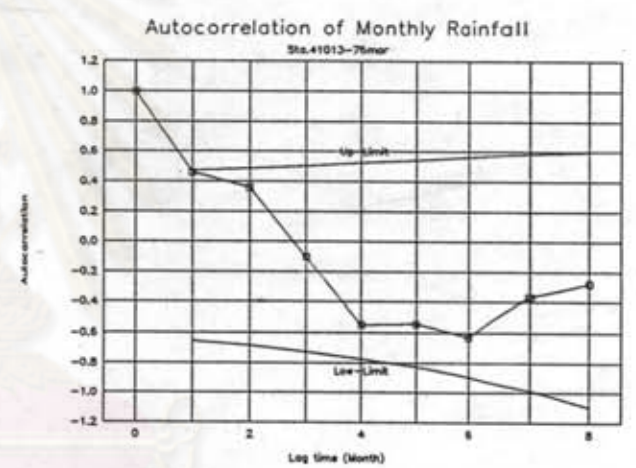
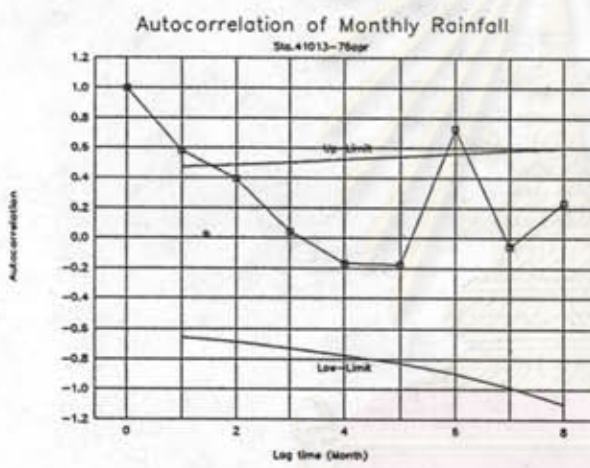
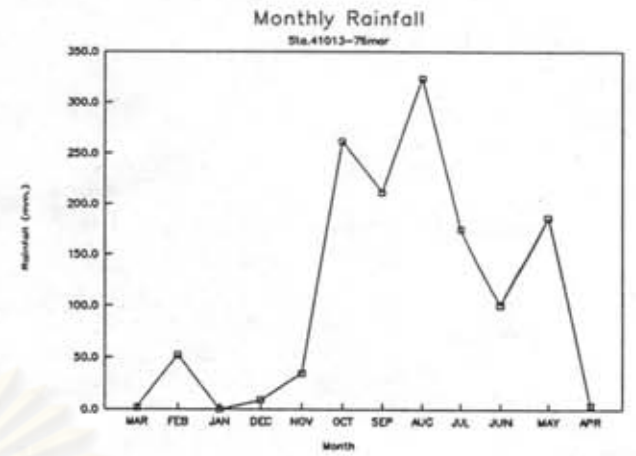
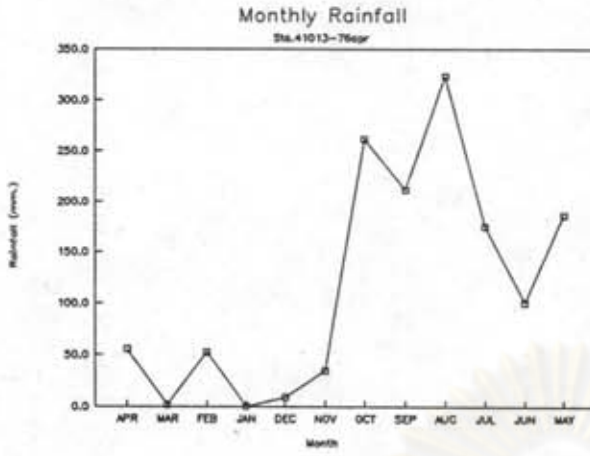


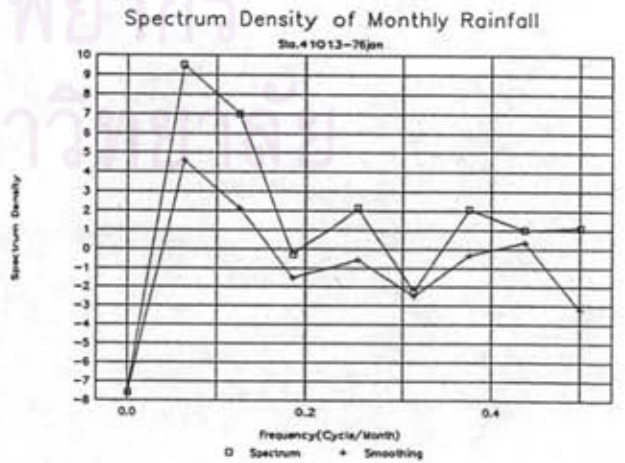
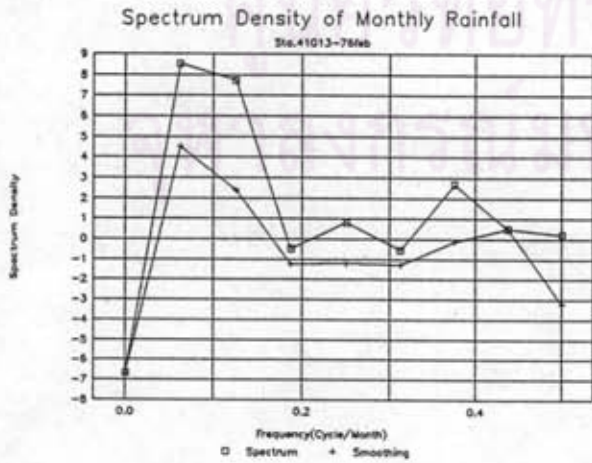
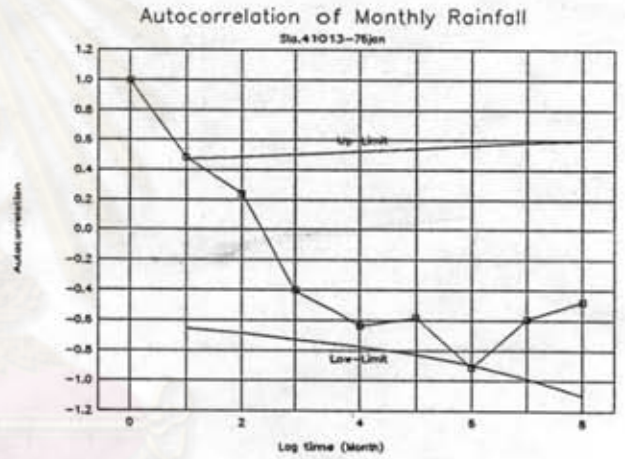
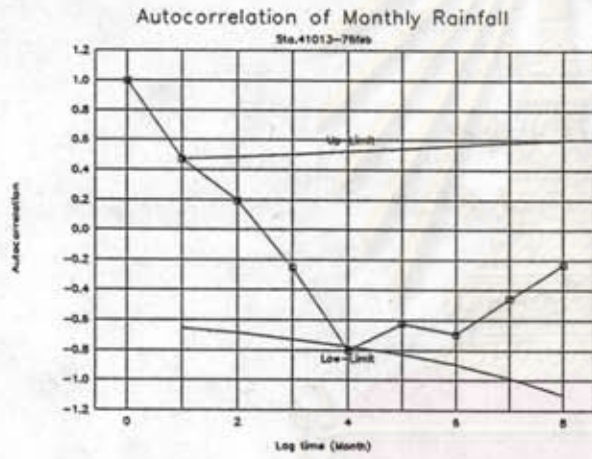
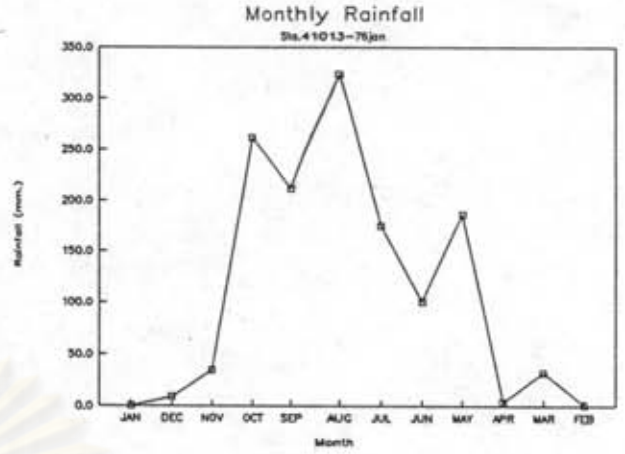
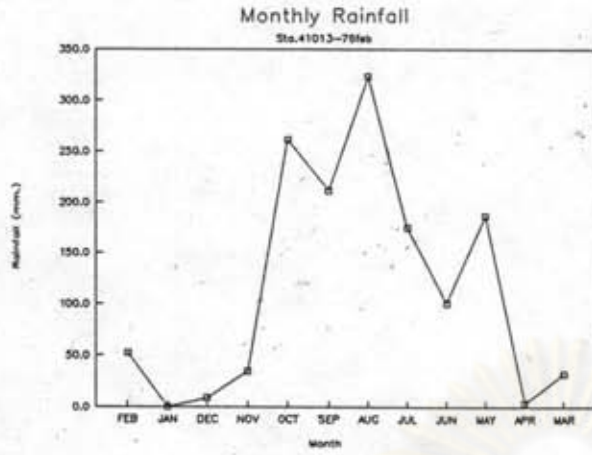


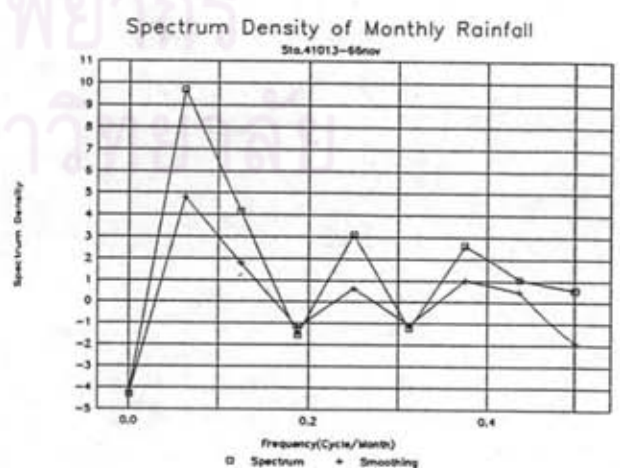
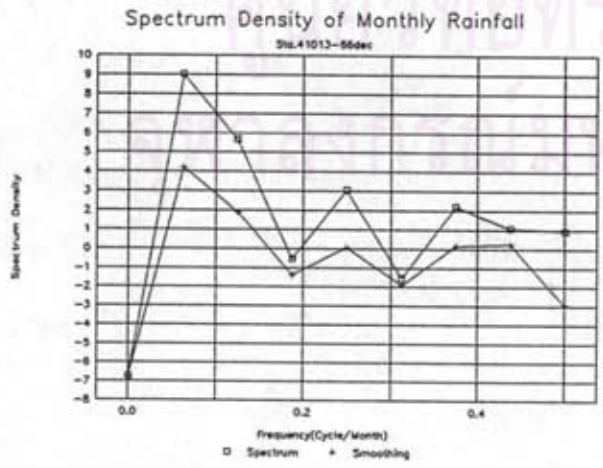
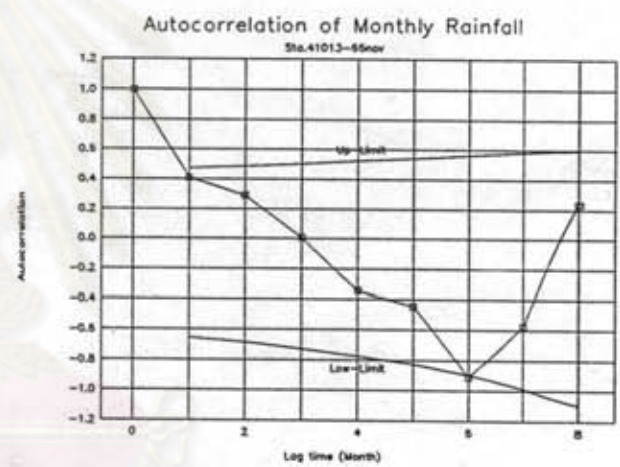
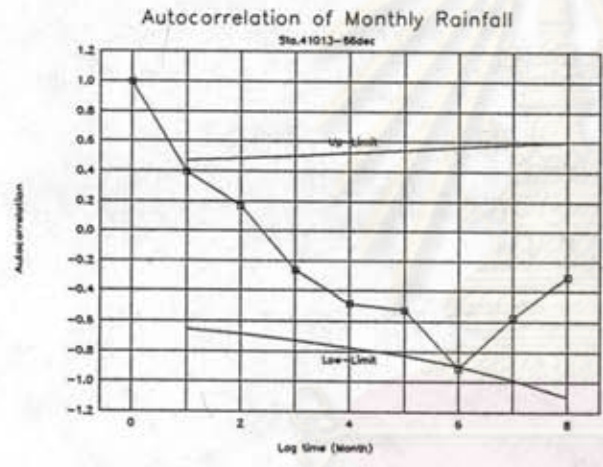
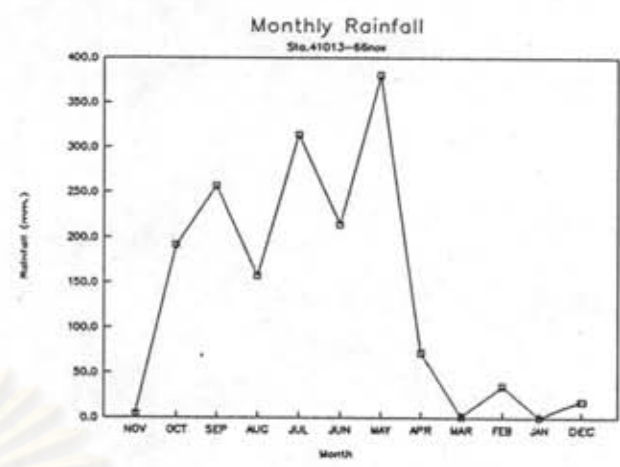
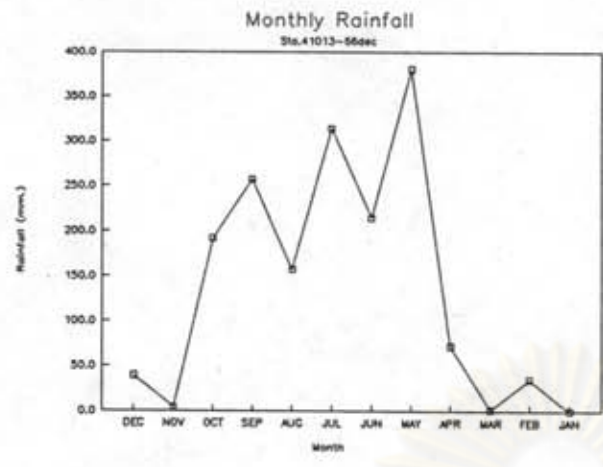


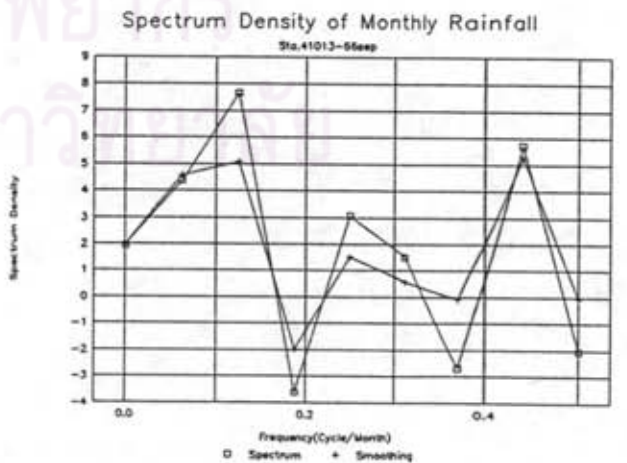
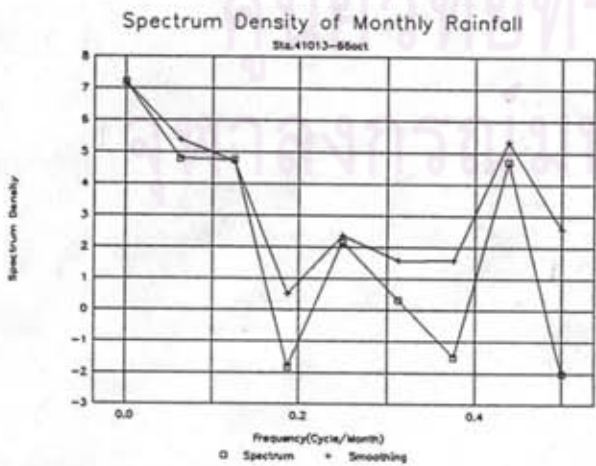
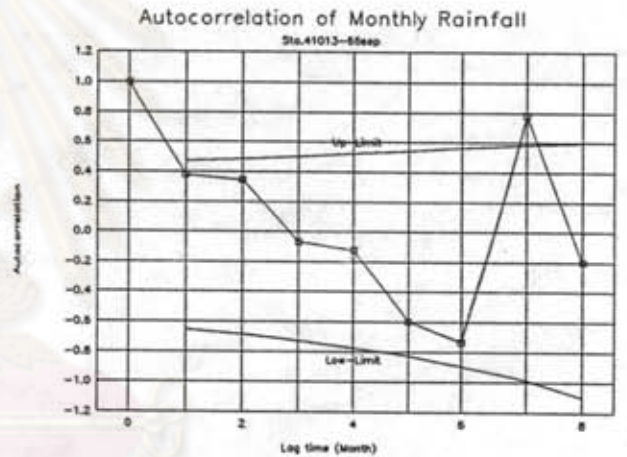
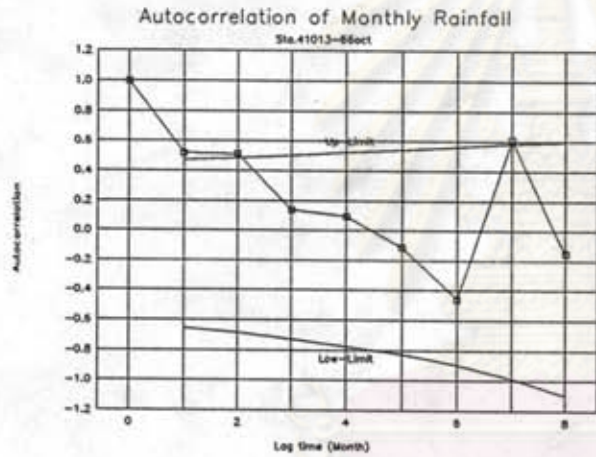
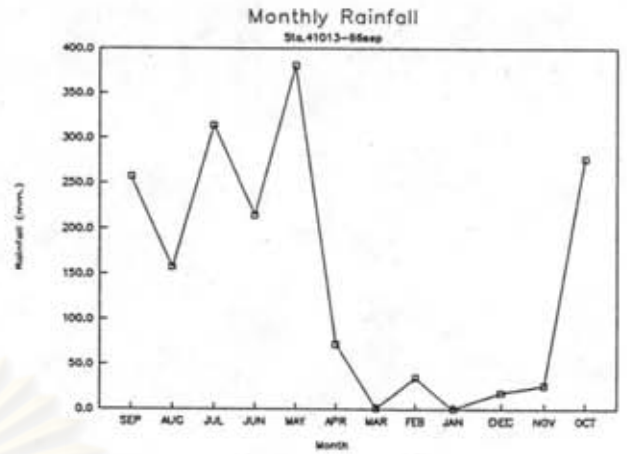
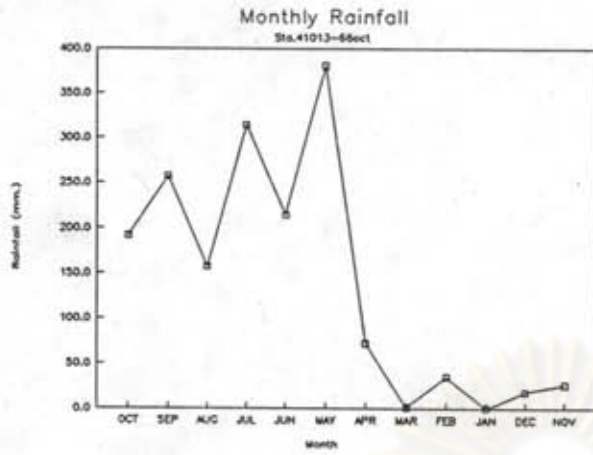


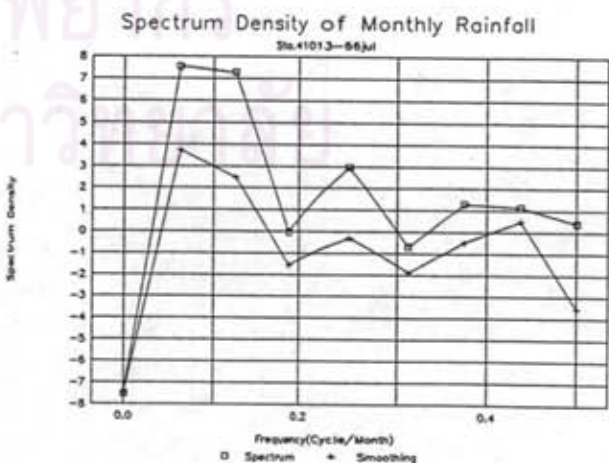
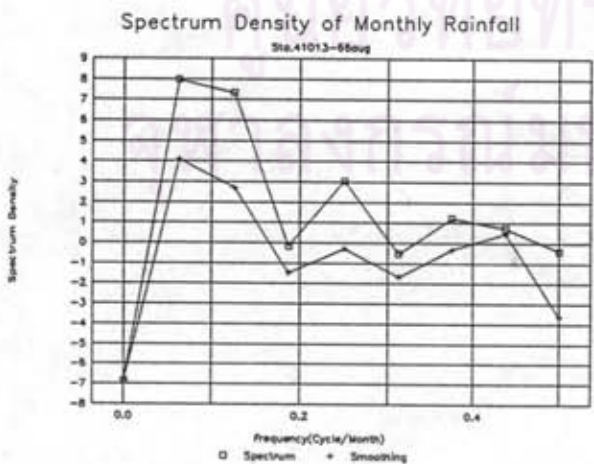
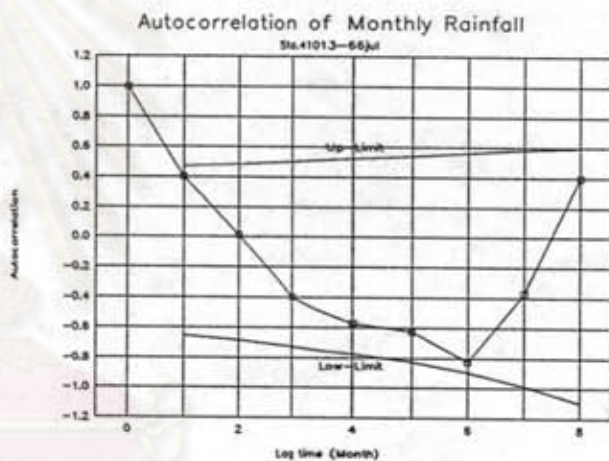
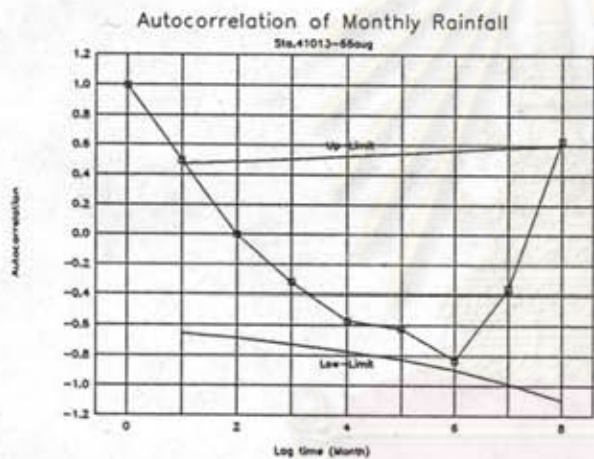
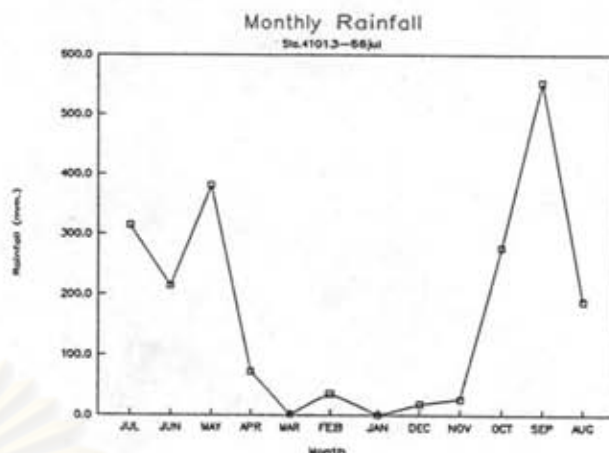
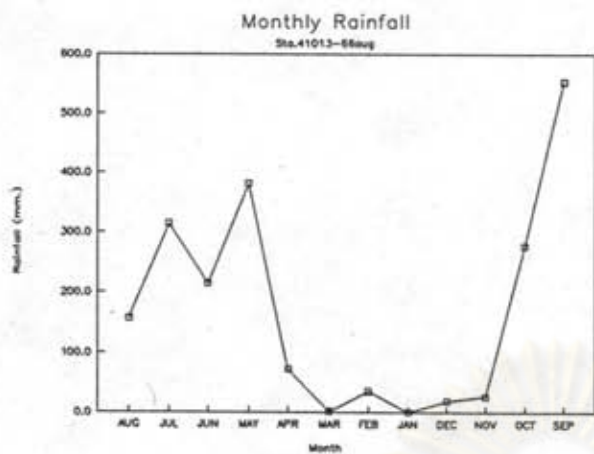


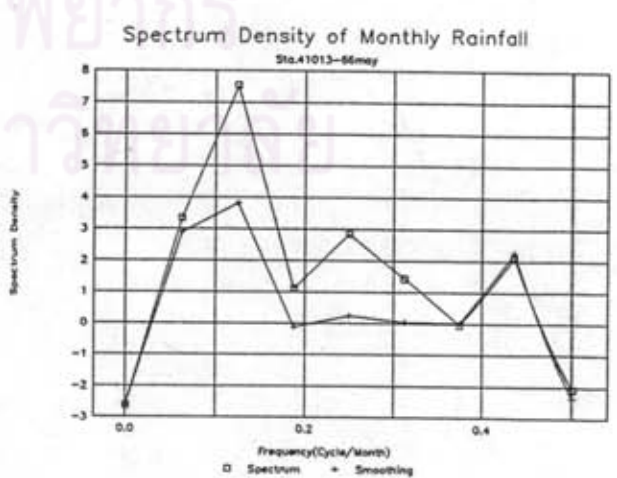
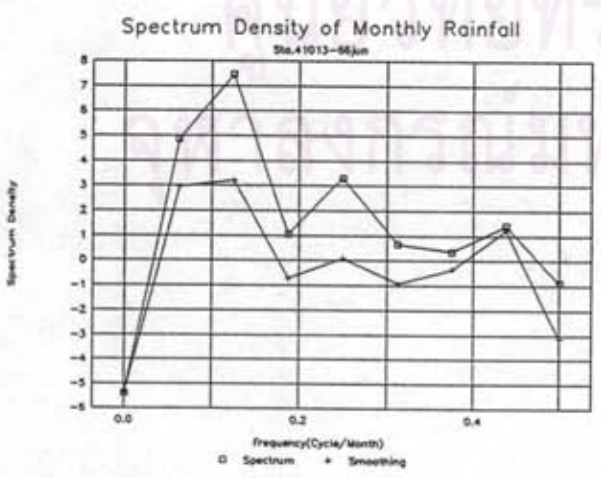
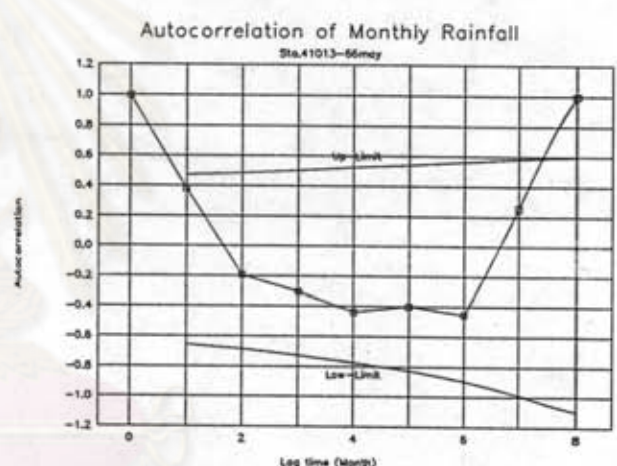
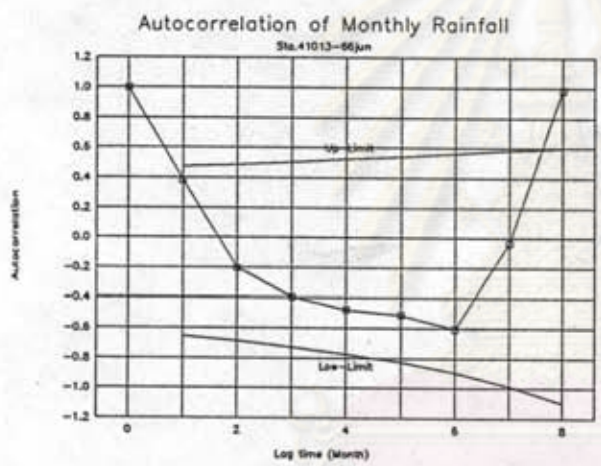
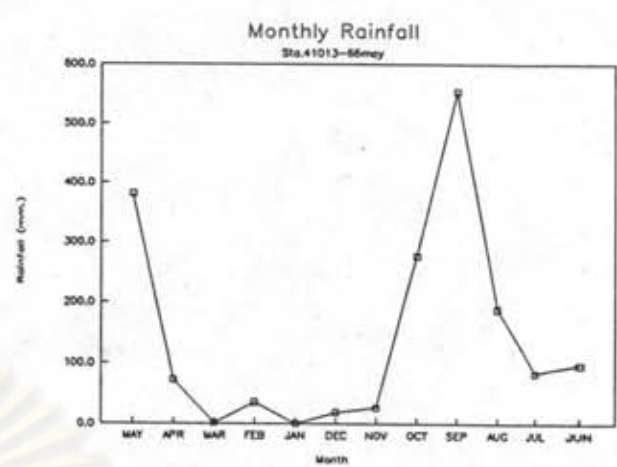
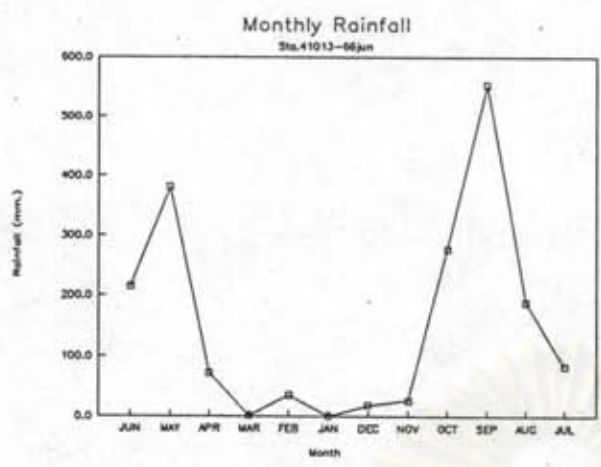


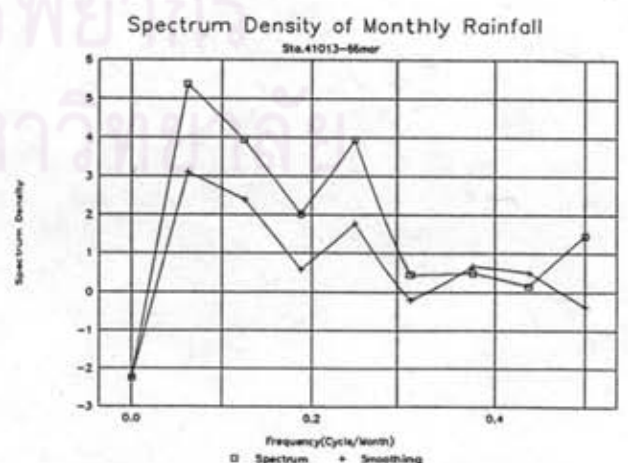
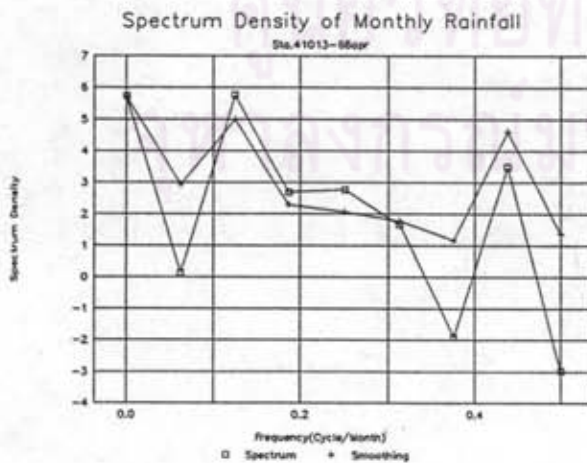
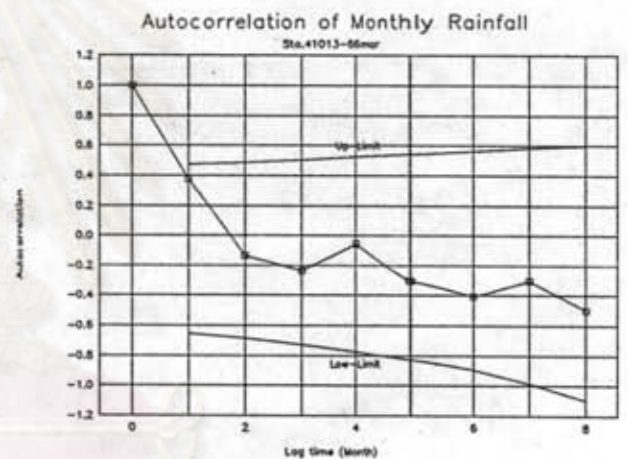
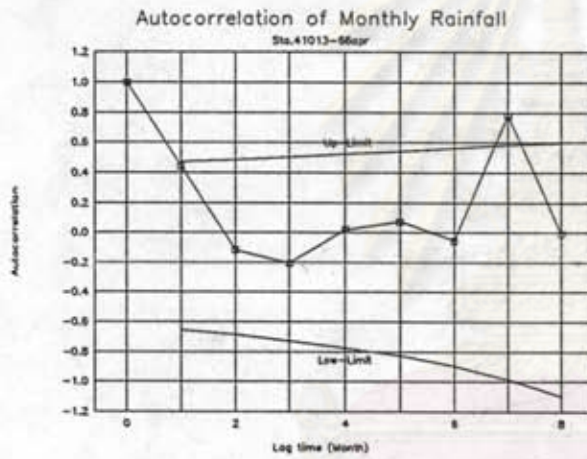
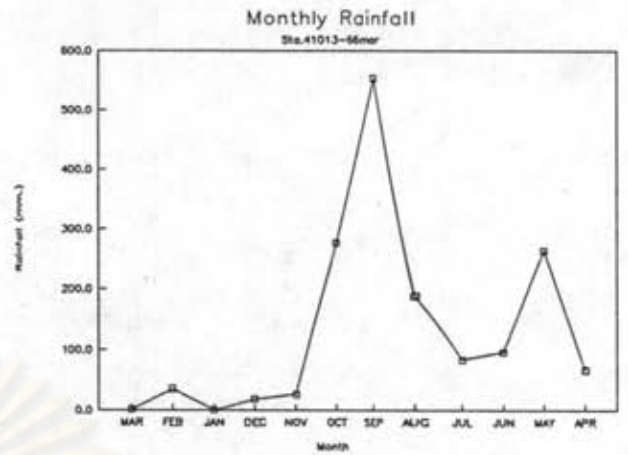
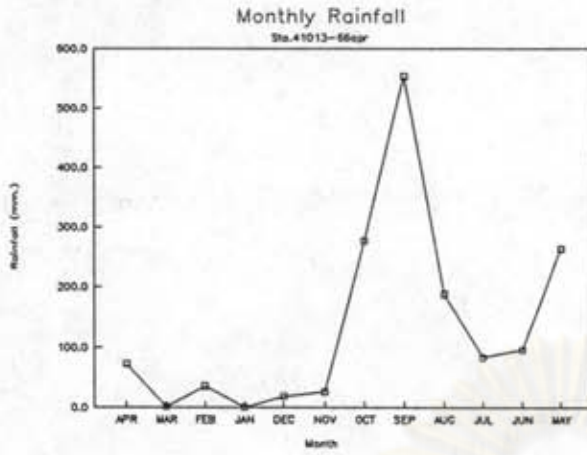


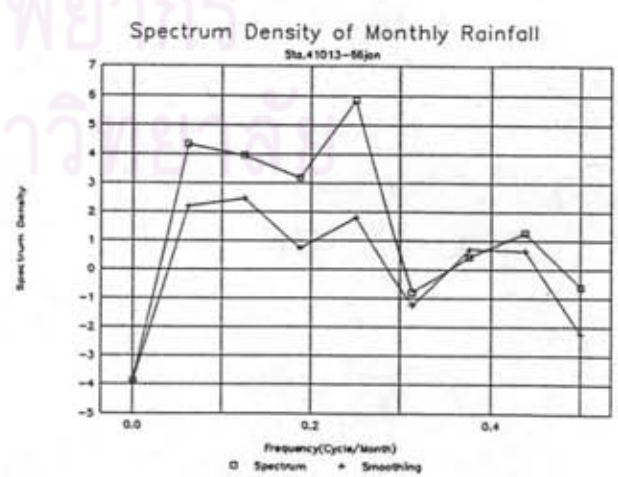
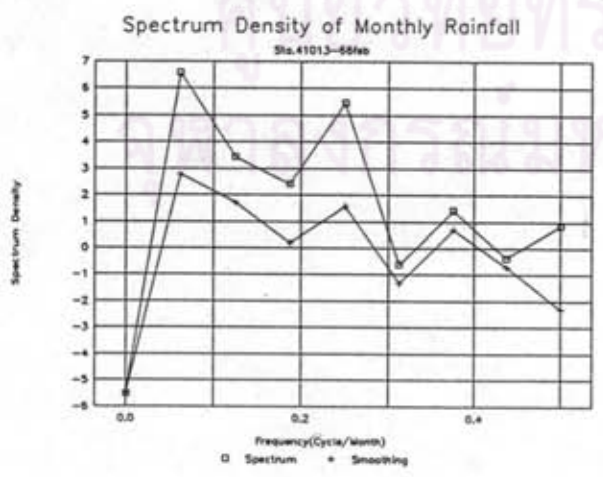
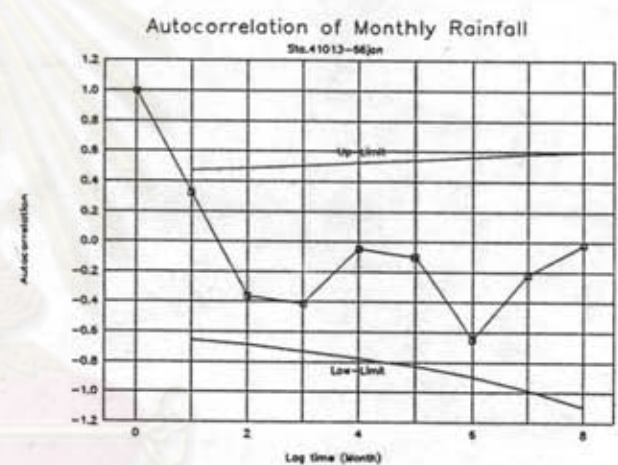
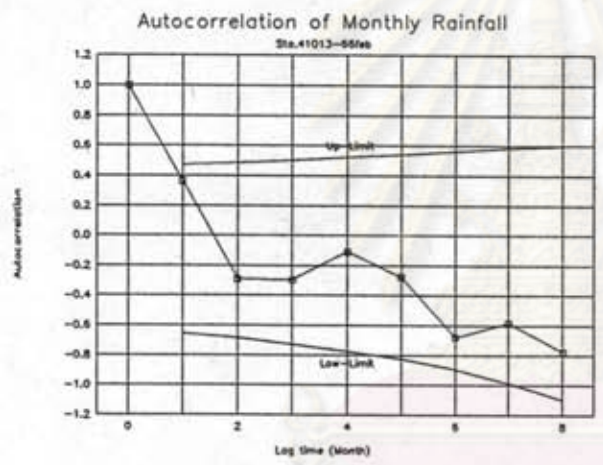
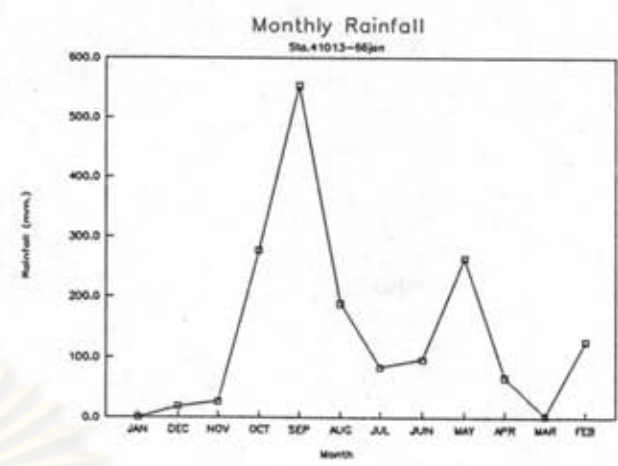
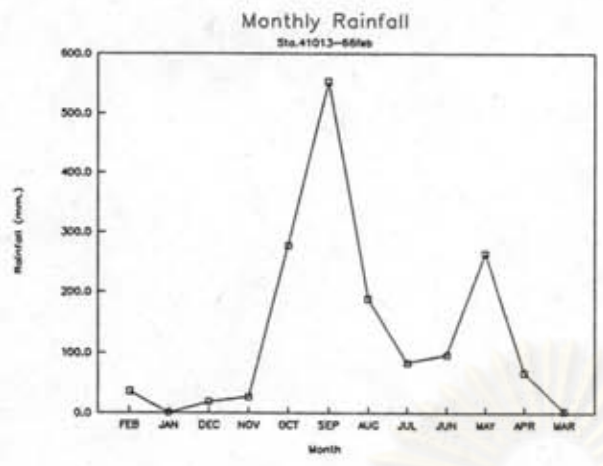


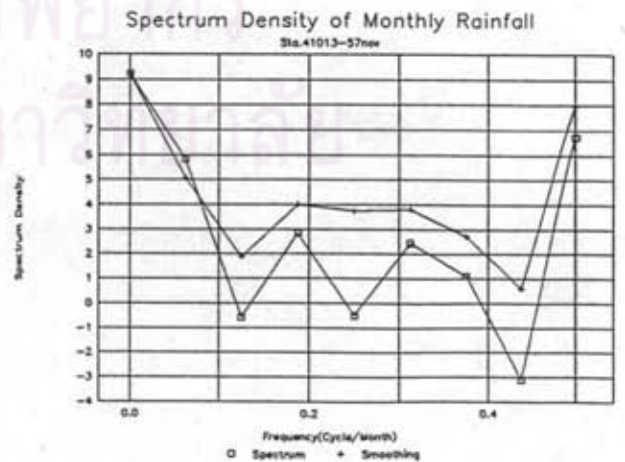
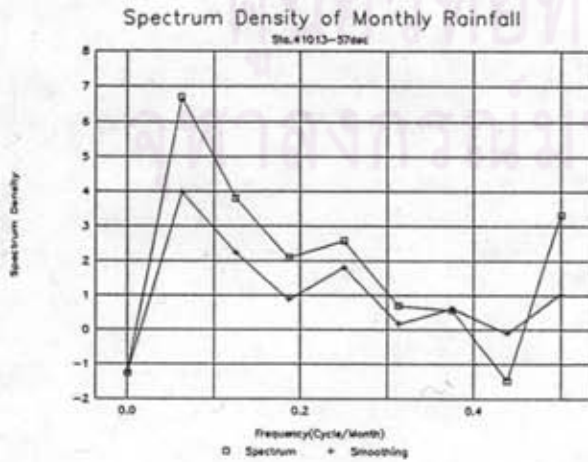
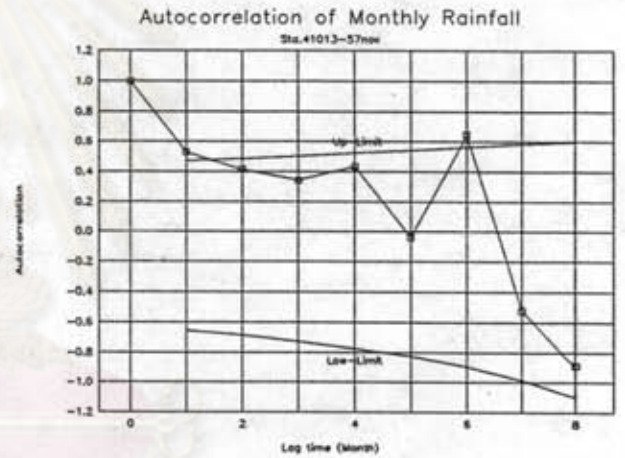
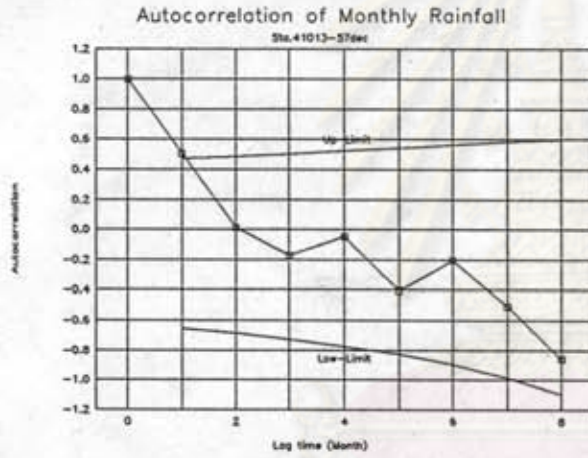
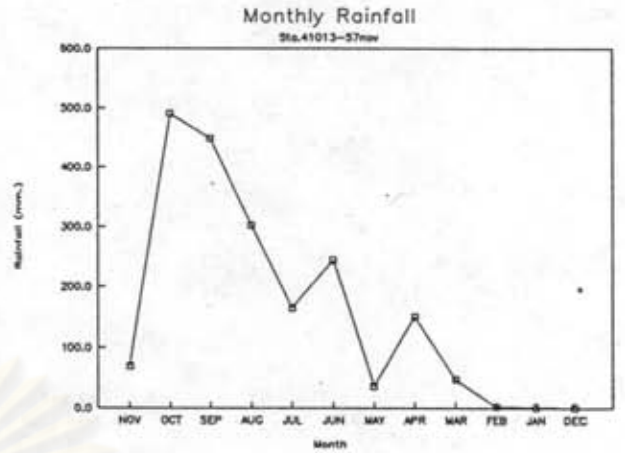
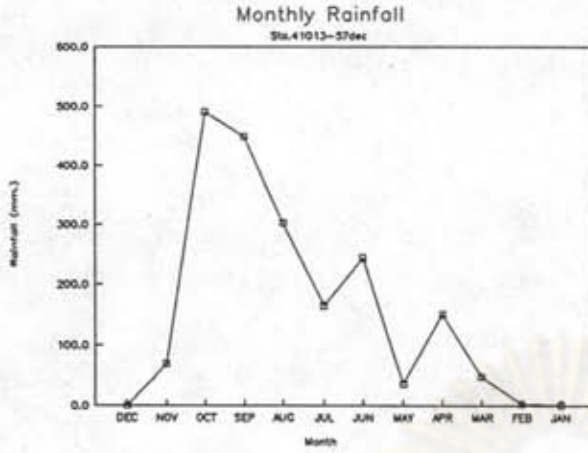


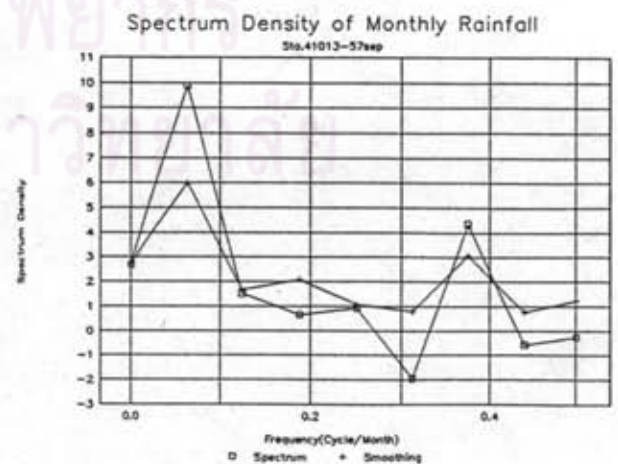
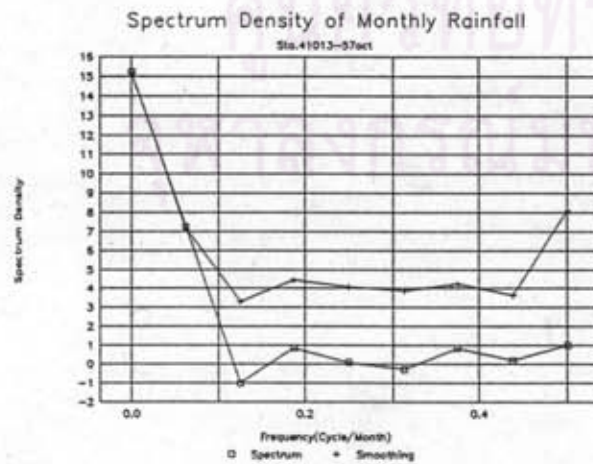
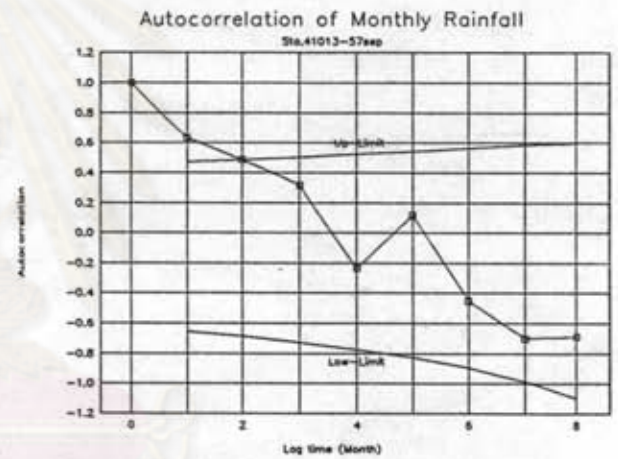
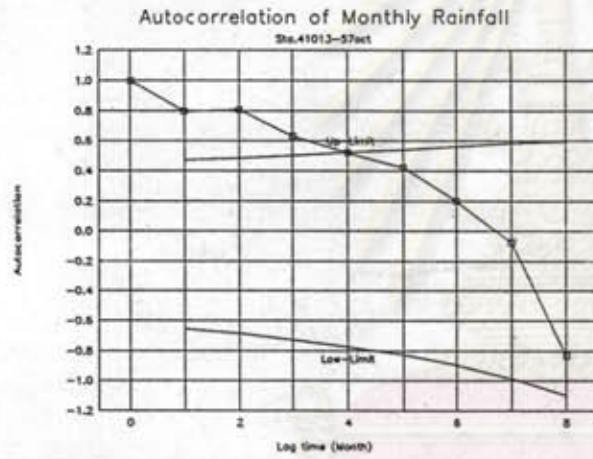
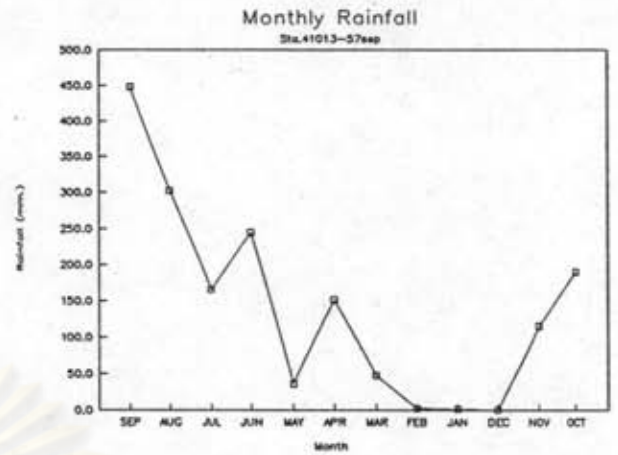
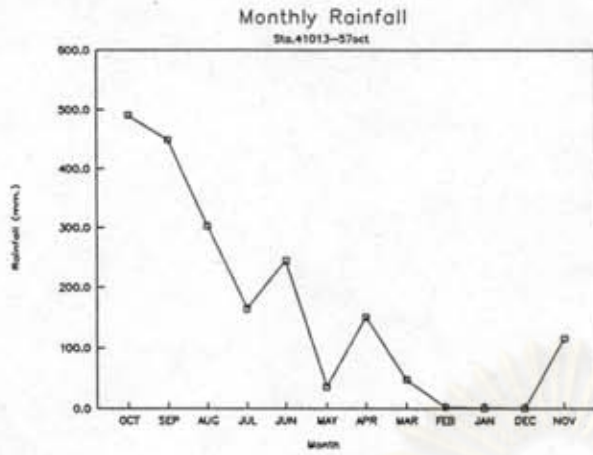


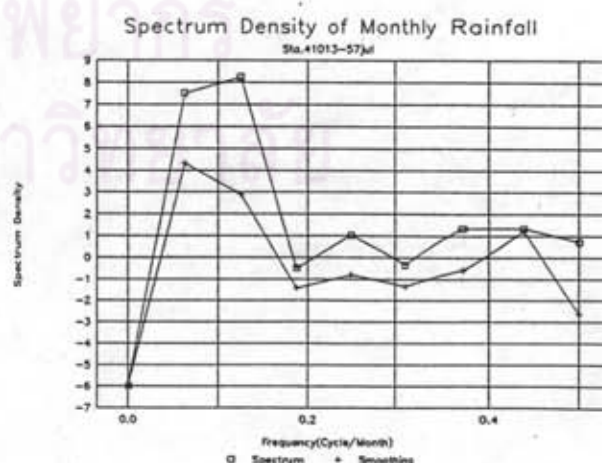
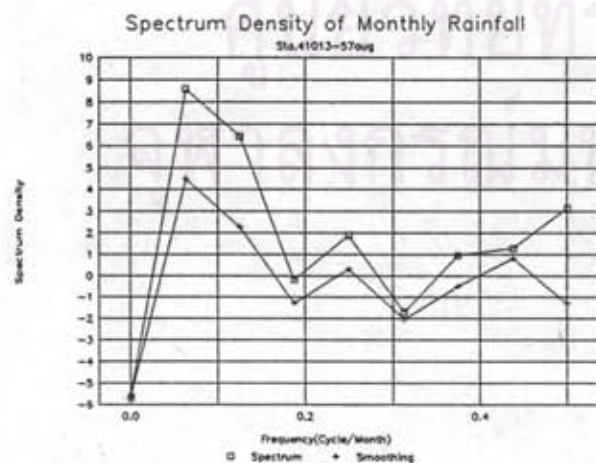
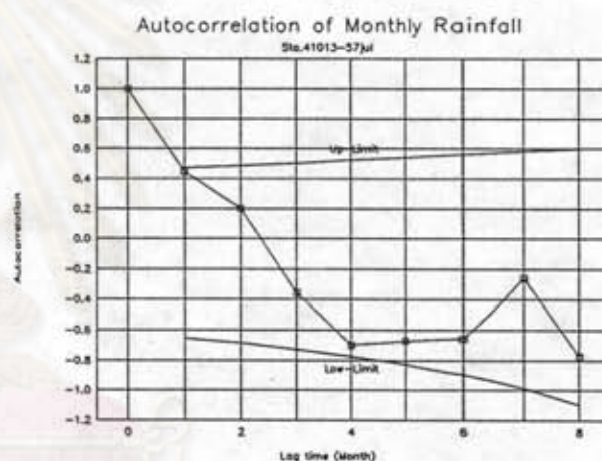
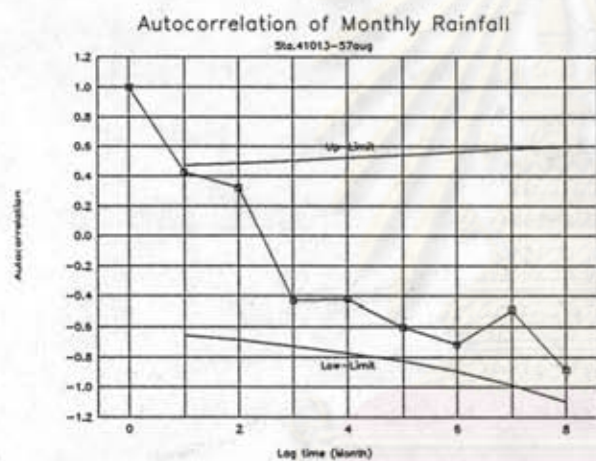
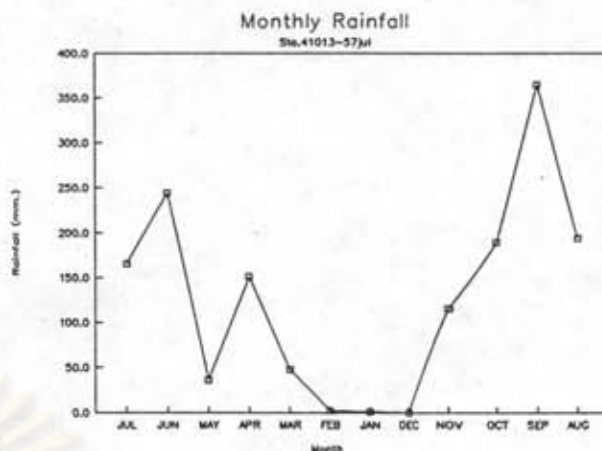
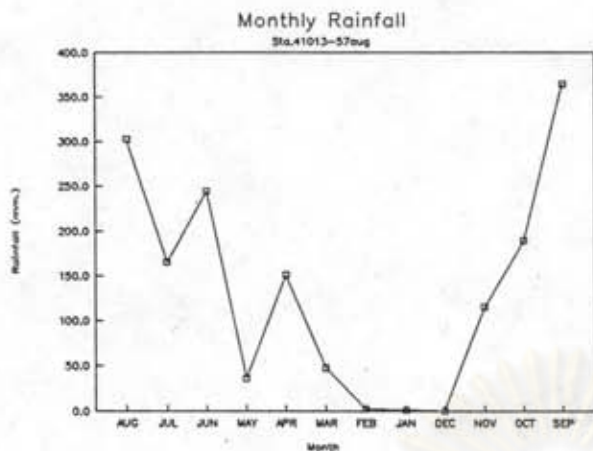


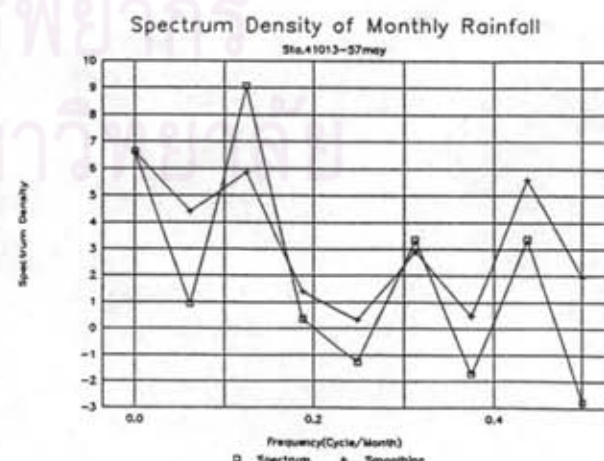
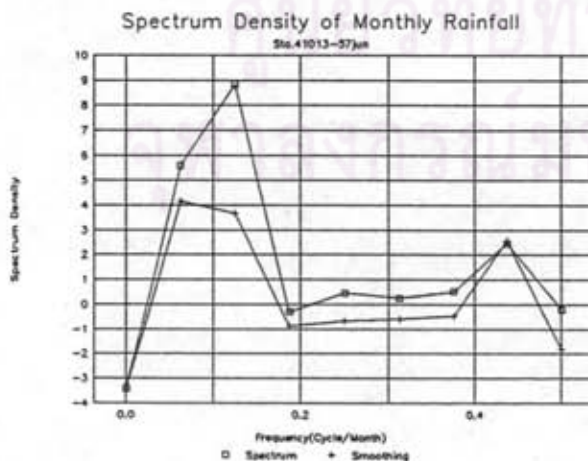
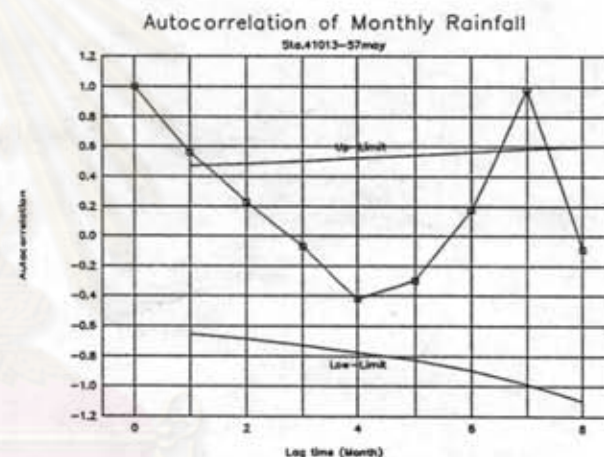
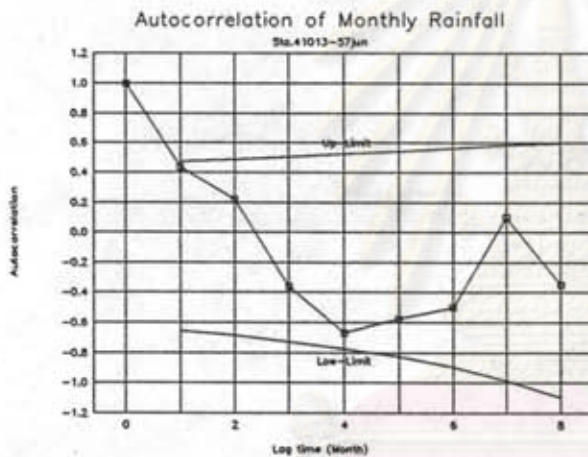
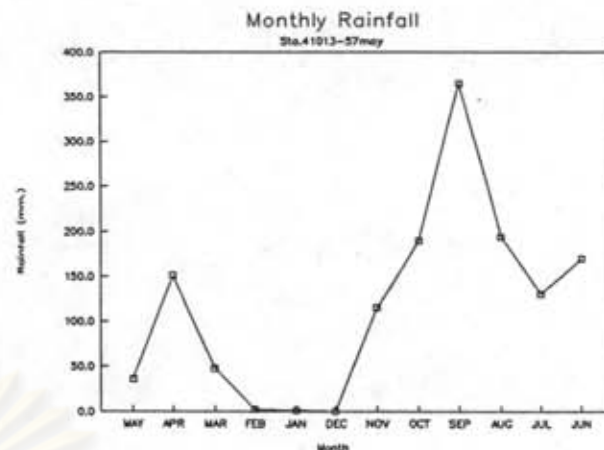
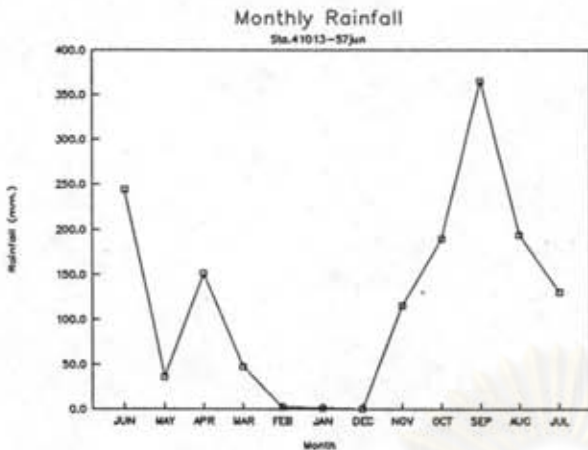


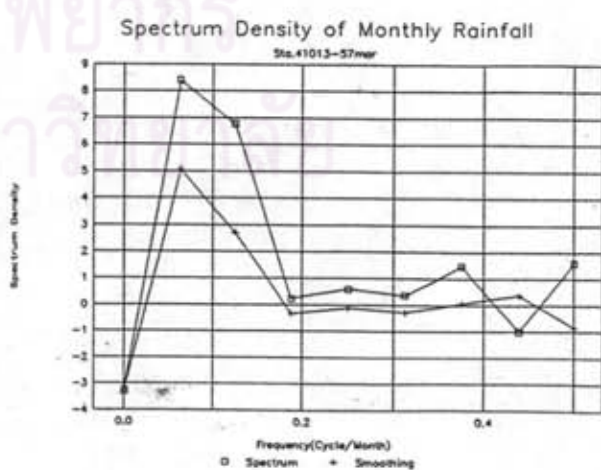
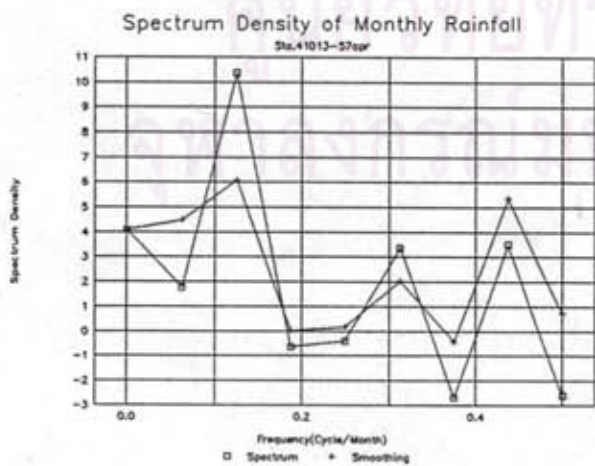
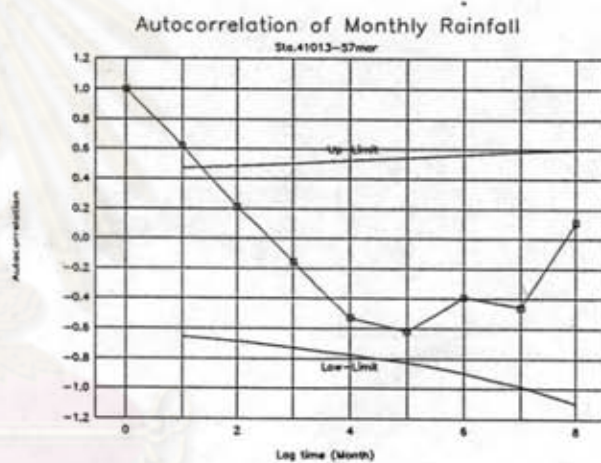
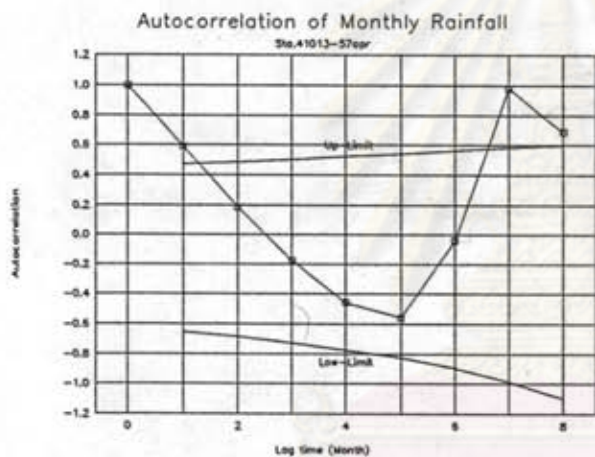
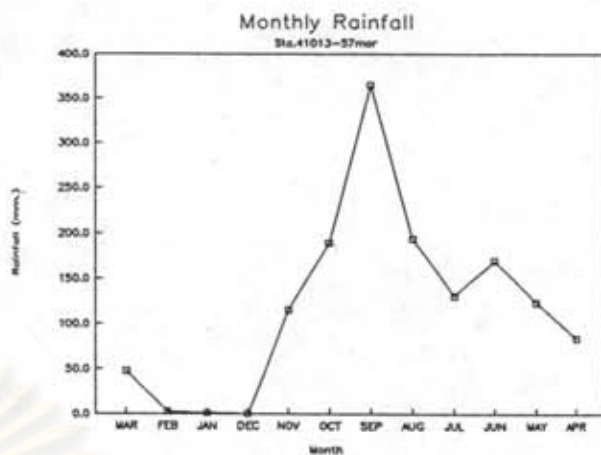
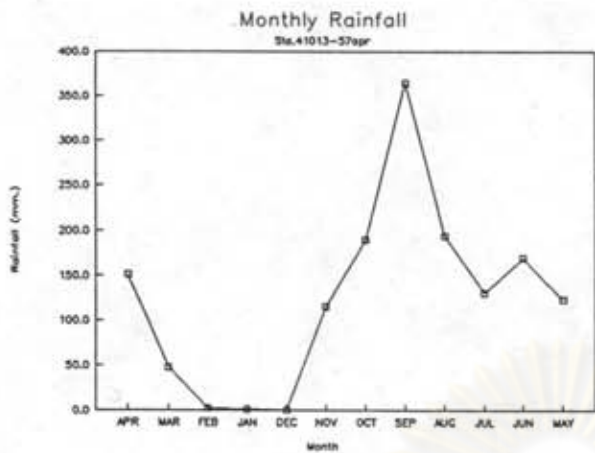


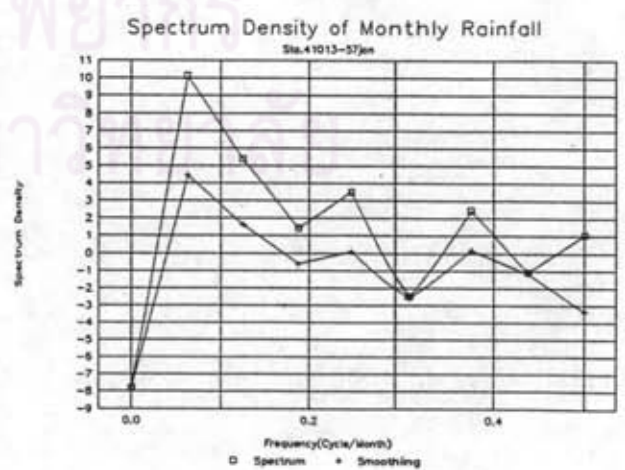
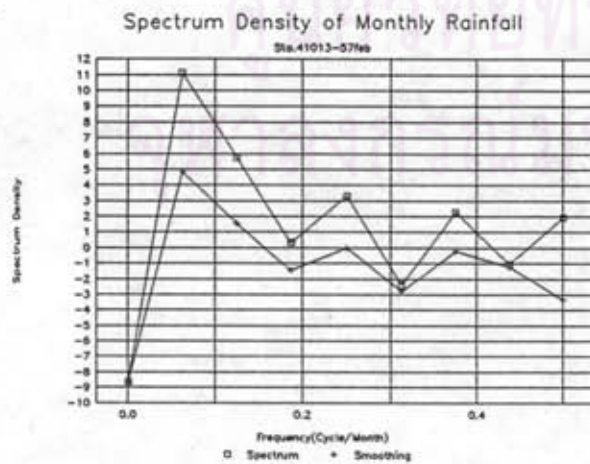
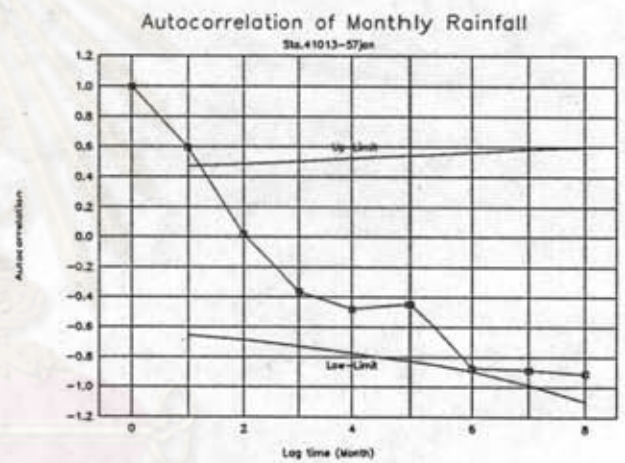
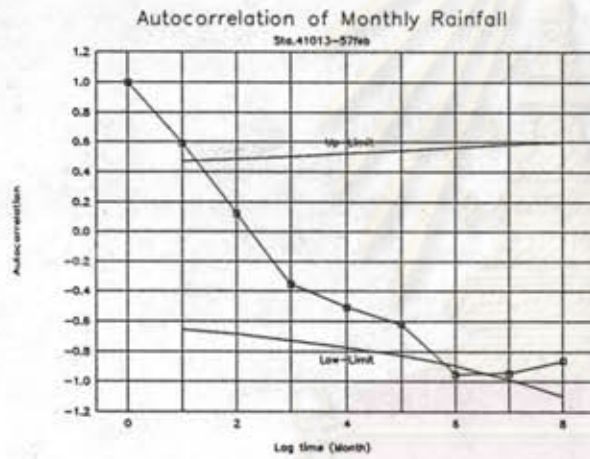
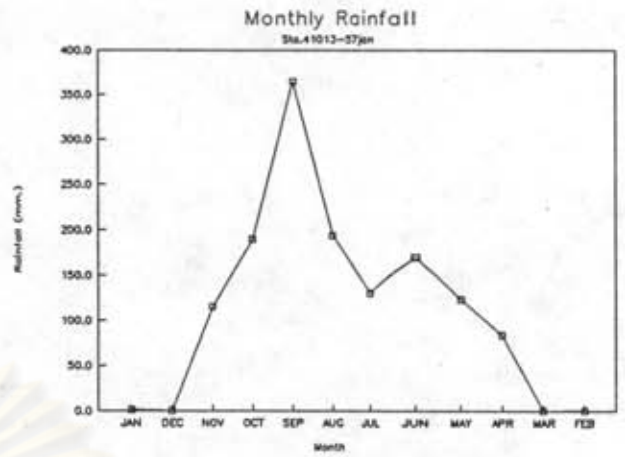
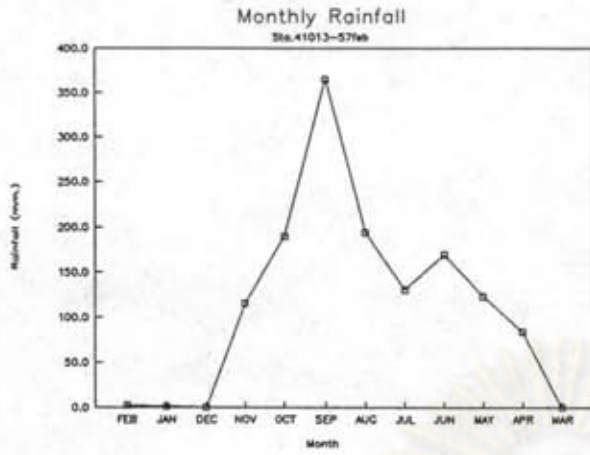


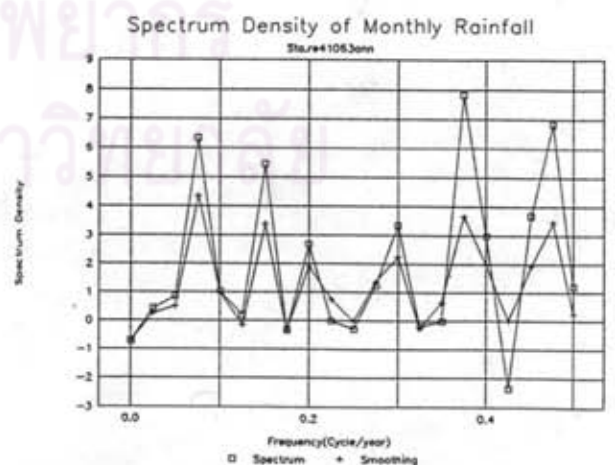
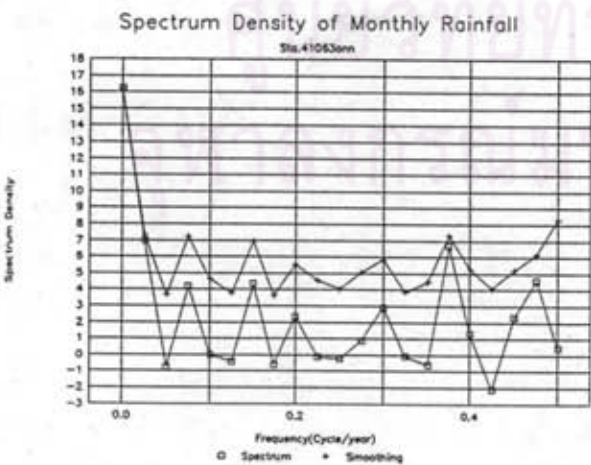
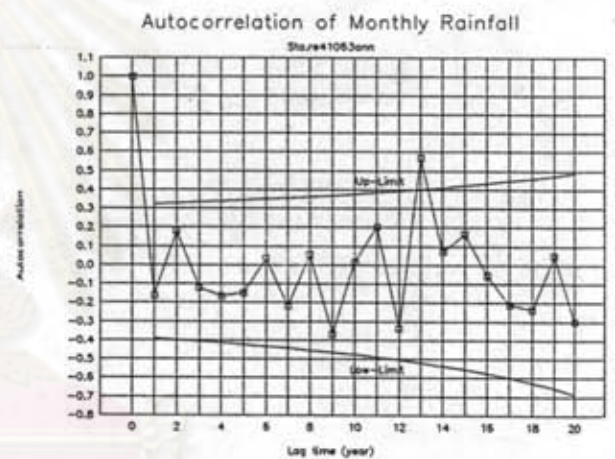
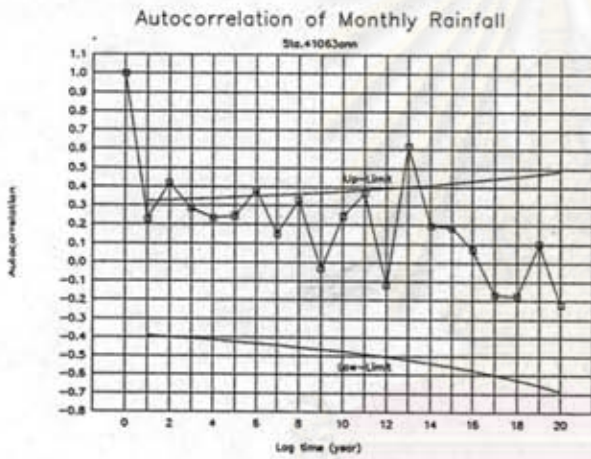
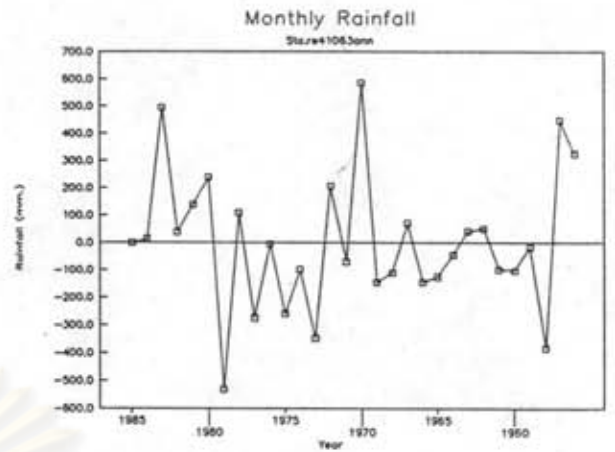
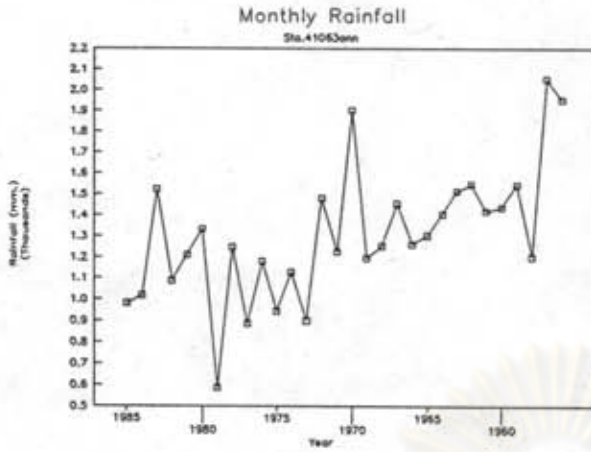




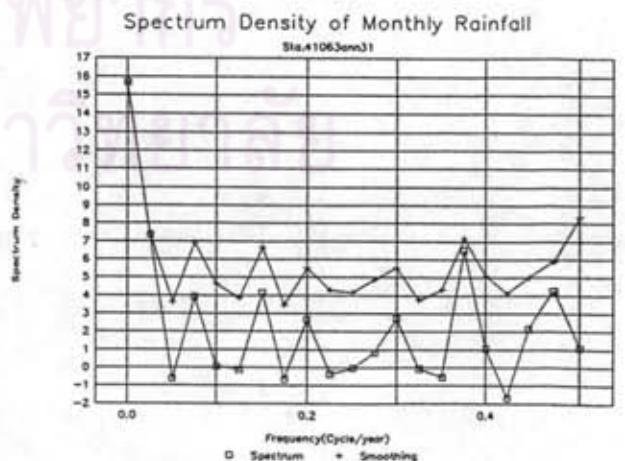
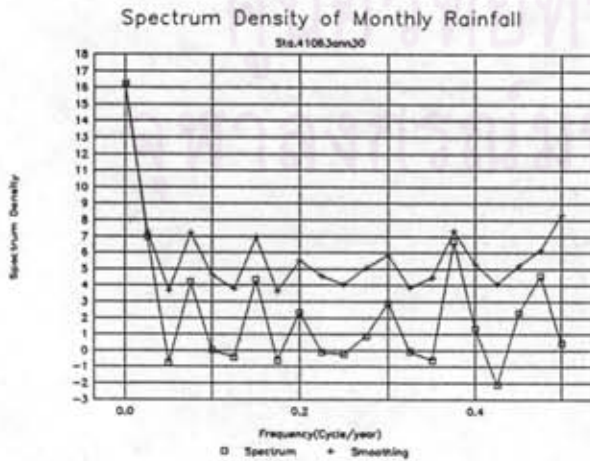
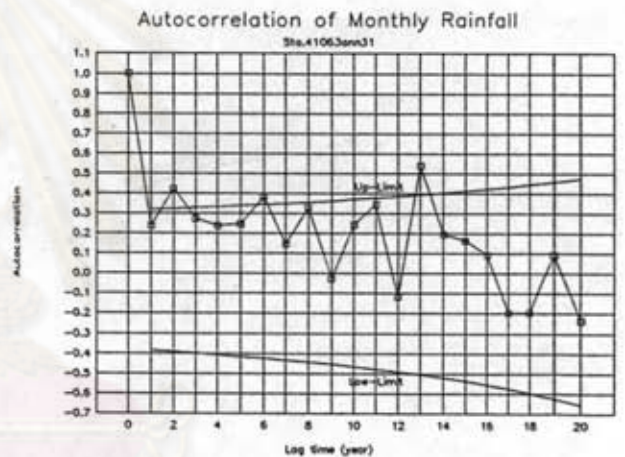
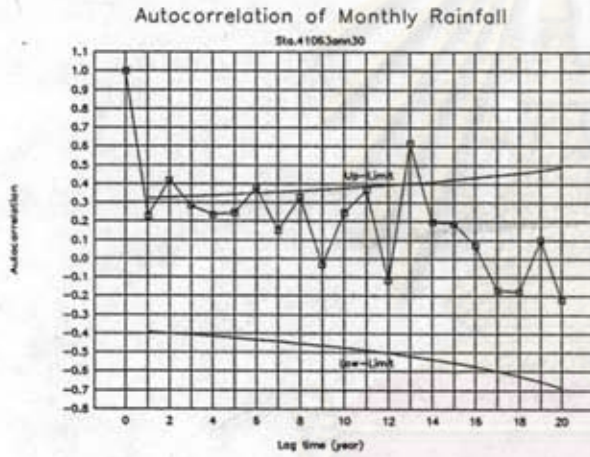
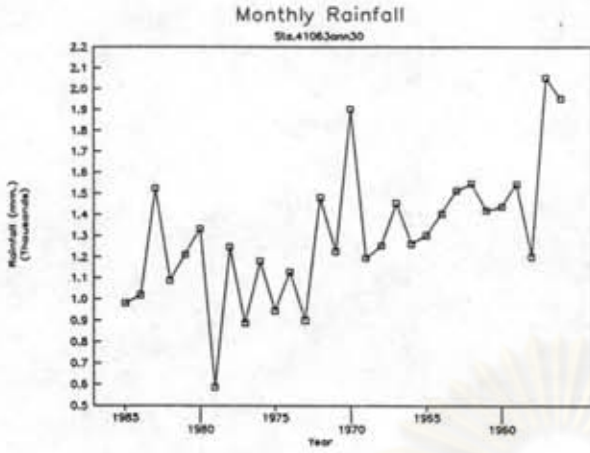


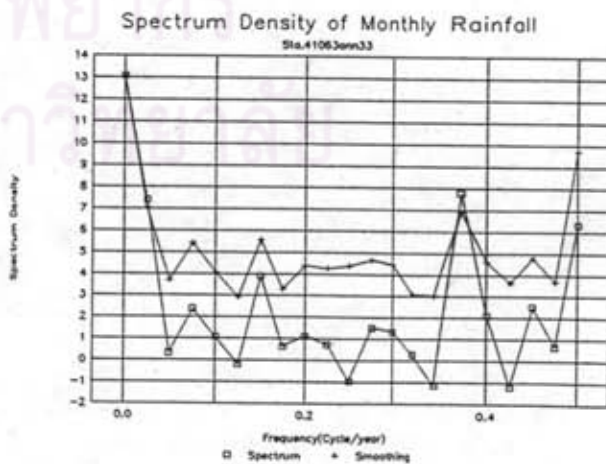
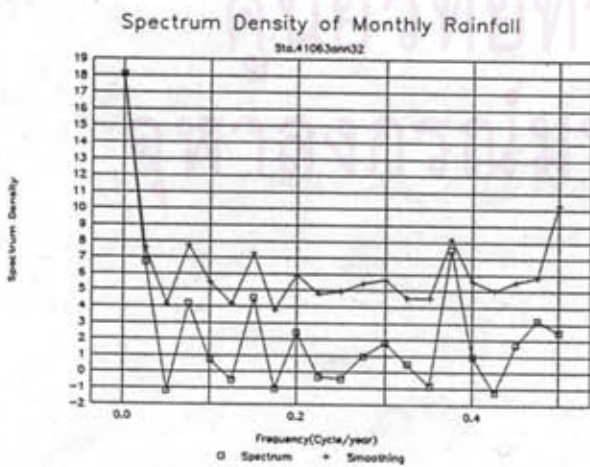
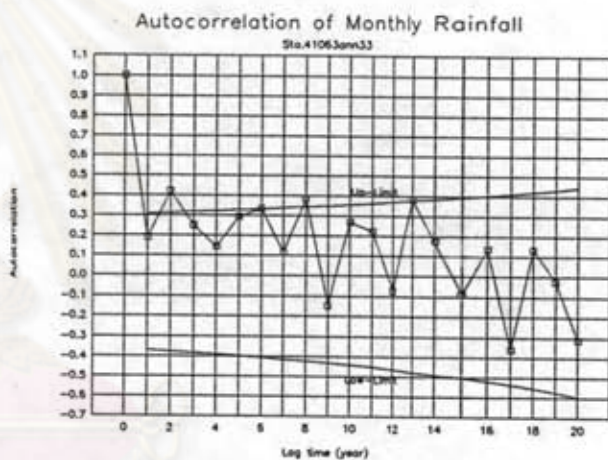
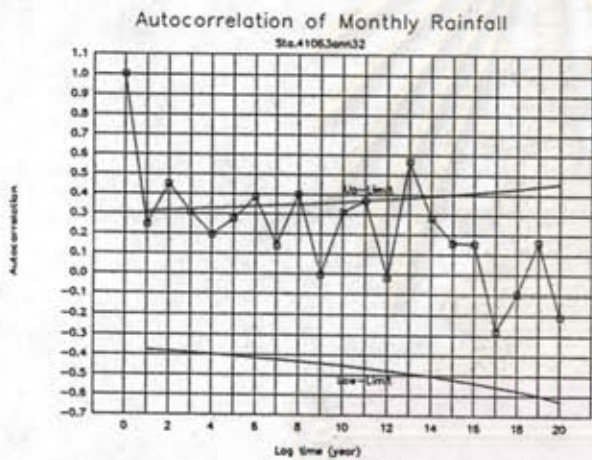
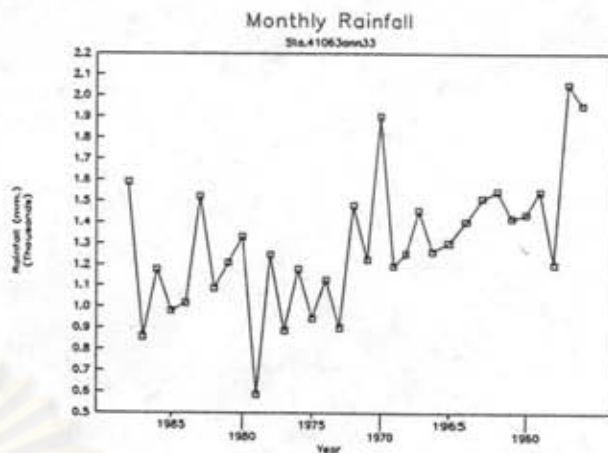
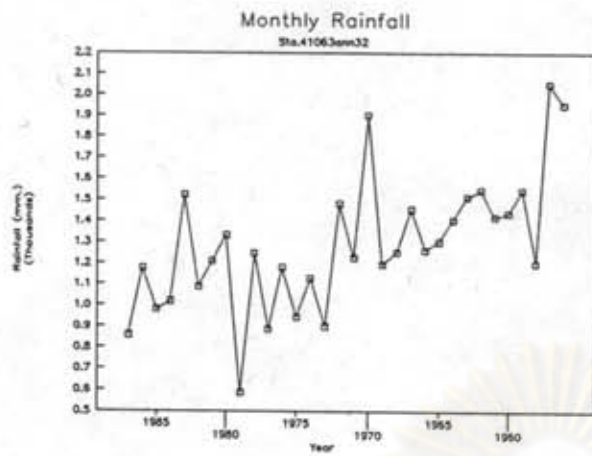


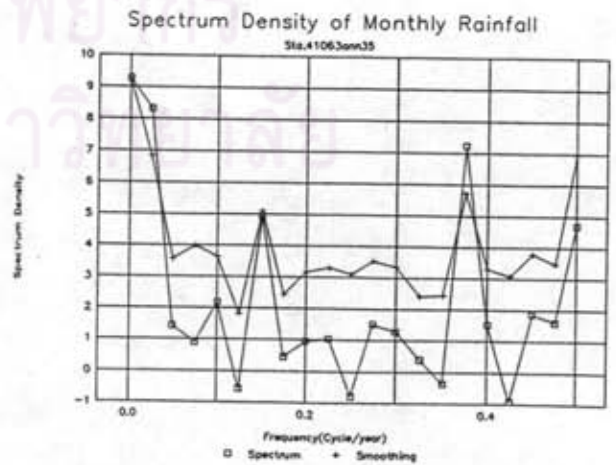
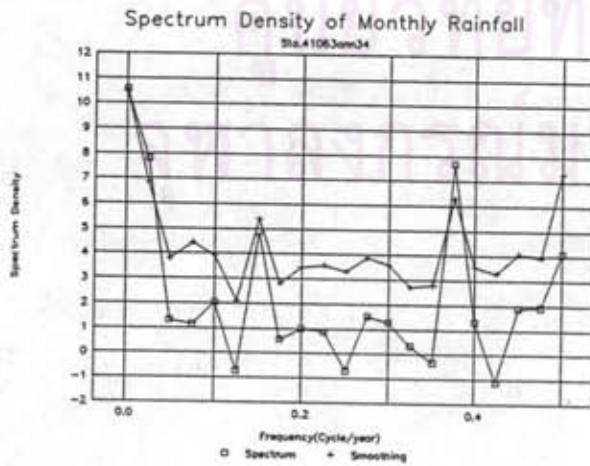
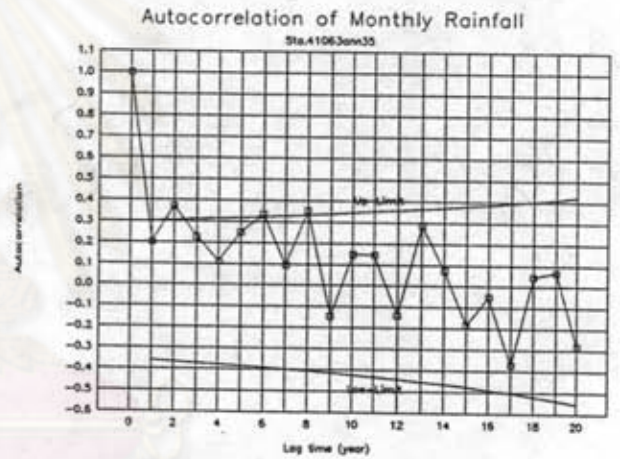
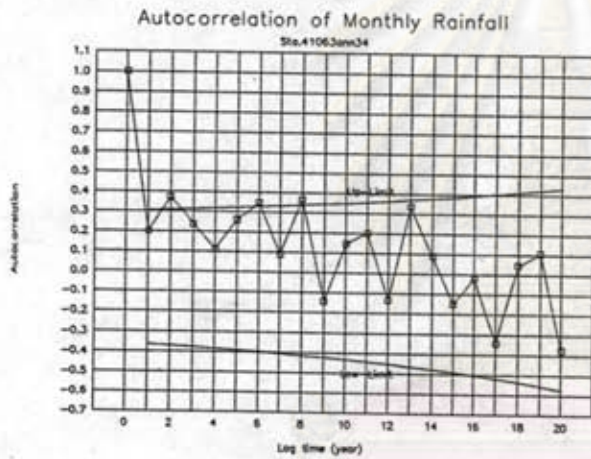
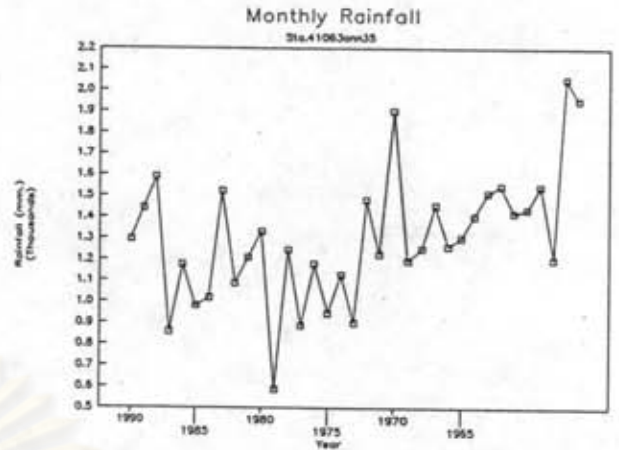
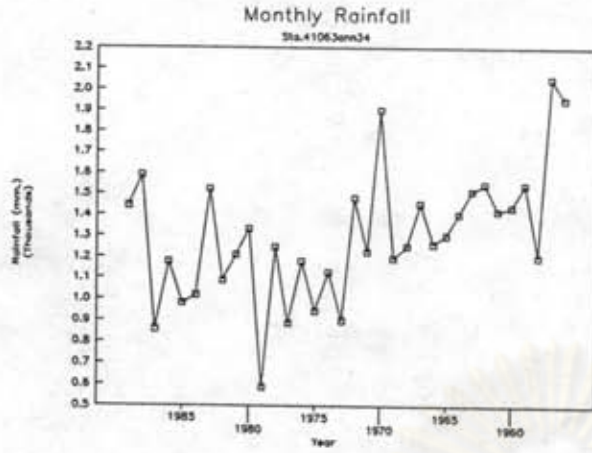


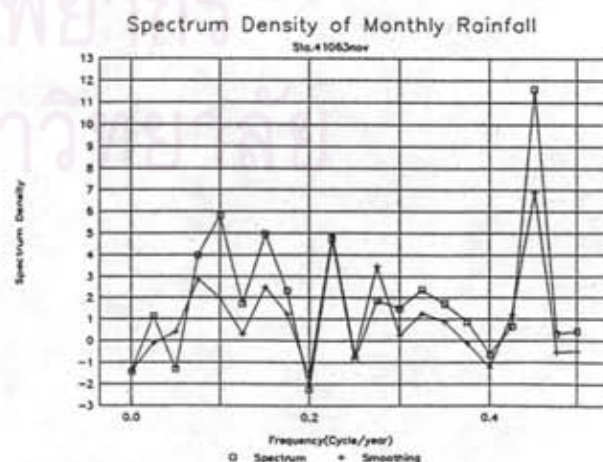
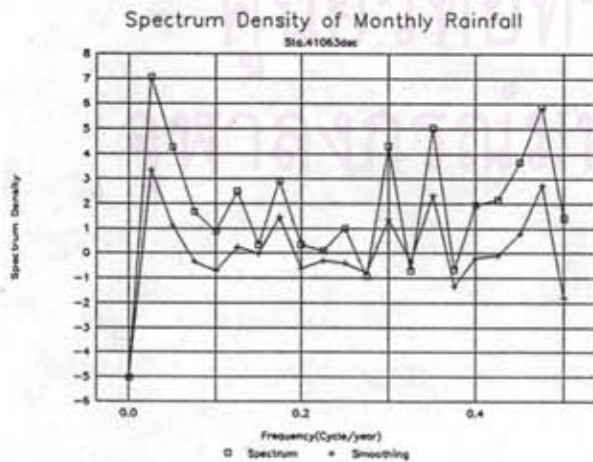
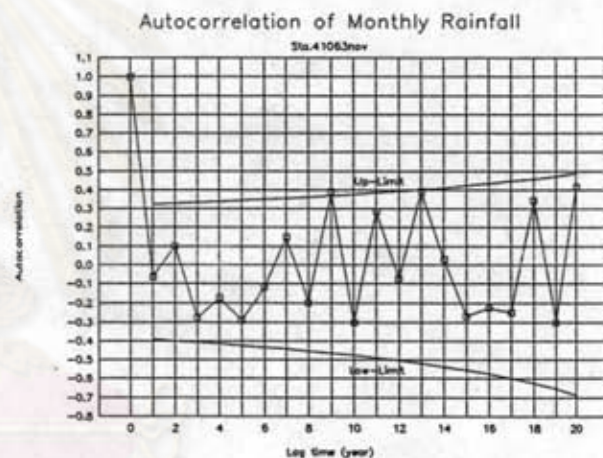
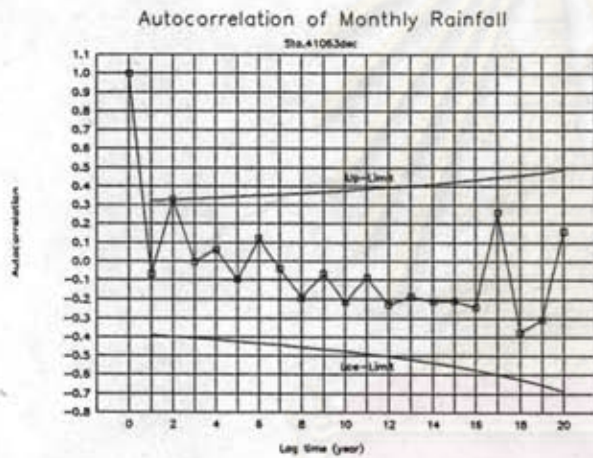
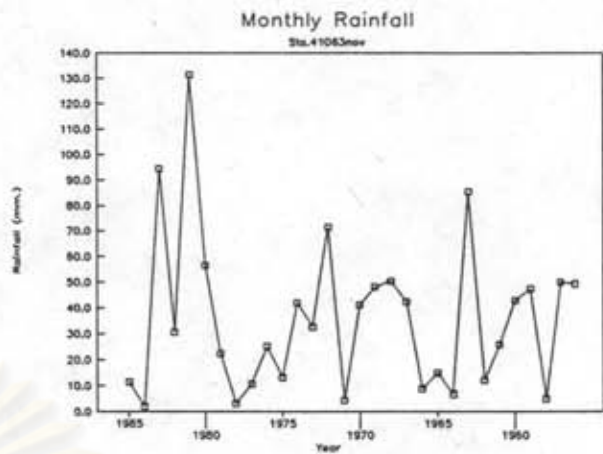
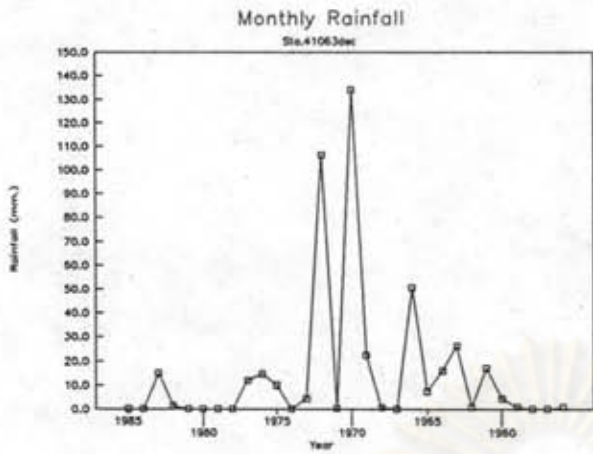


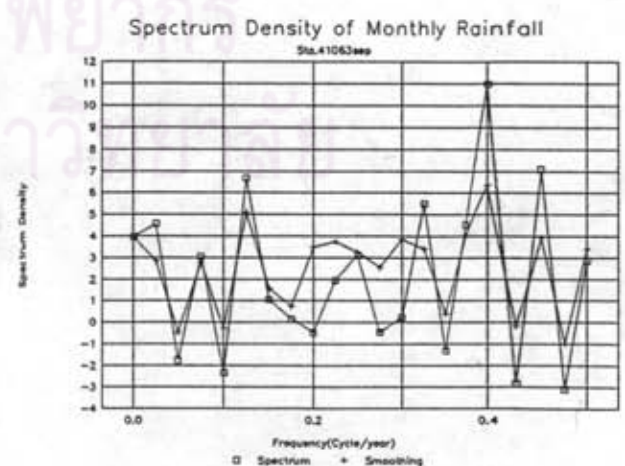
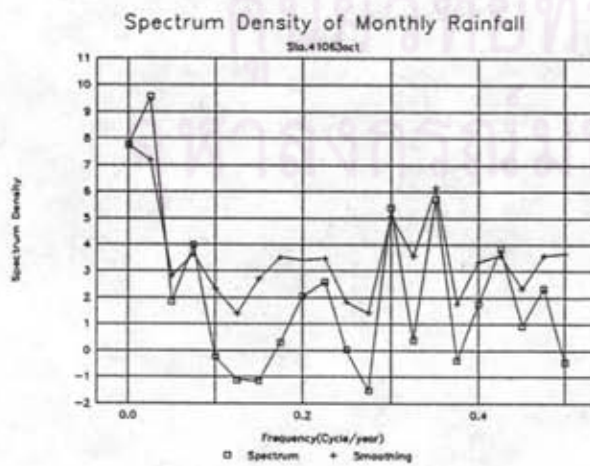
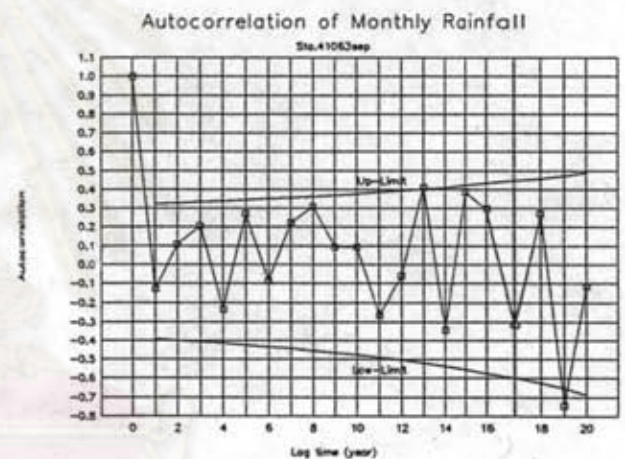
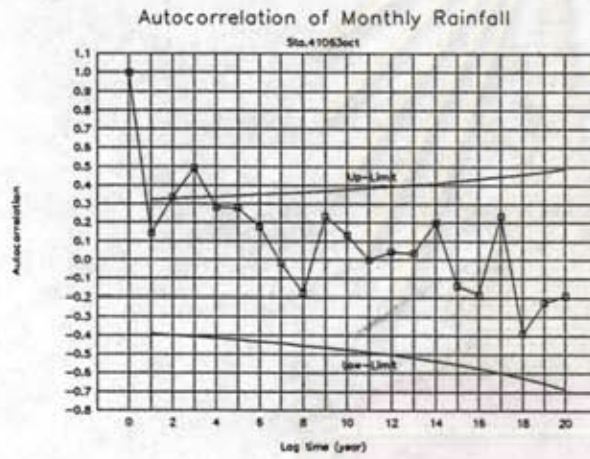
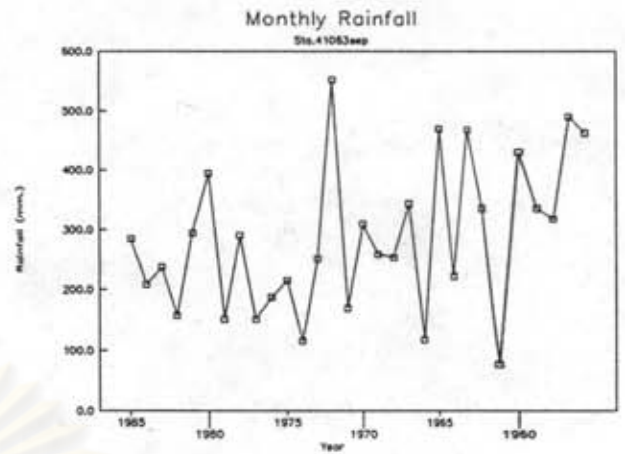
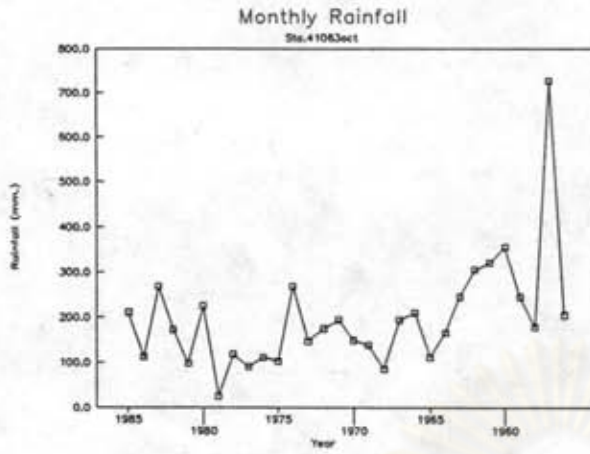
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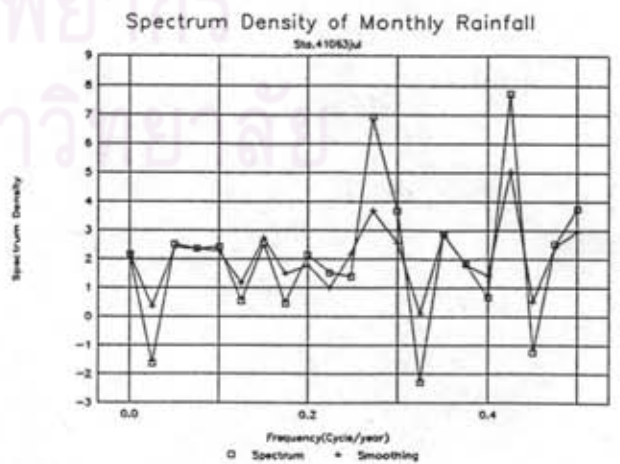
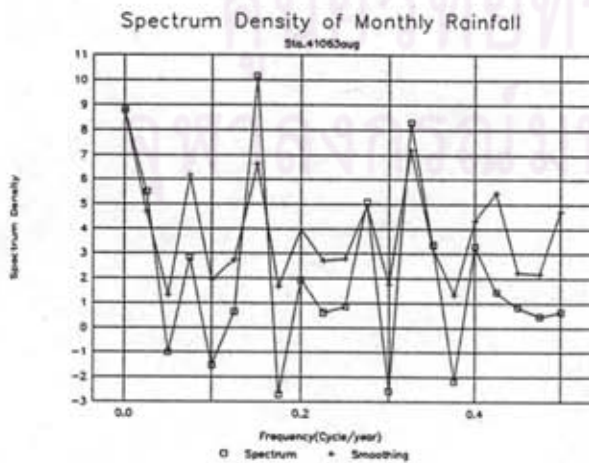
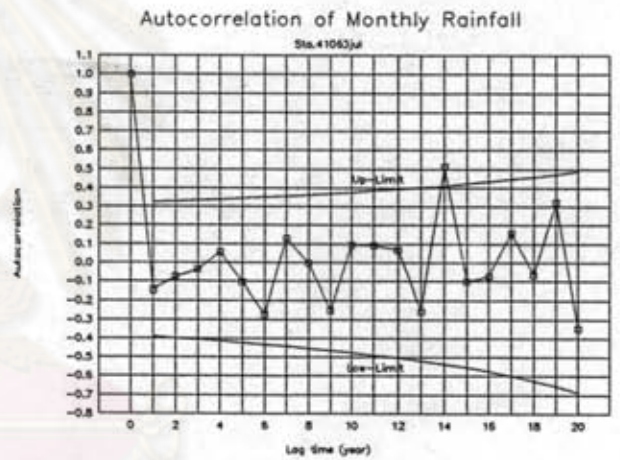
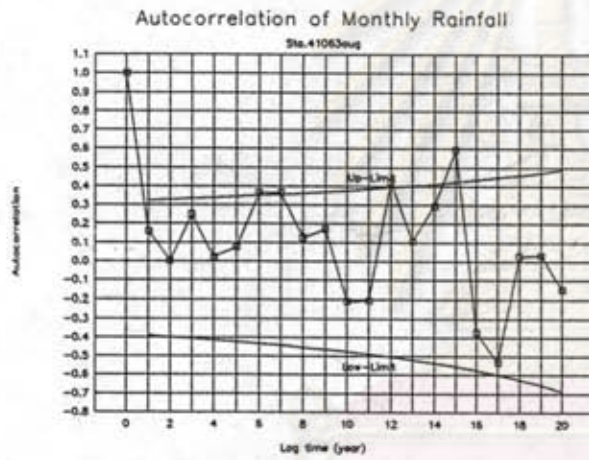
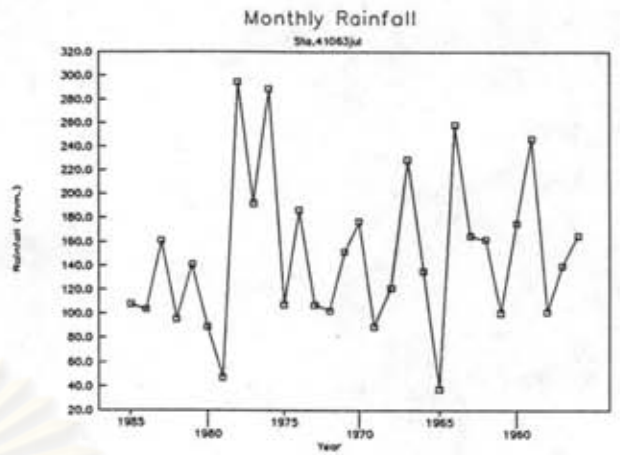
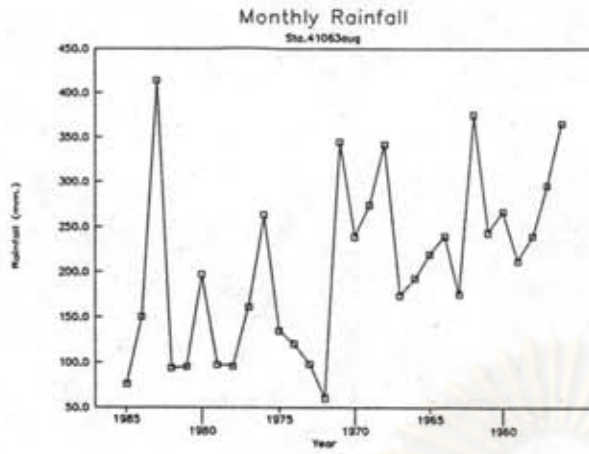




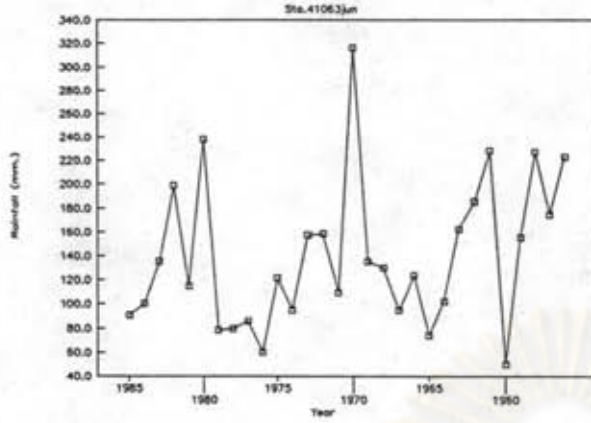




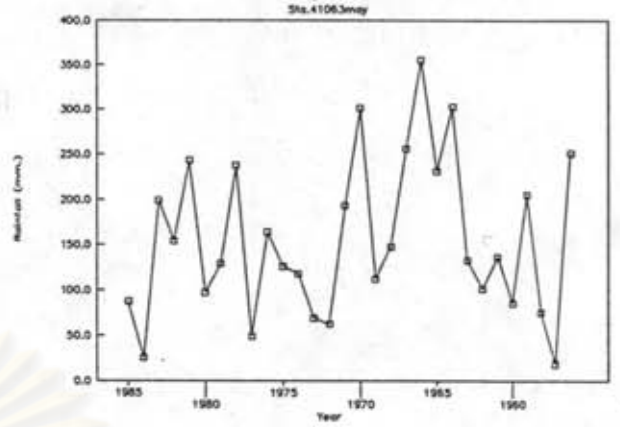




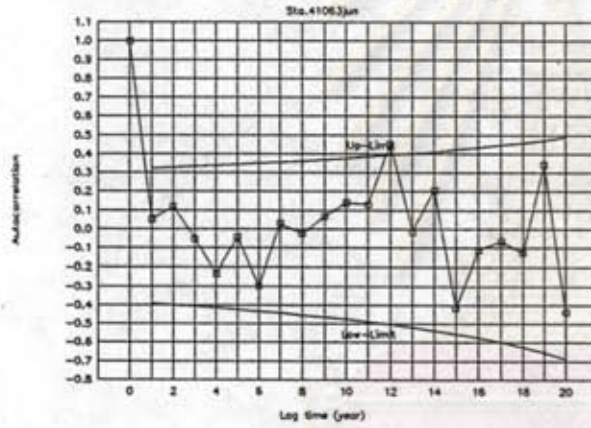
Monthly Rainfall



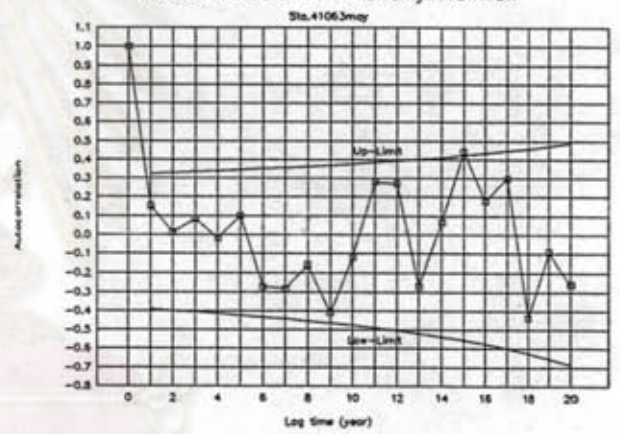
Monthly Rainfall



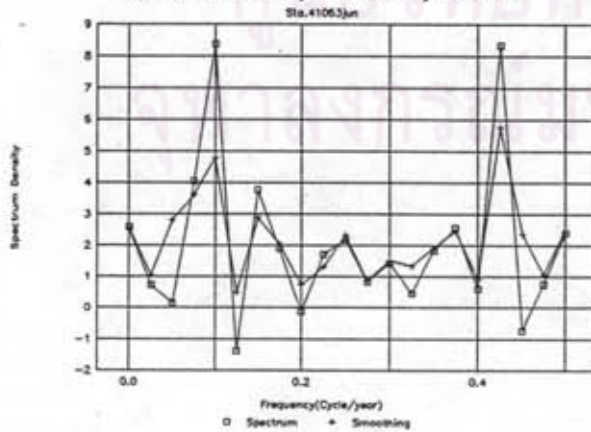
Autocorrelation of Monthly Rainfall



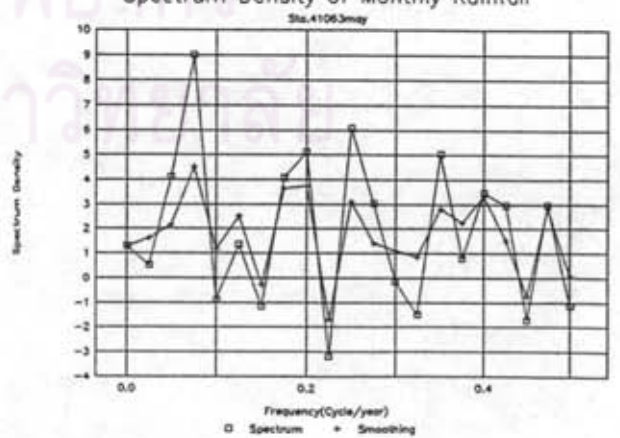
Autocorrelation of Monthly Rainfall



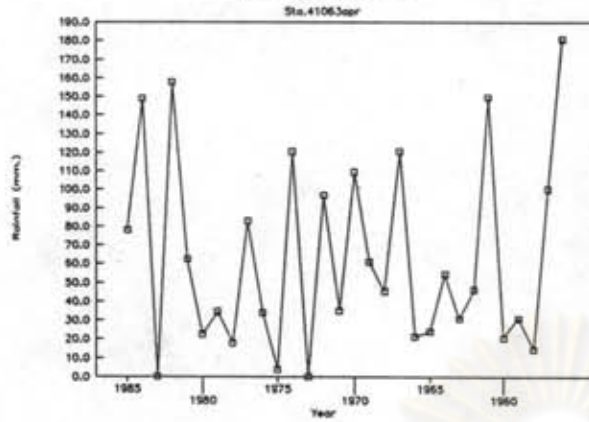
Spectrum Density of Monthly Rainfall



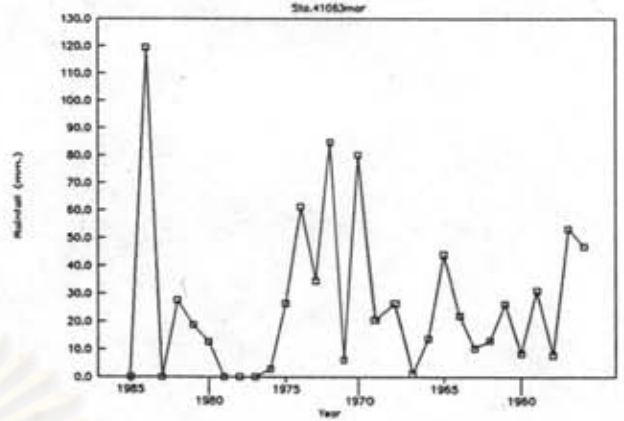
Spectrum Density of Monthly Rainfall



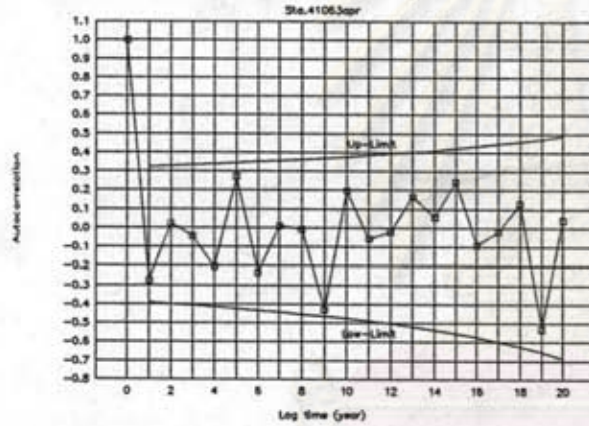
Monthly Rainfall



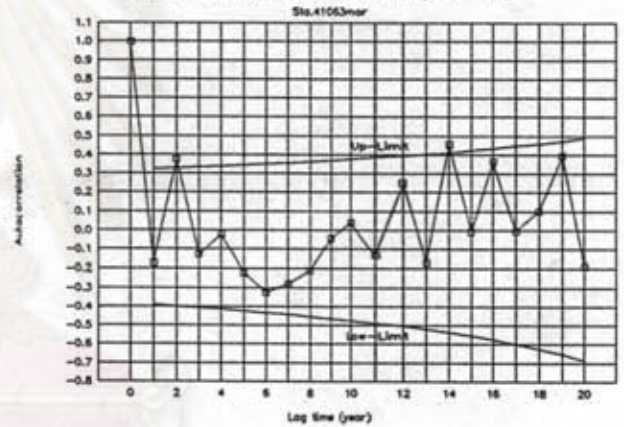
Monthly Rainfall



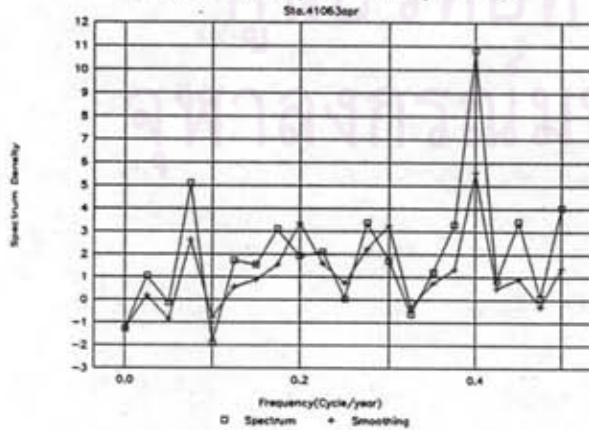
Autocorrelation of Monthly Rainfall



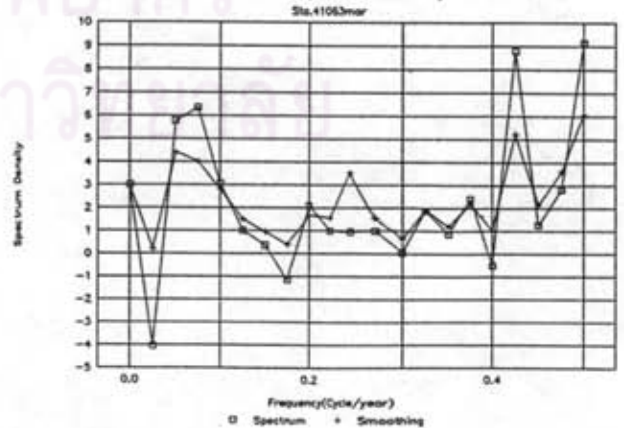
Autocorrelation of Monthly Rainfall

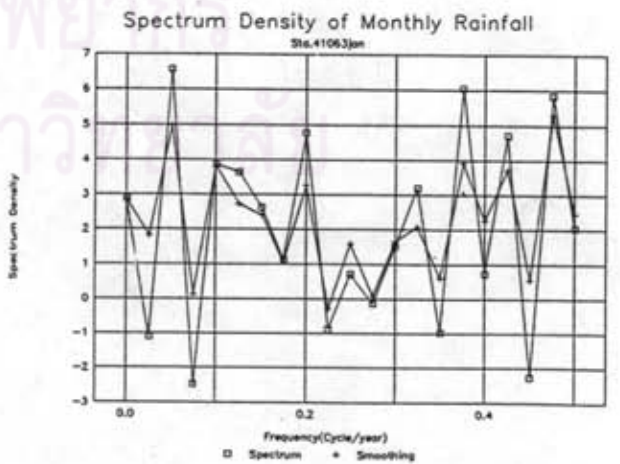
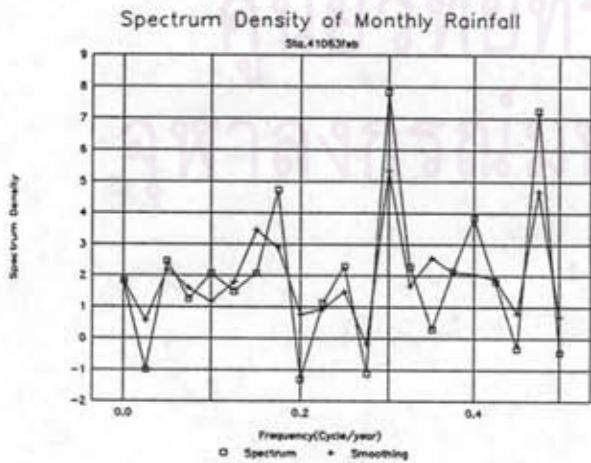
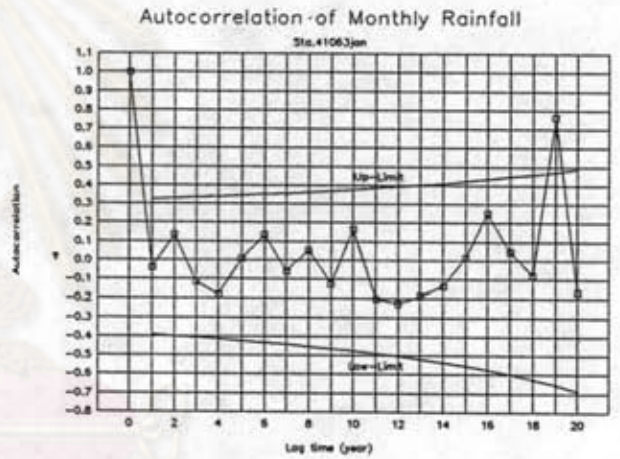
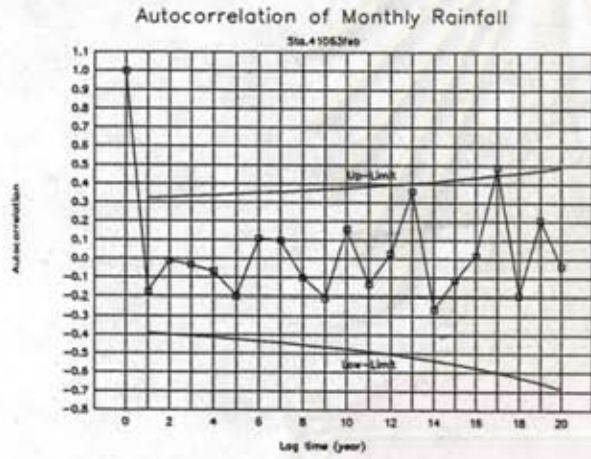
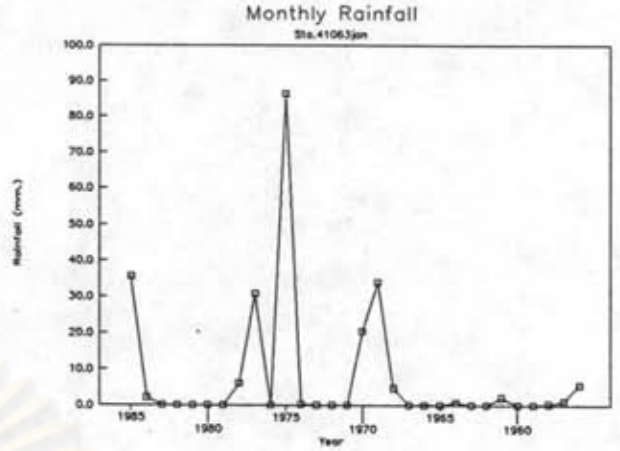
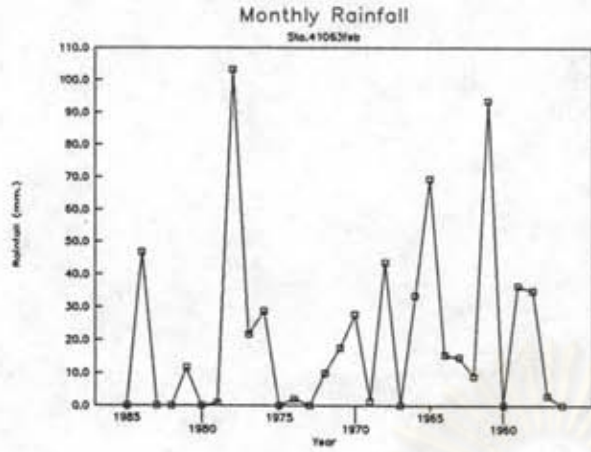


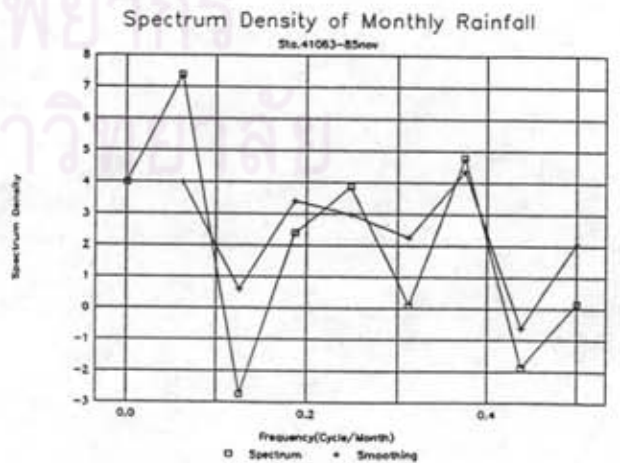
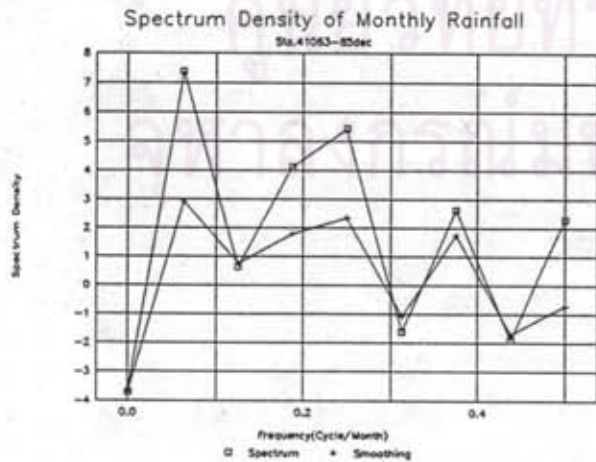
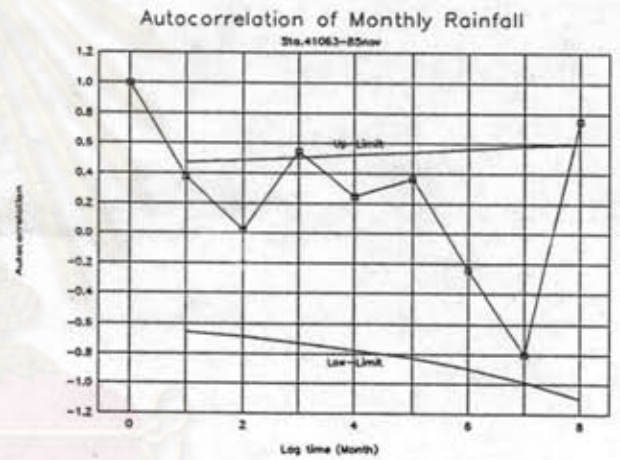
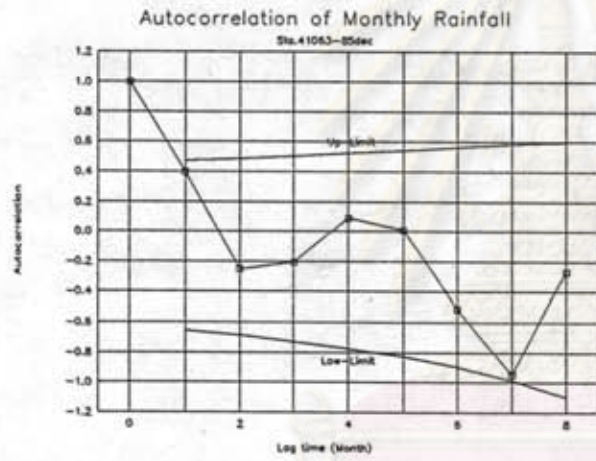
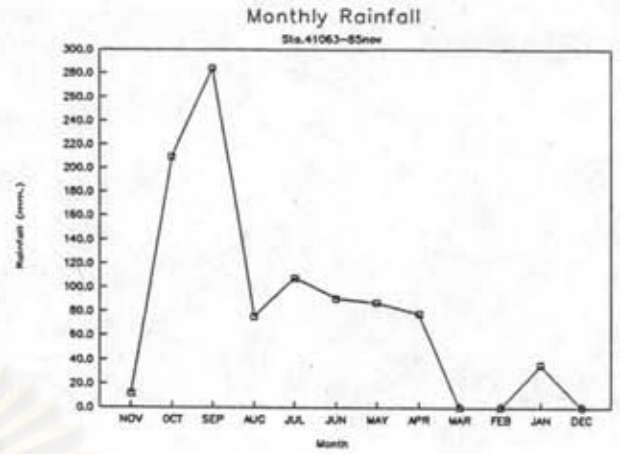
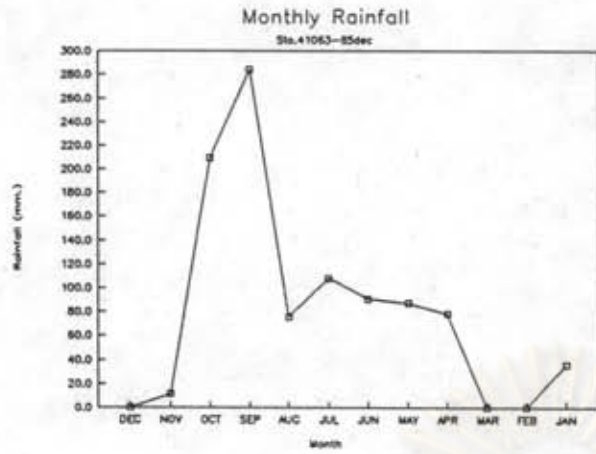
Spectrum Density of Monthly Rainfall



Spectrum Density of Monthly Rainfall

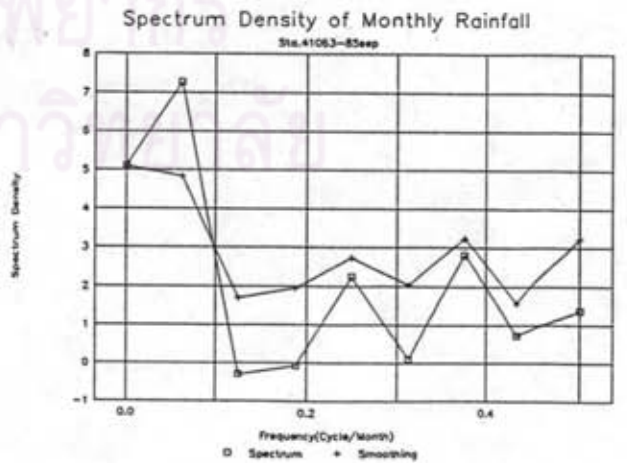
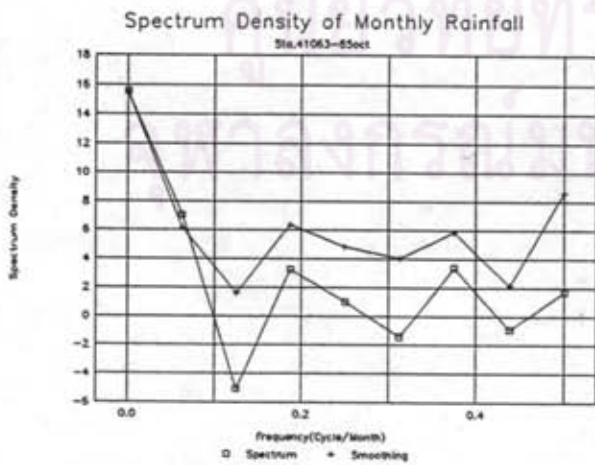
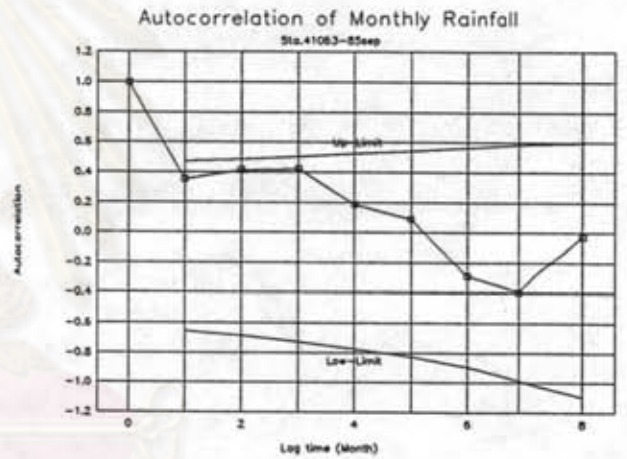
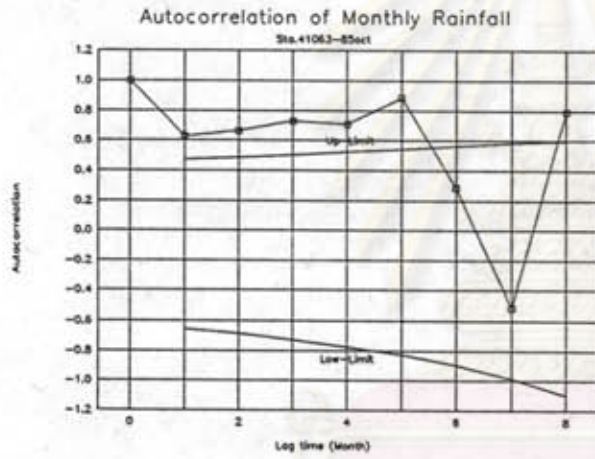
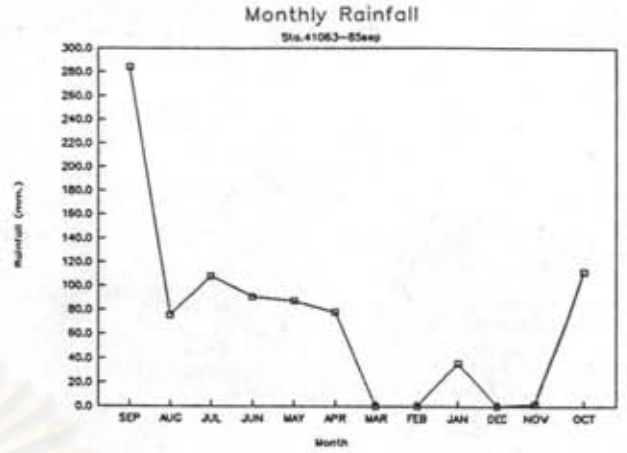
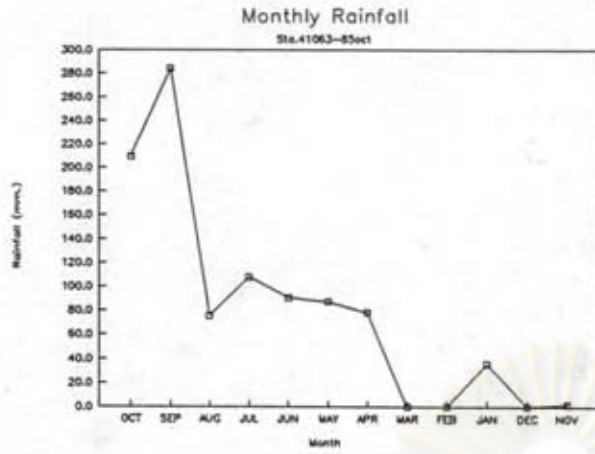


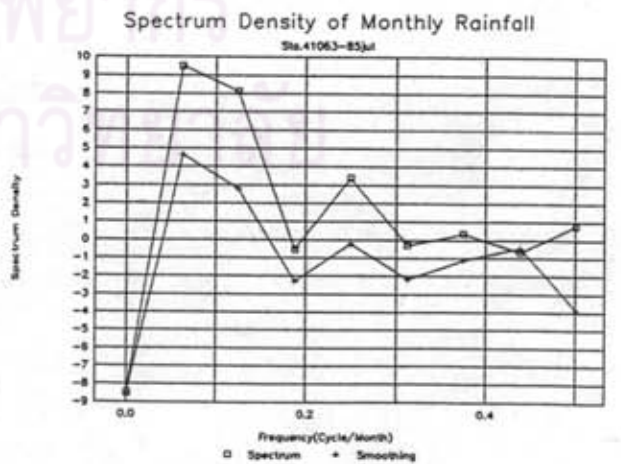
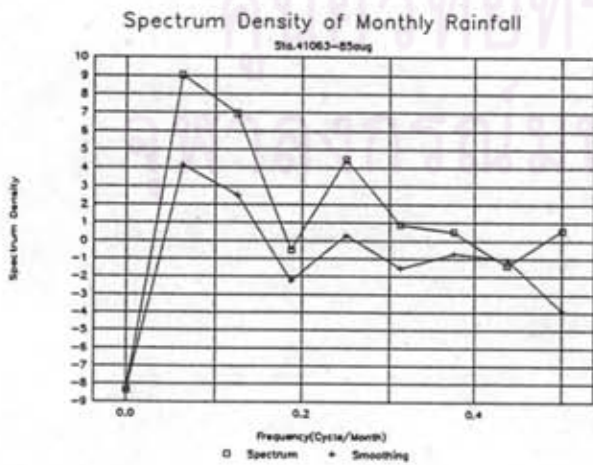
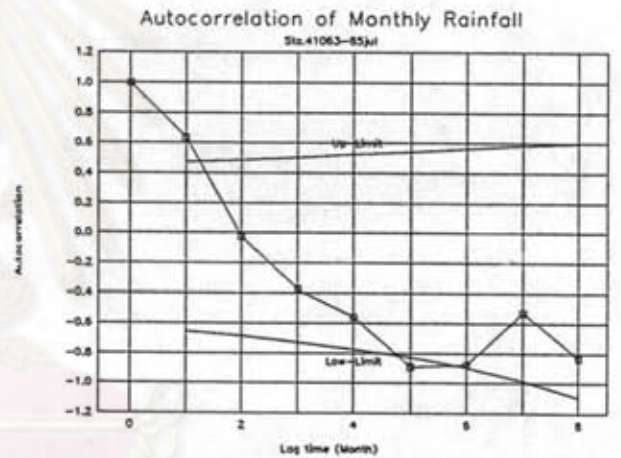
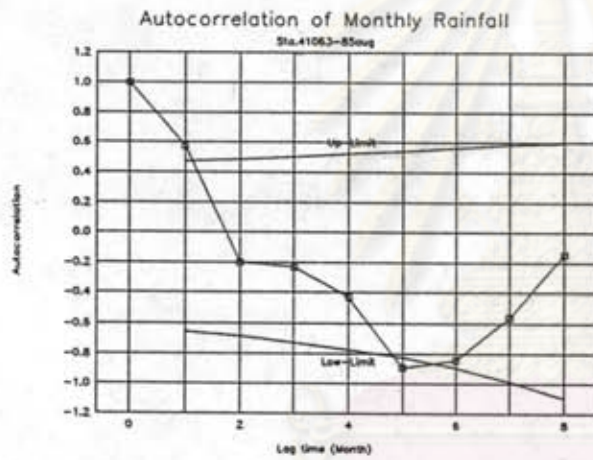
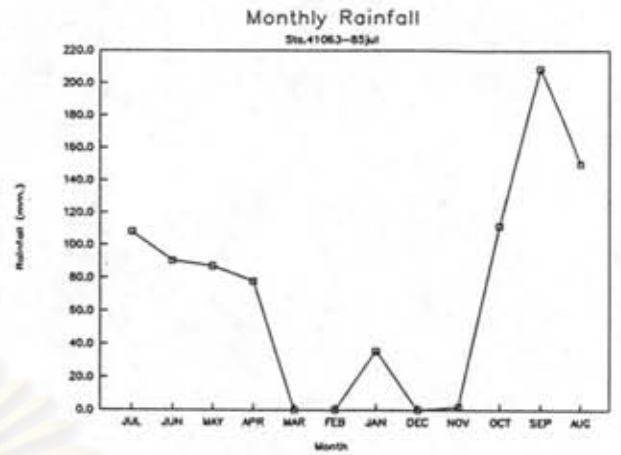
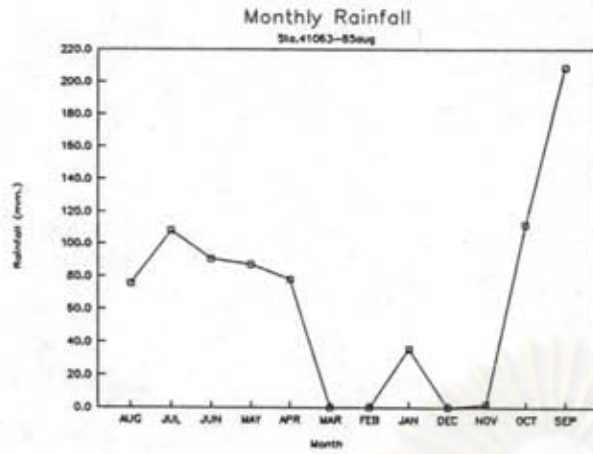


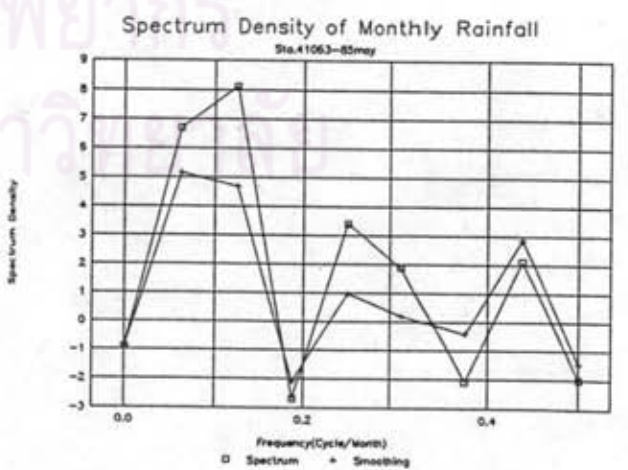
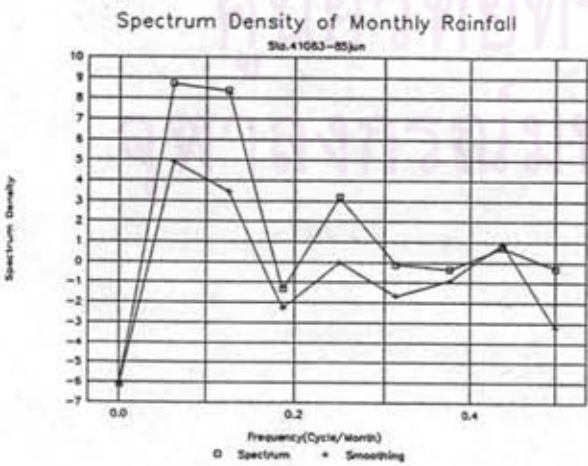
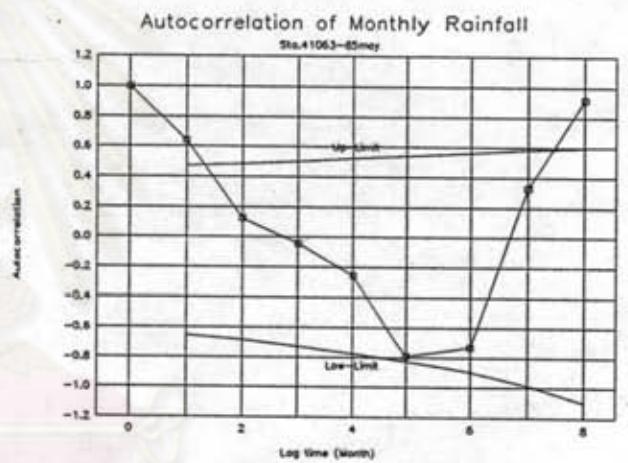
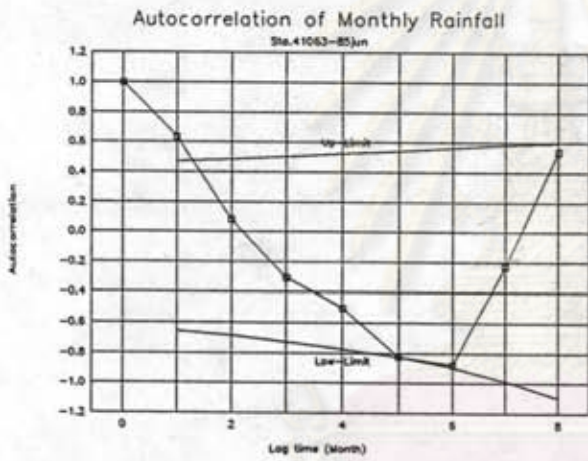
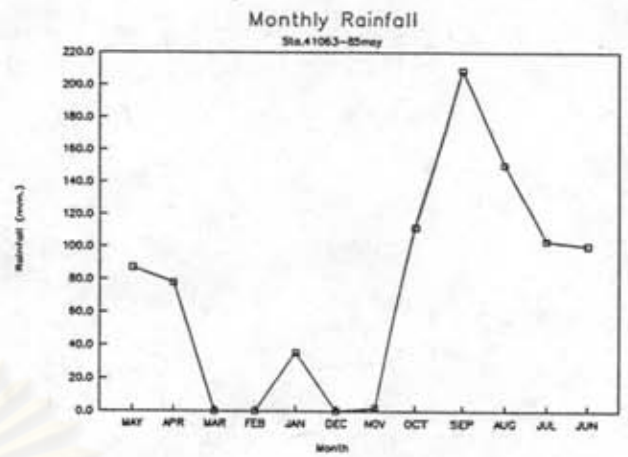
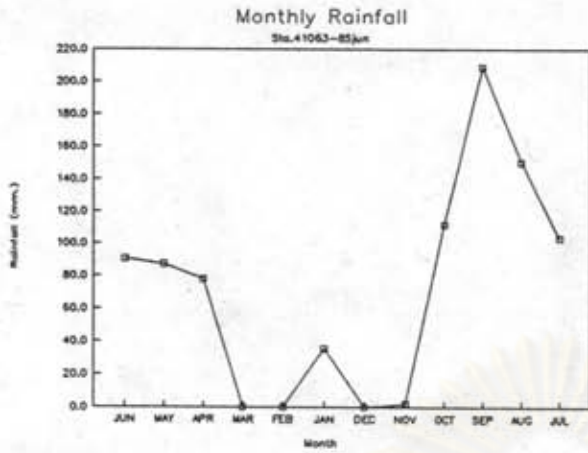


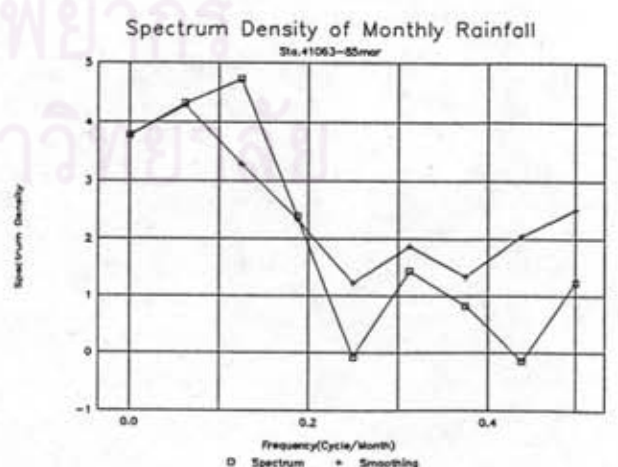
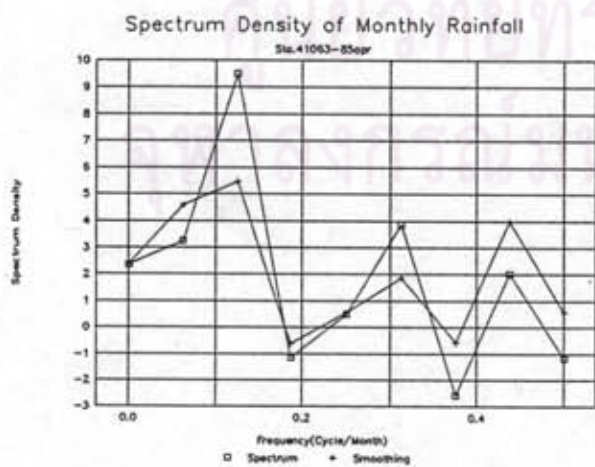
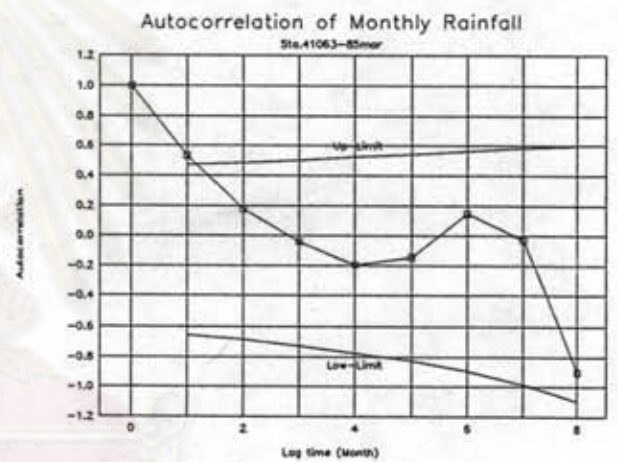
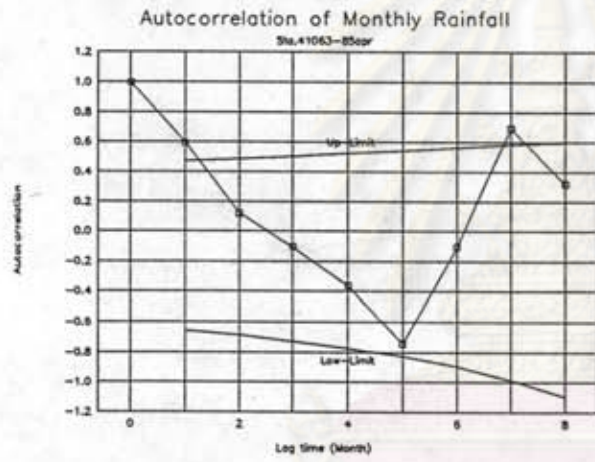
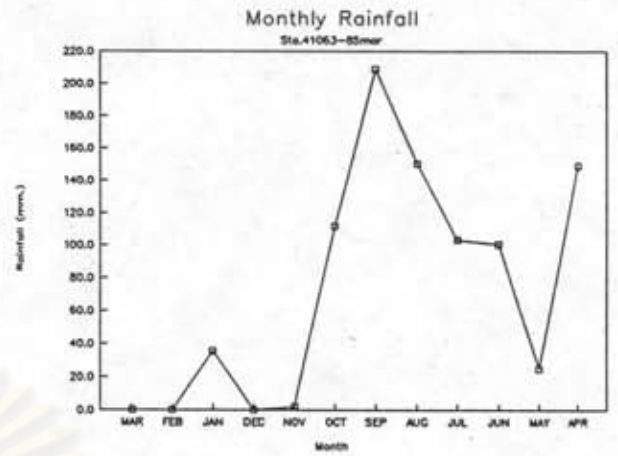
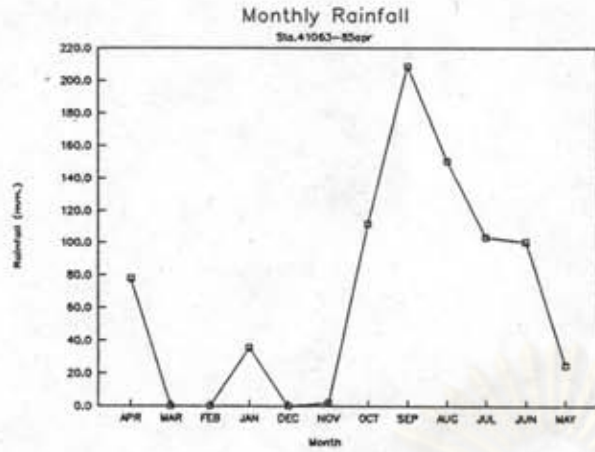
คะแนนการเขียนทักษะแต่ละข้อ

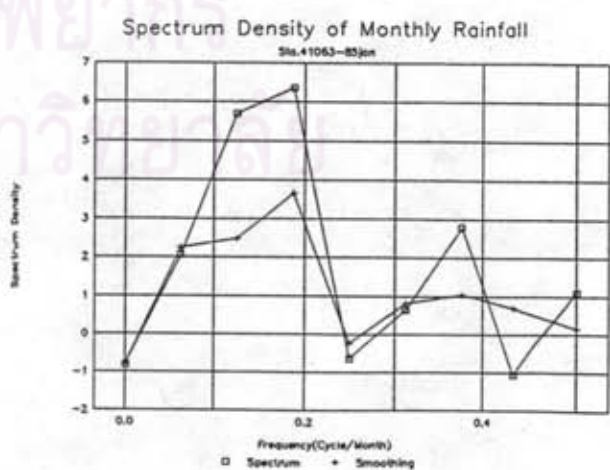
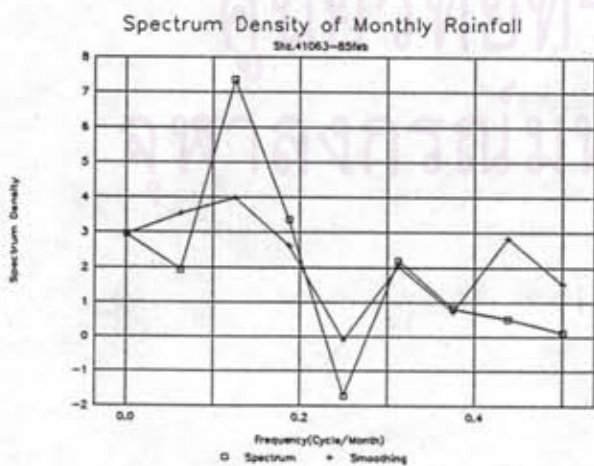
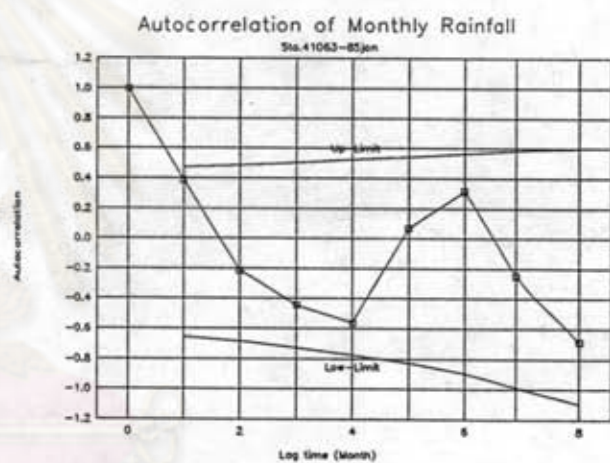
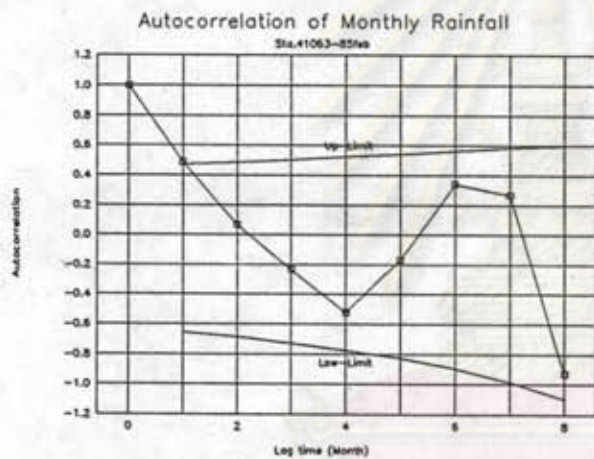
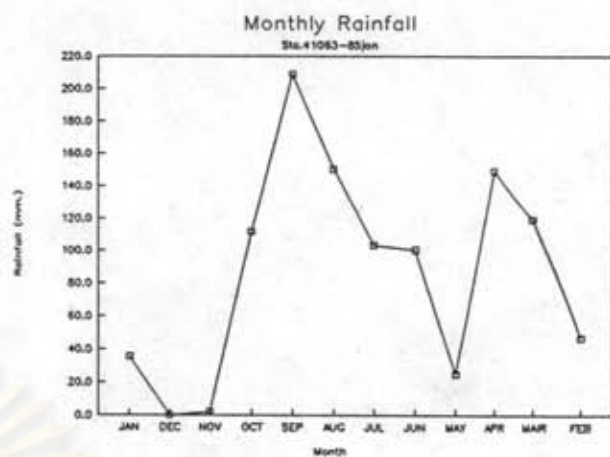
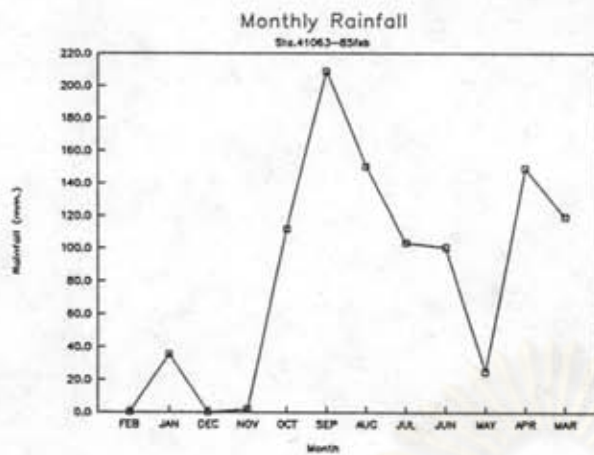
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61	73	75	82	73	70	72	68	80	62	66	64	56	57	68	66	56	66	53	2,060
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68	76	66	78	74	80	64	75	75	68	62	74	56	72	64	72	72	76	72	2,147
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72	84	72	61	72	78	71	78	68	75	67	63	58	58	58	58	25	8	66	1,929
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6.18	6.37	6.16	6	5.29	5.29	5.83	5.47	5.67	9.4	7.36	7.53	9.21	5.49	7.85	8.9	10.94	14.12	7.75	S.D. = 78.98
18.19	48.57	37.94	36	27.98	27.98	33.98	29.92	32.14	88.36	54.16	56.7	84.82	38.14	61.62	79.21	119.68	119.37	60.06	$S_t^2 = 6,237.84$ $\Sigma S_i = 1414.11$

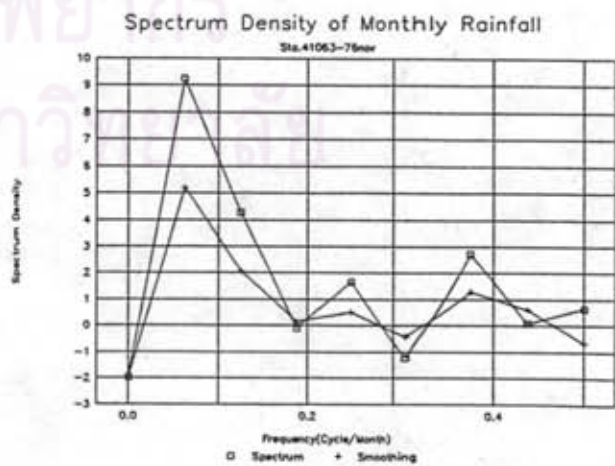
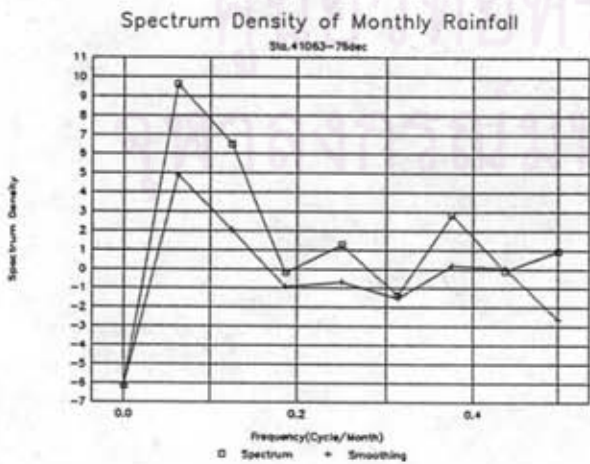
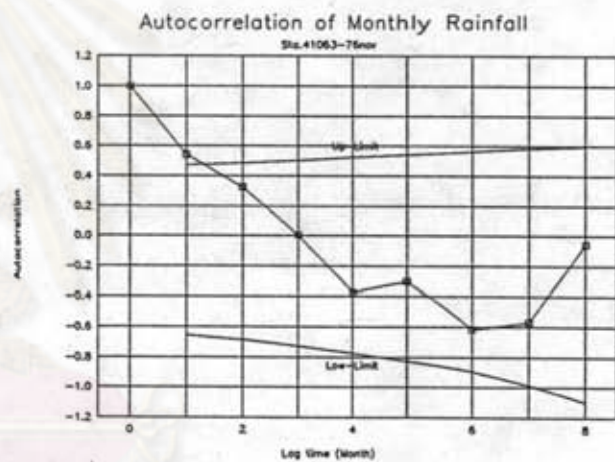
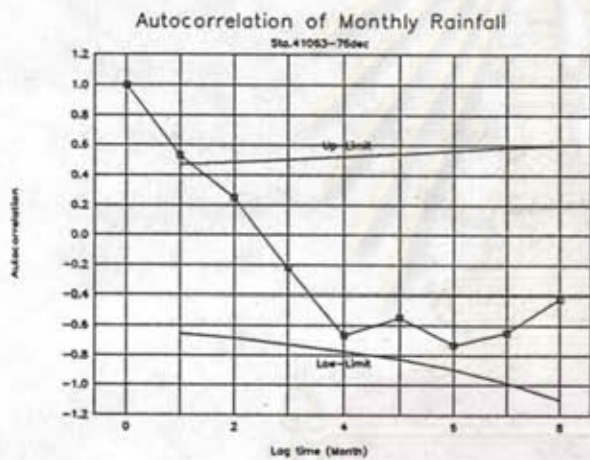
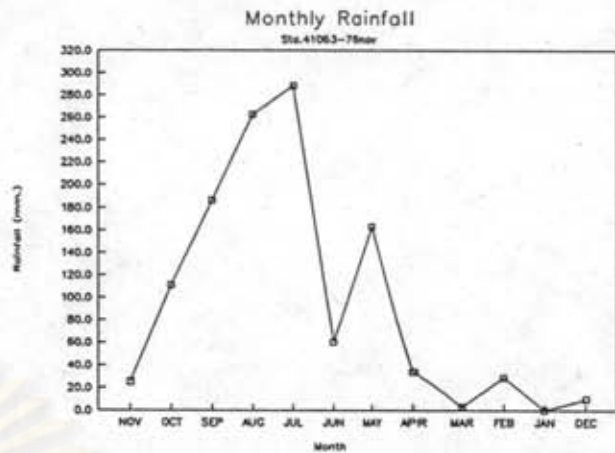
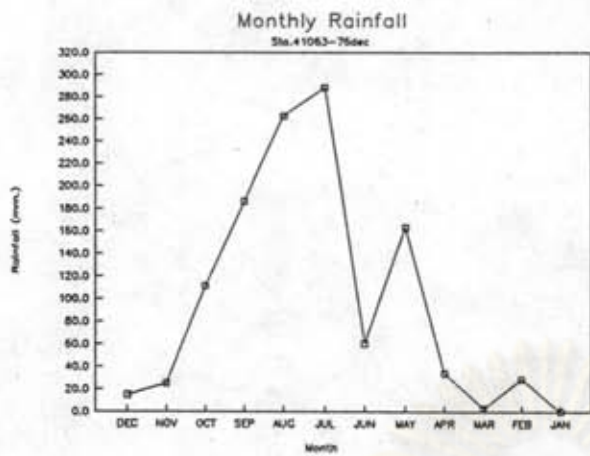


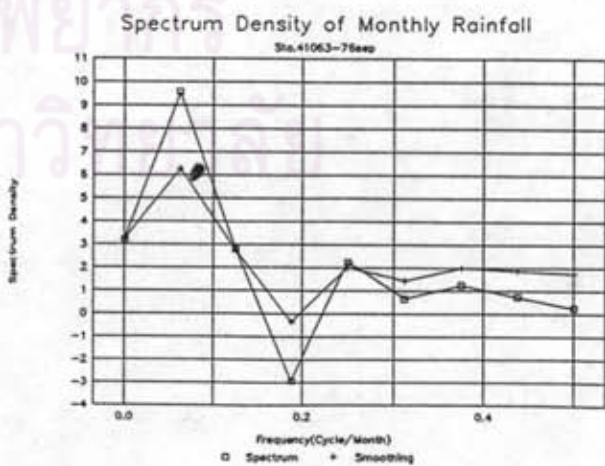
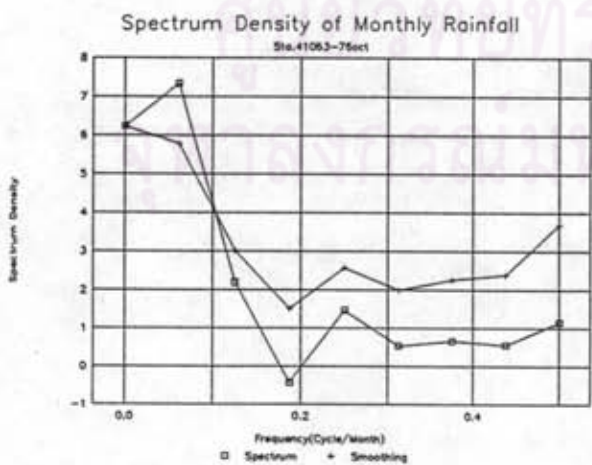
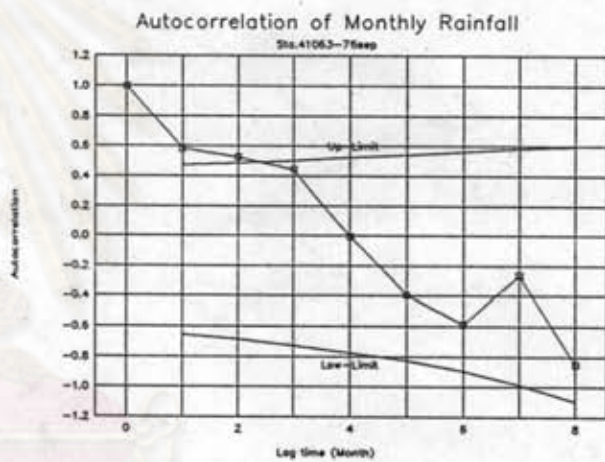
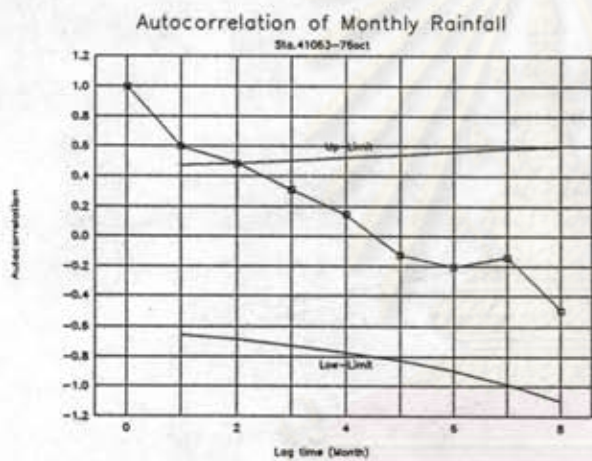
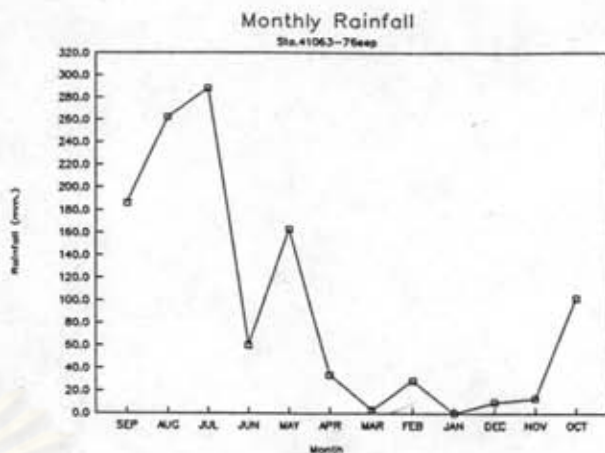
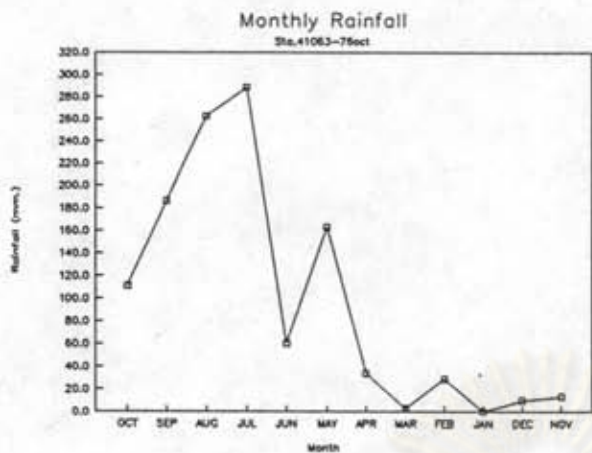


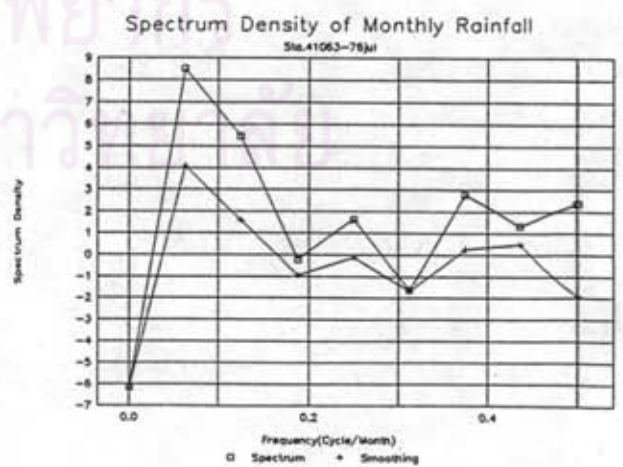
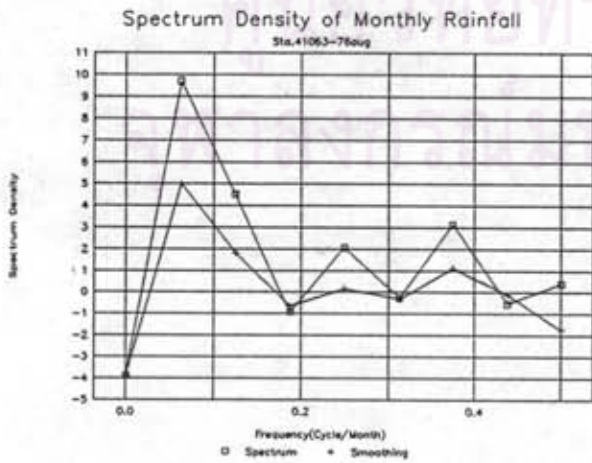
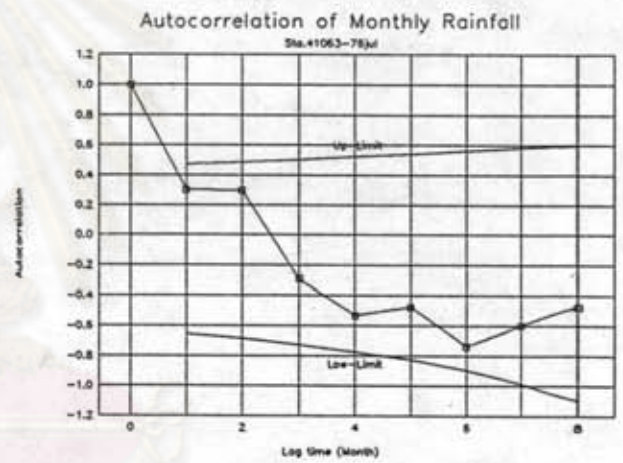
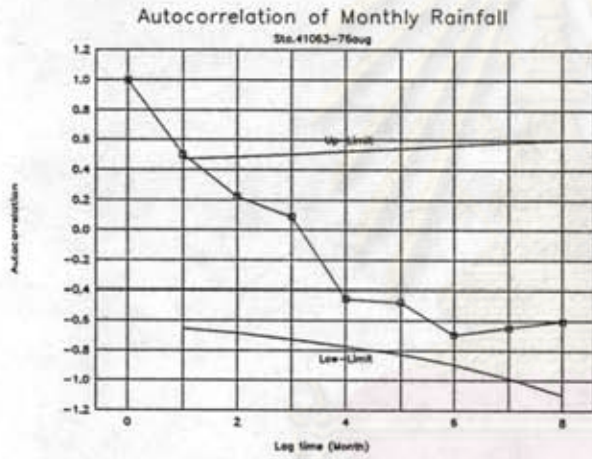
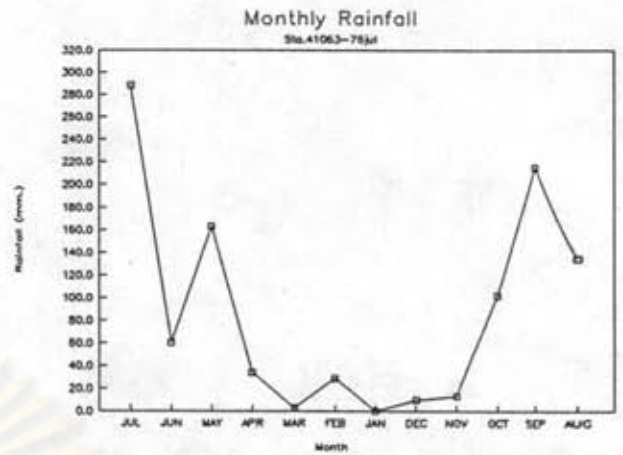
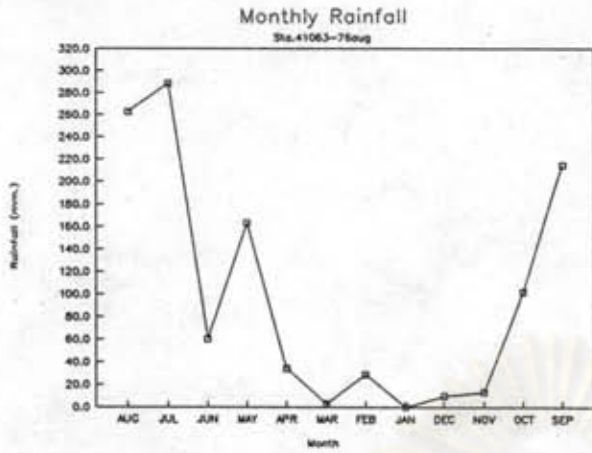


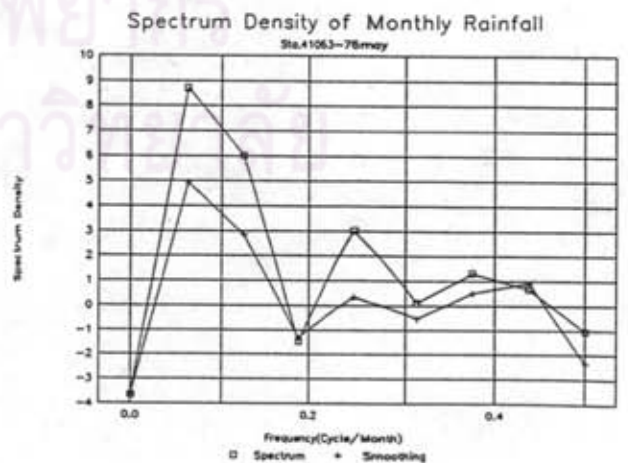
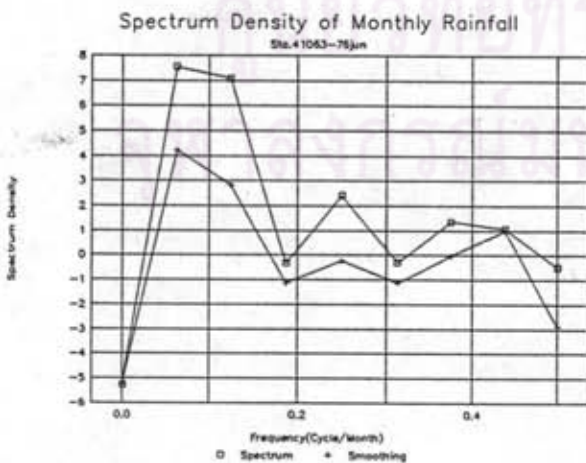
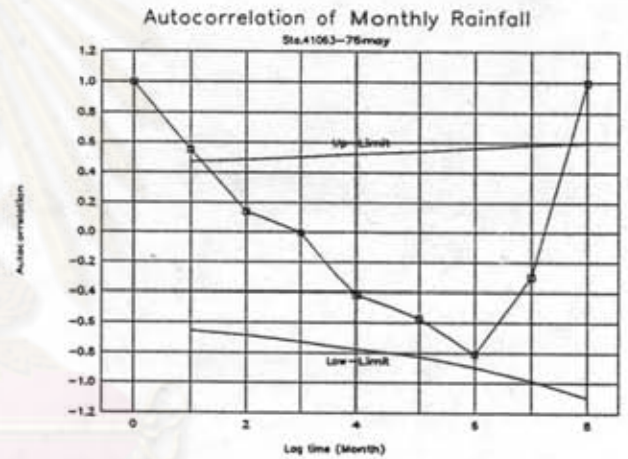
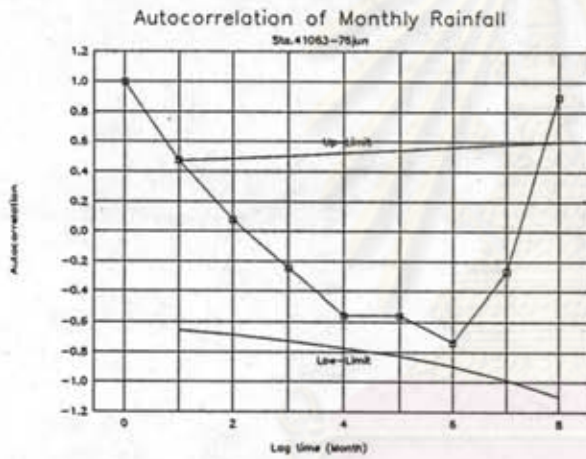
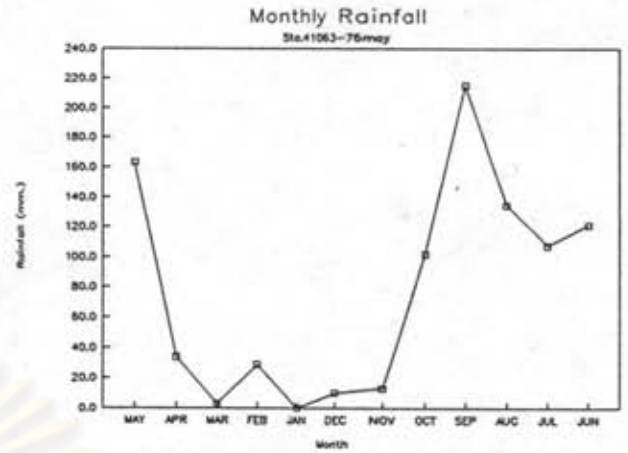
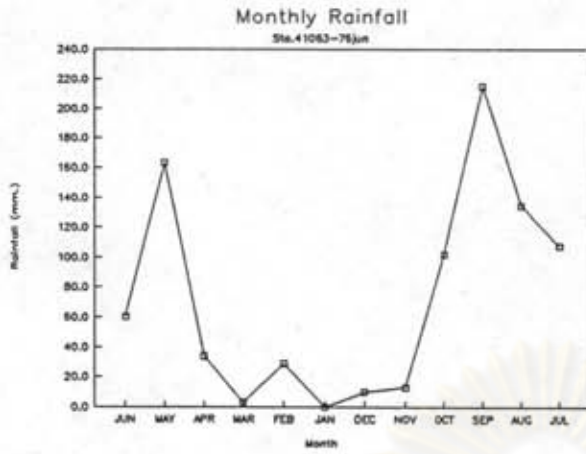


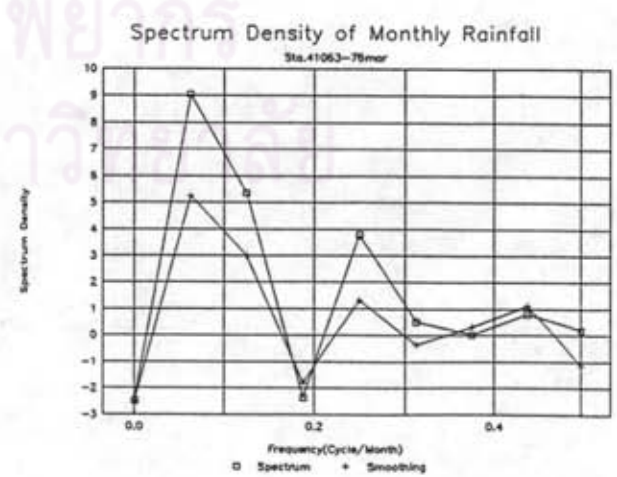
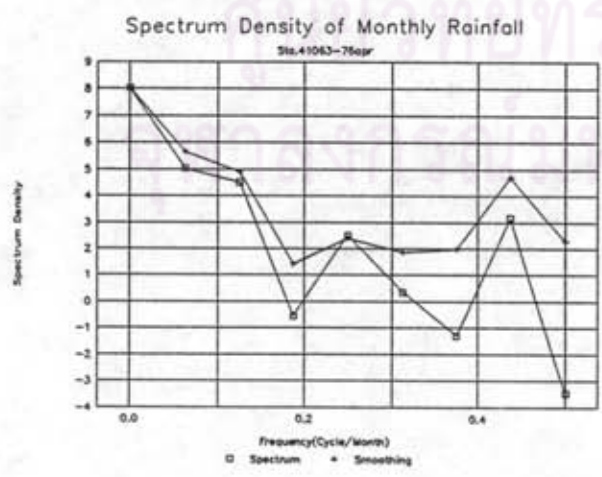
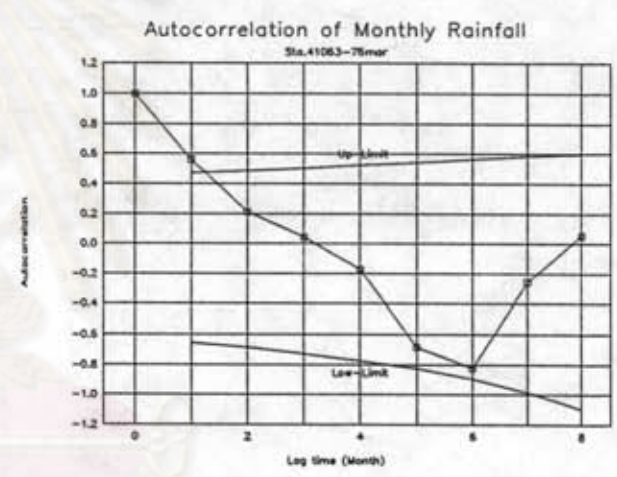
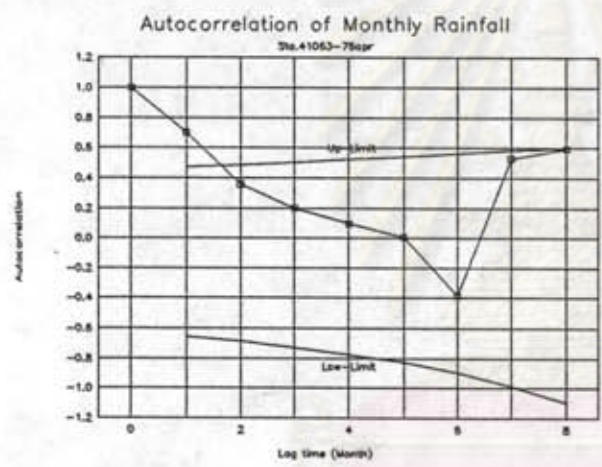
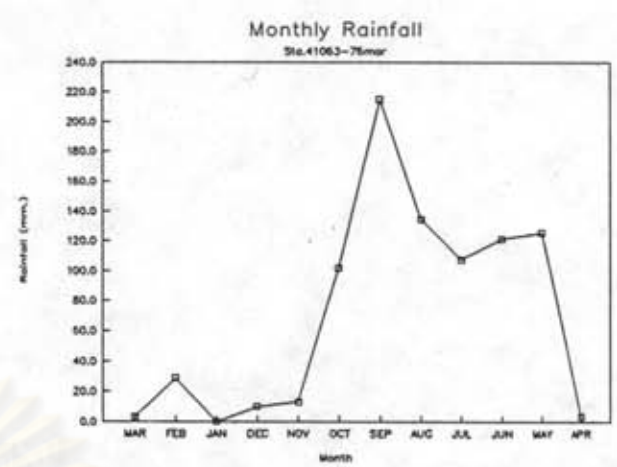
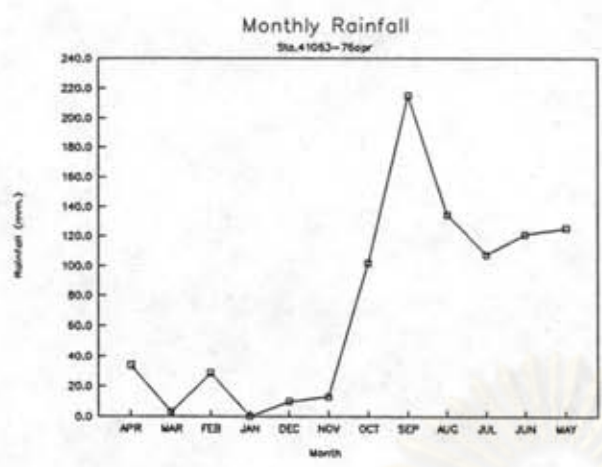


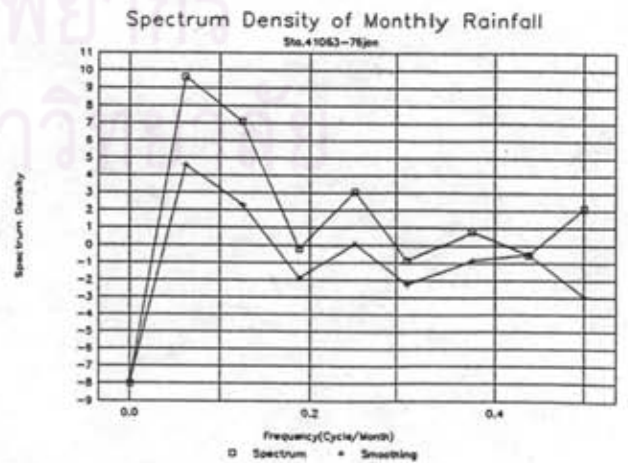
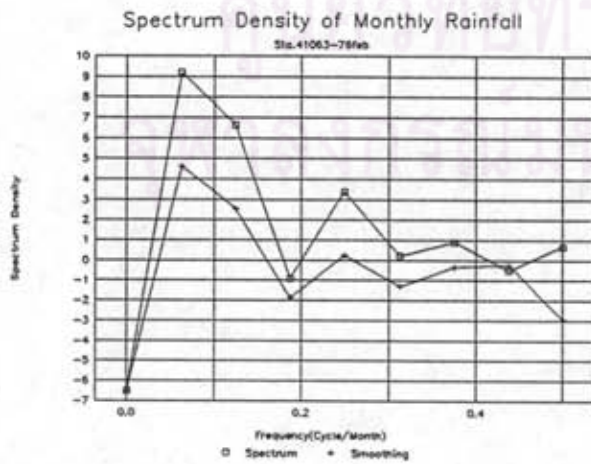
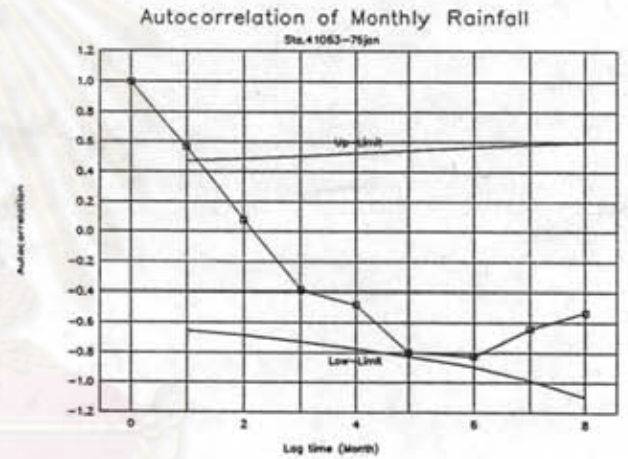
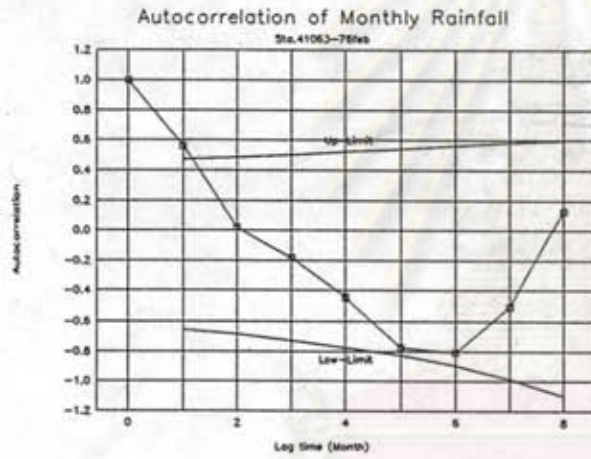
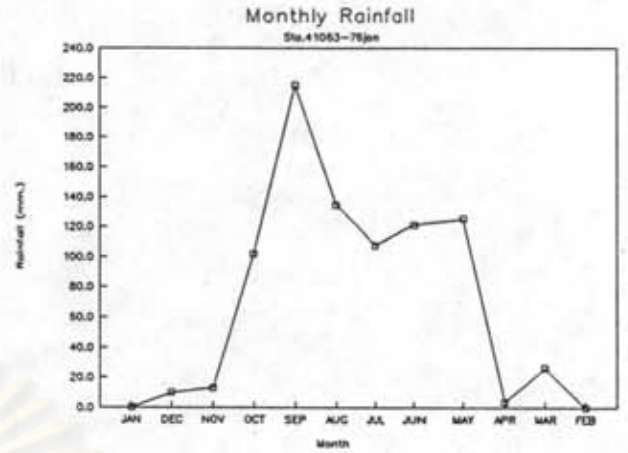
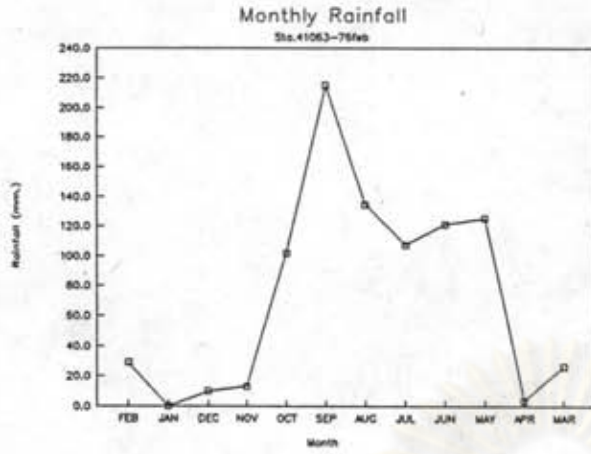


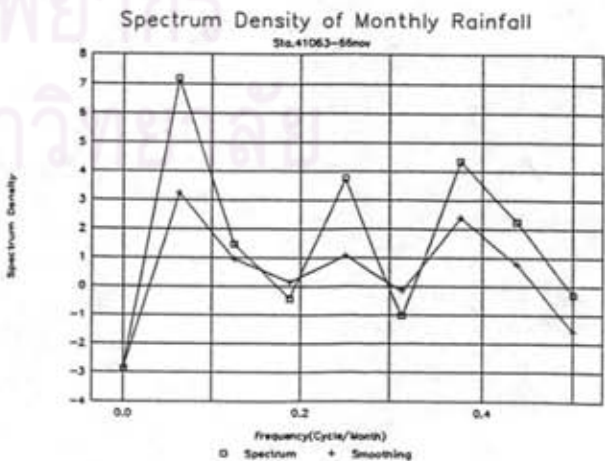
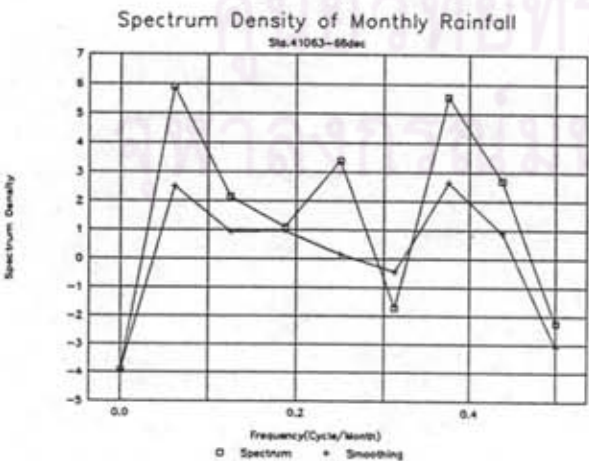
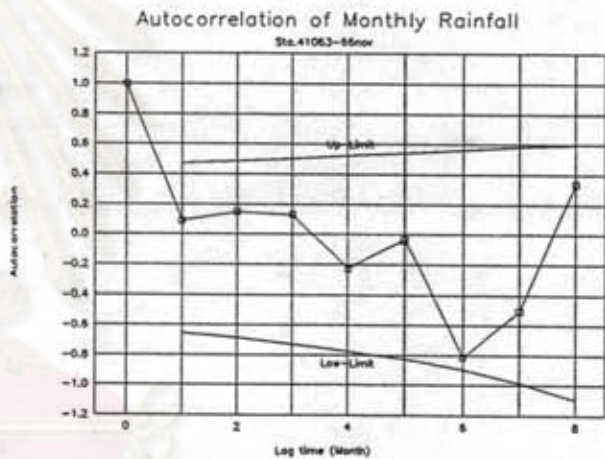
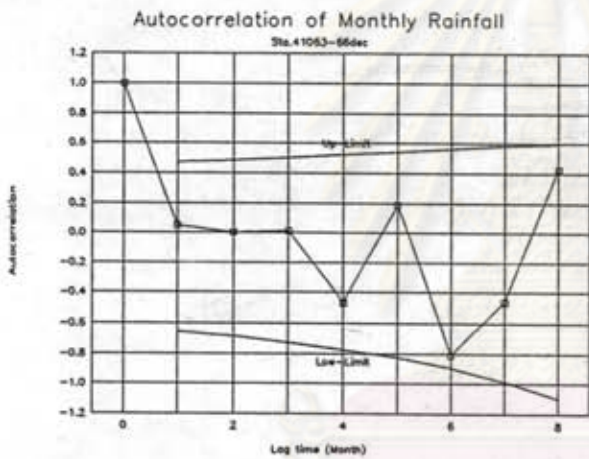
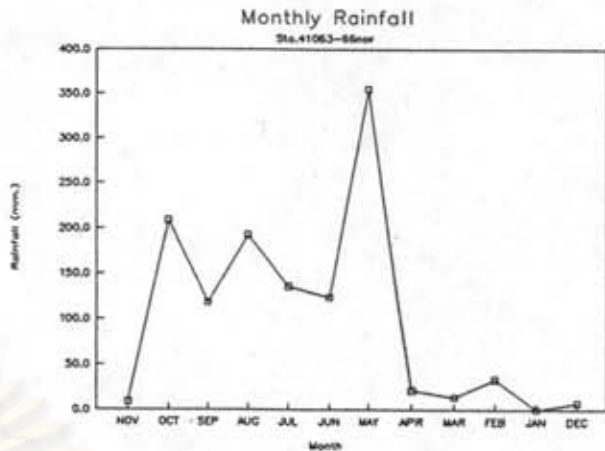
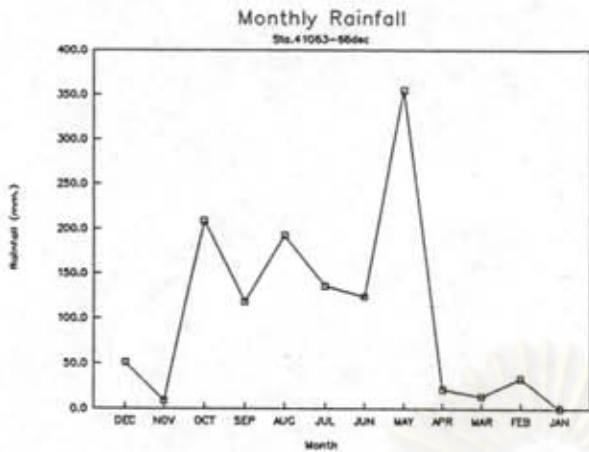


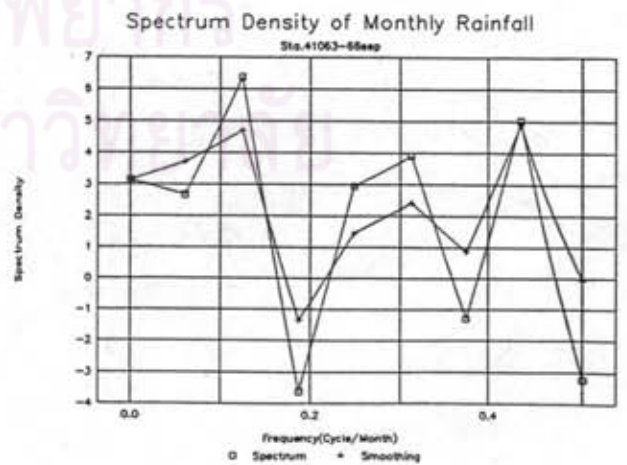
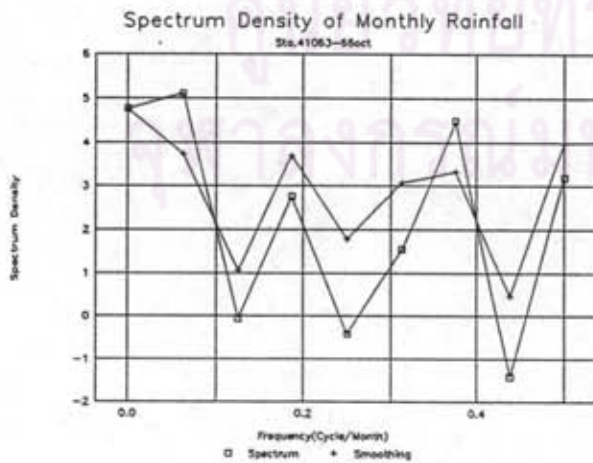
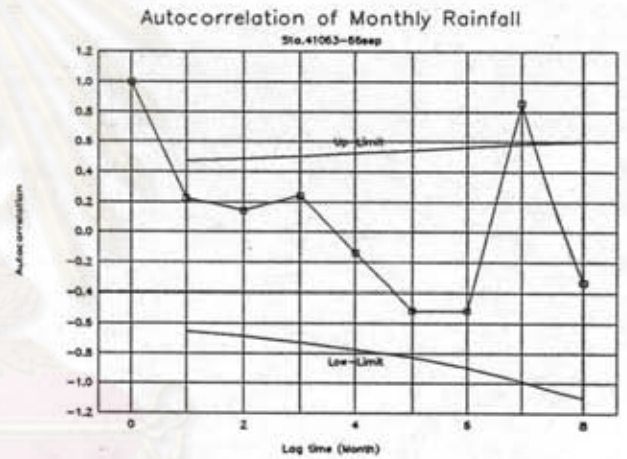
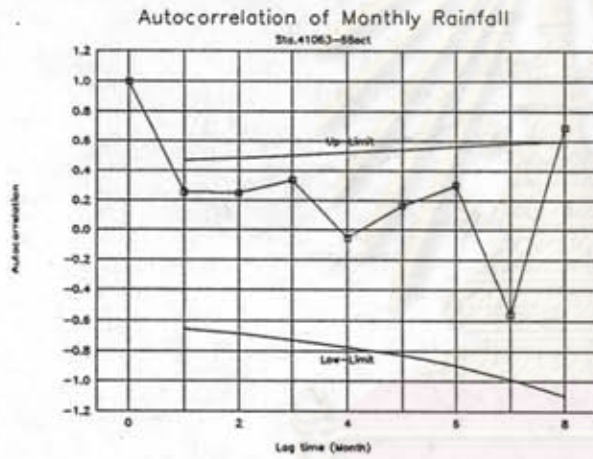
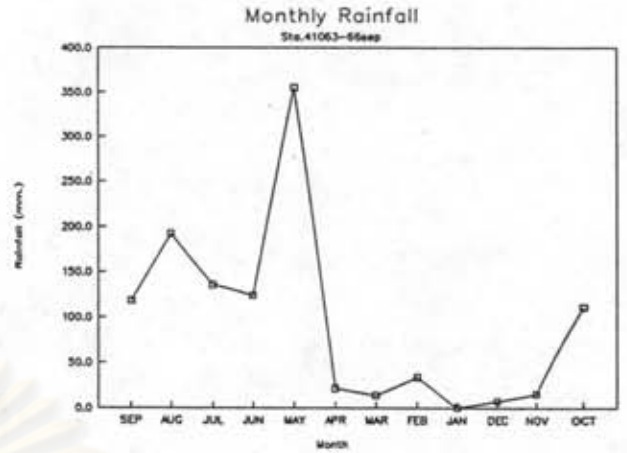
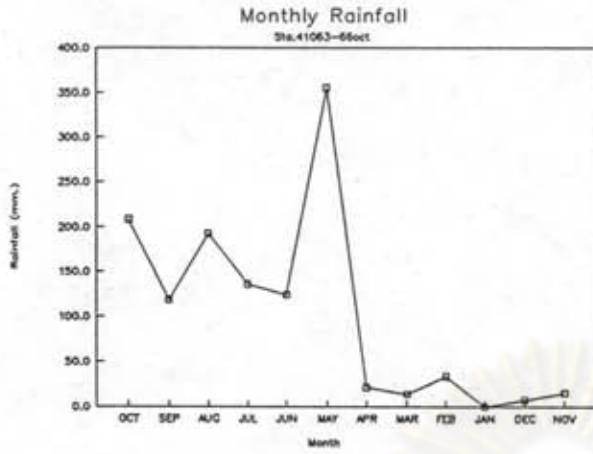


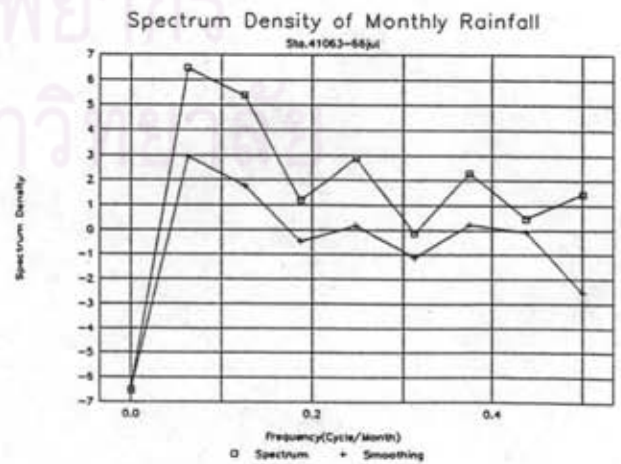
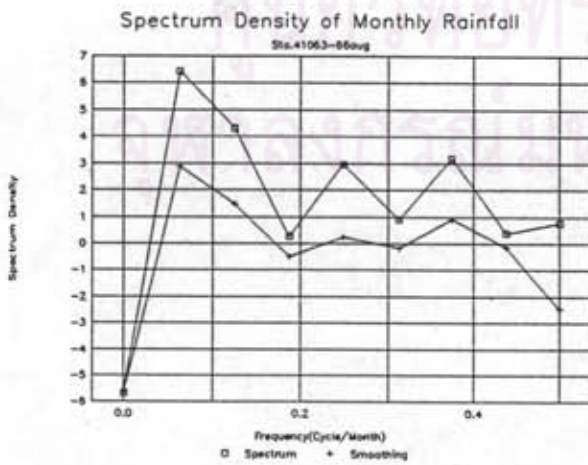
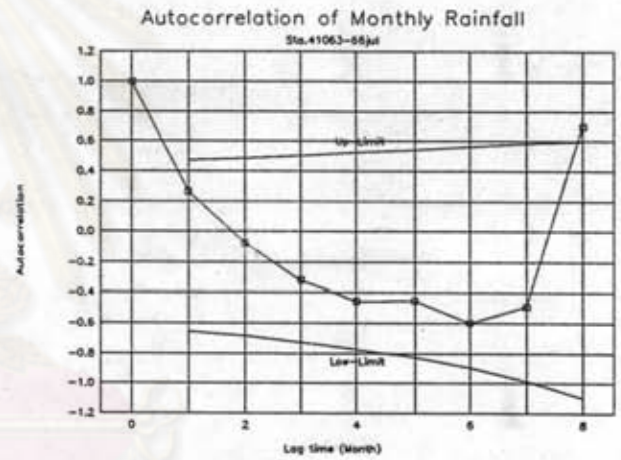
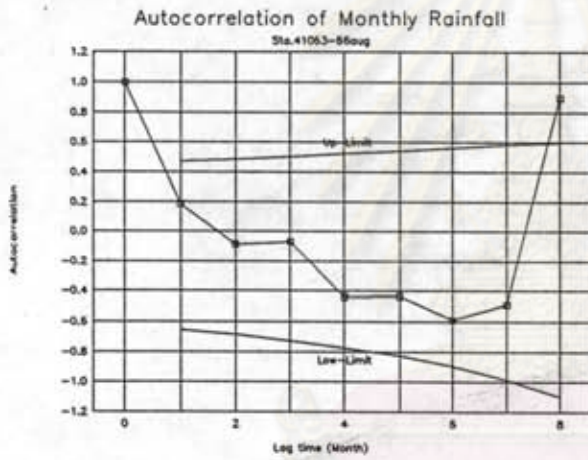
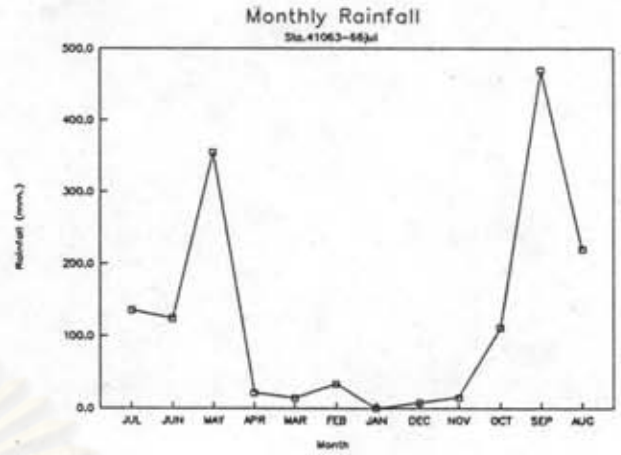
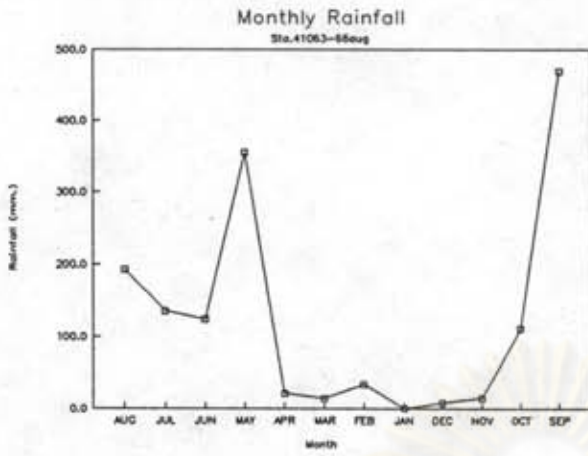


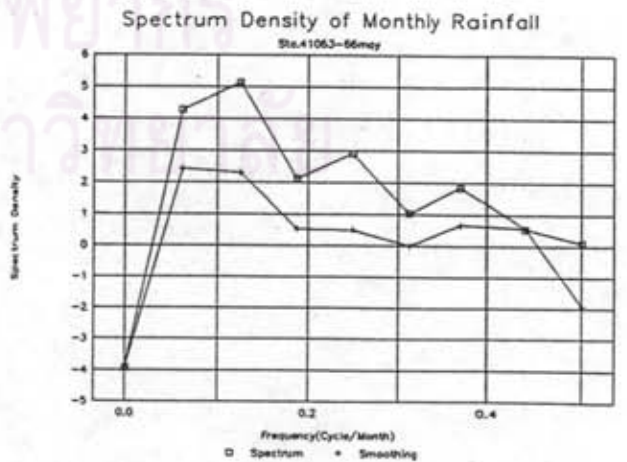
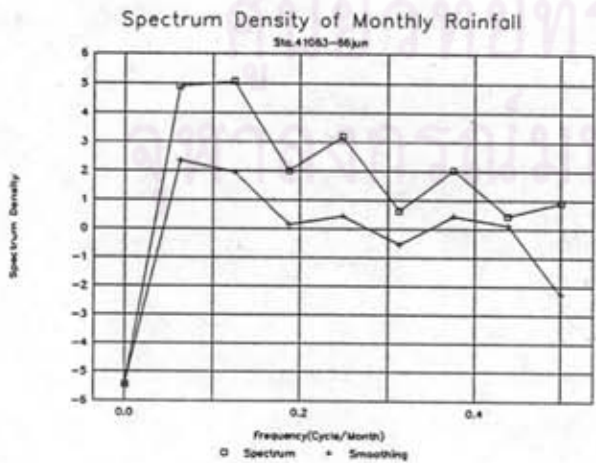
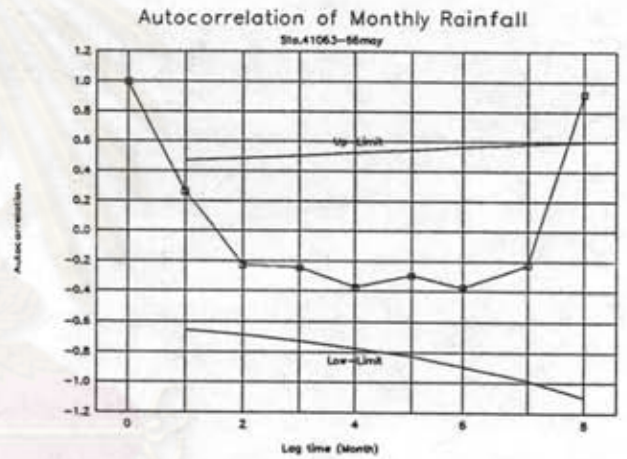
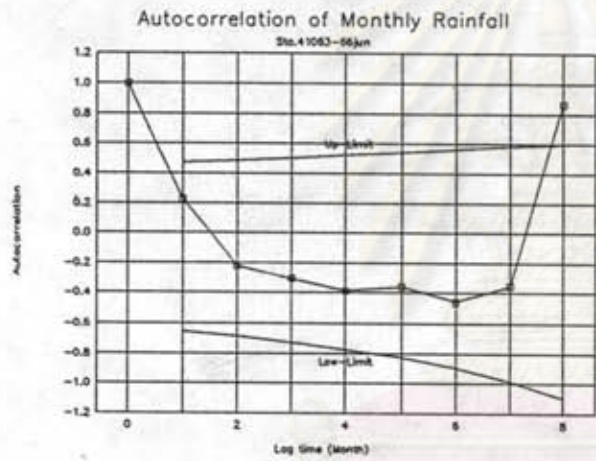
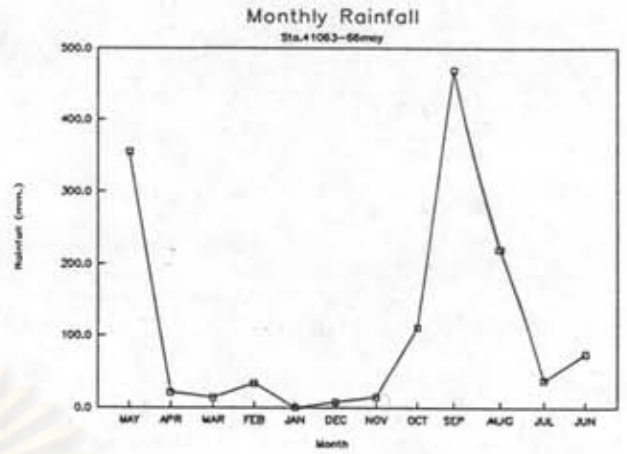
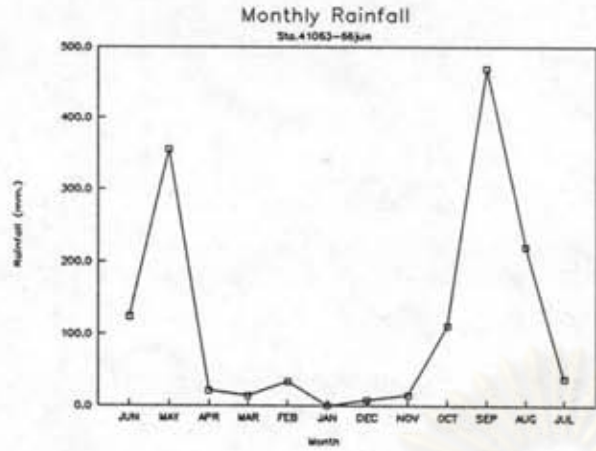


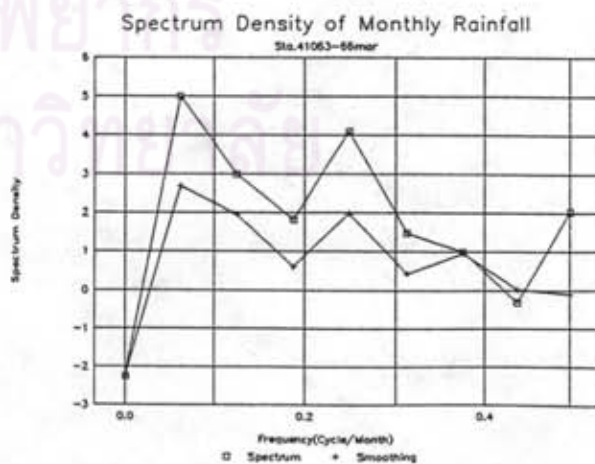
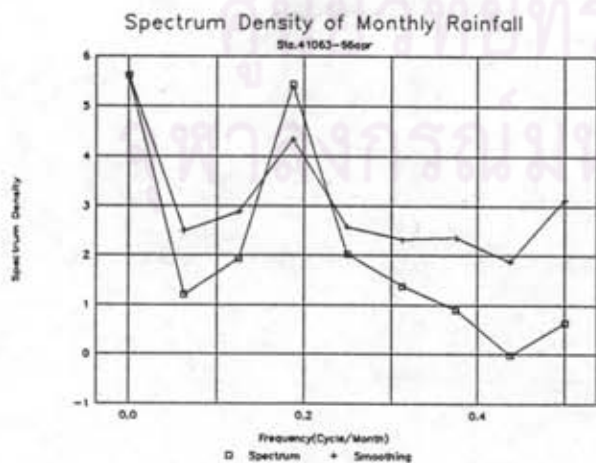
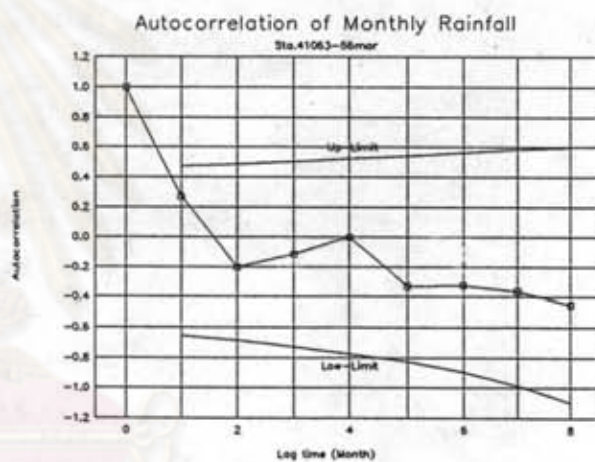
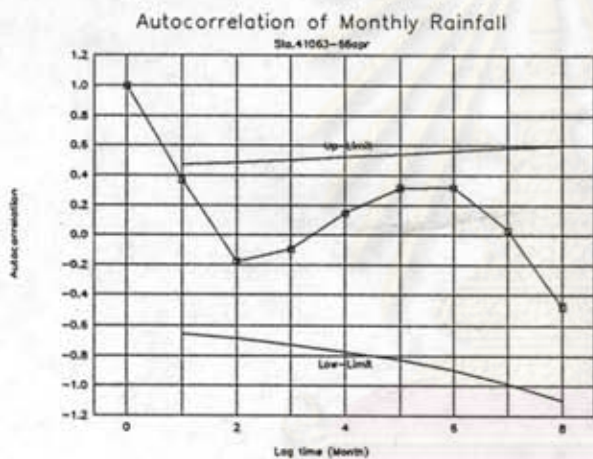
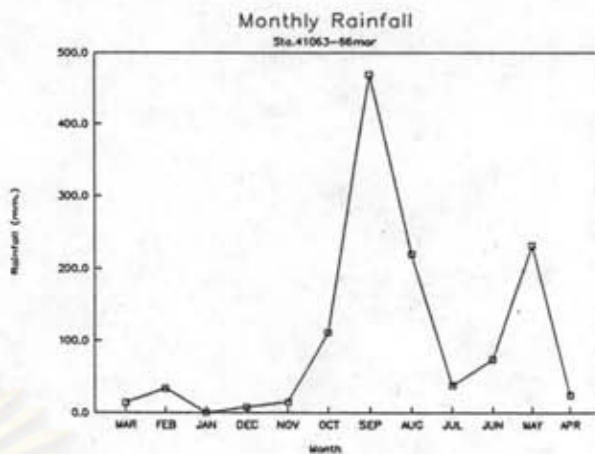
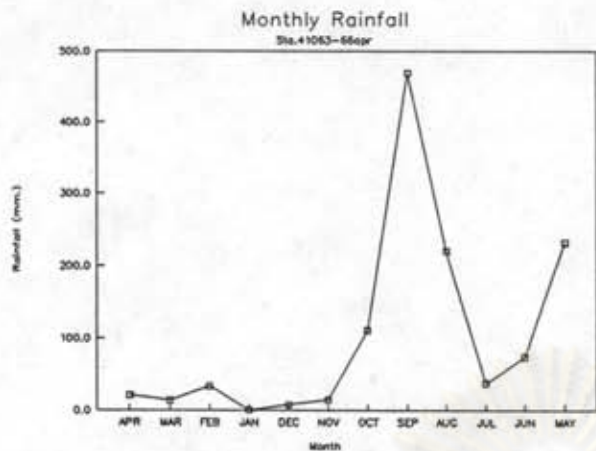


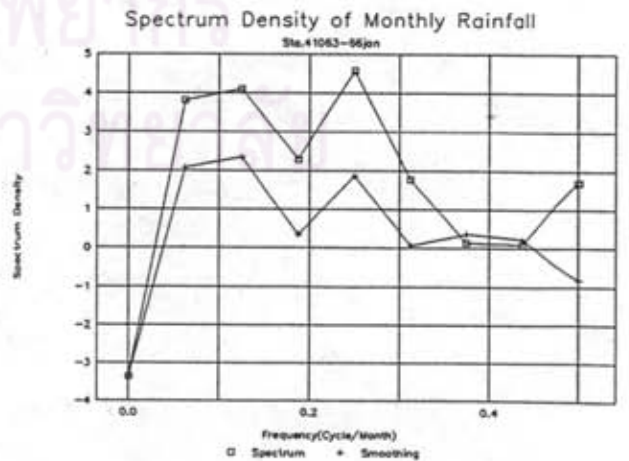
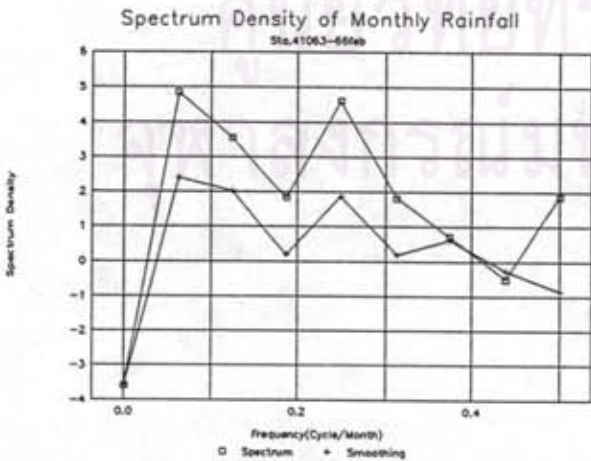
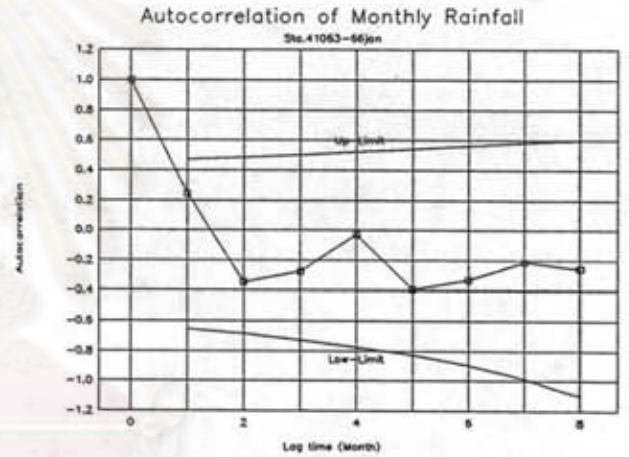
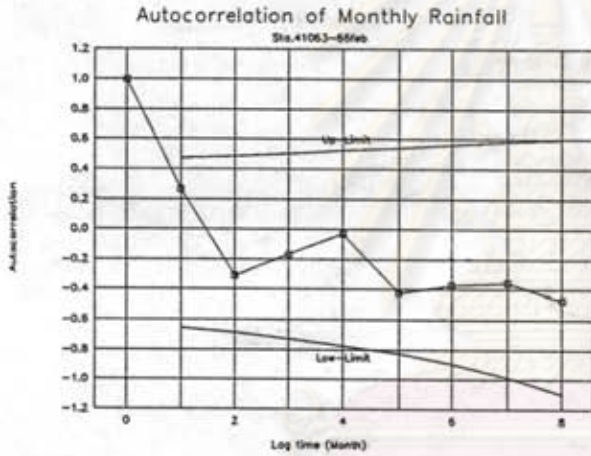
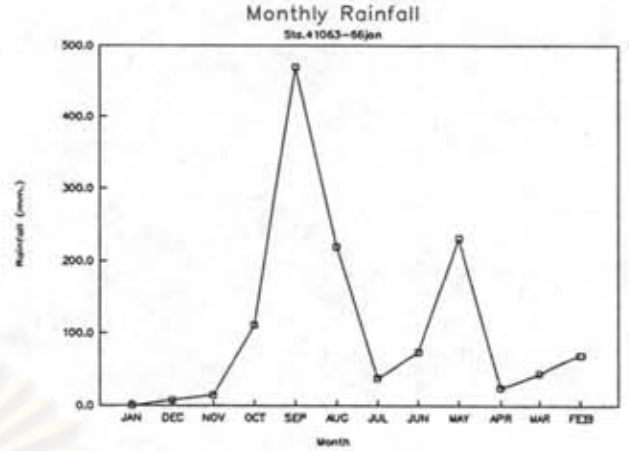
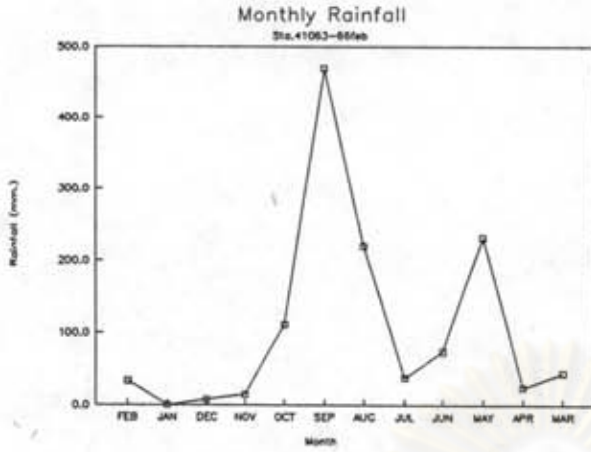


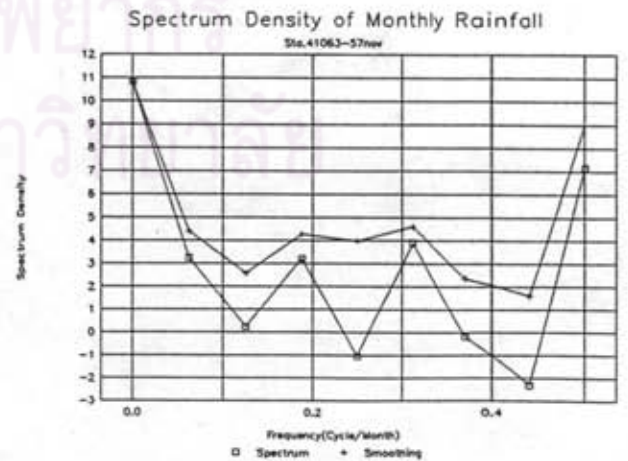
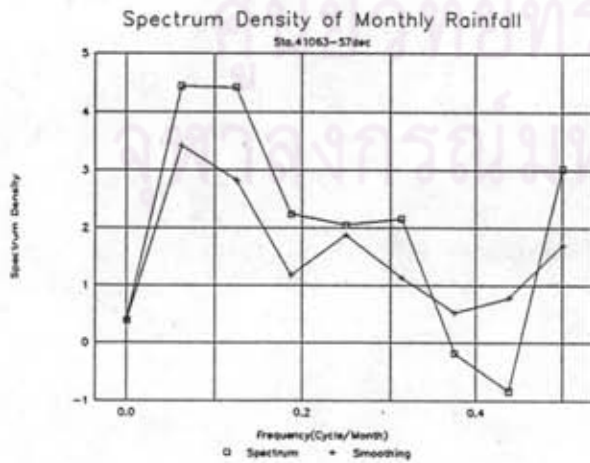
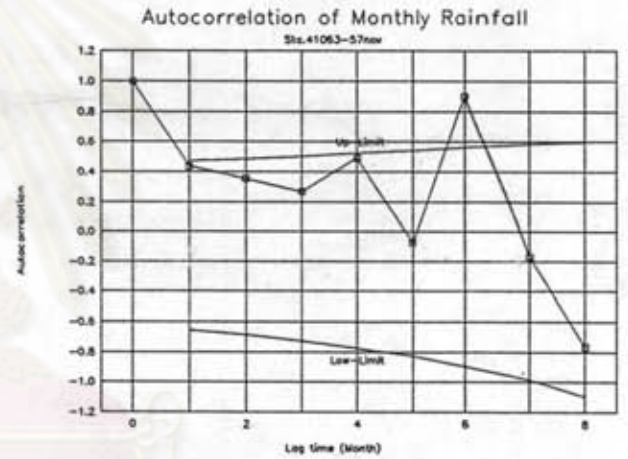
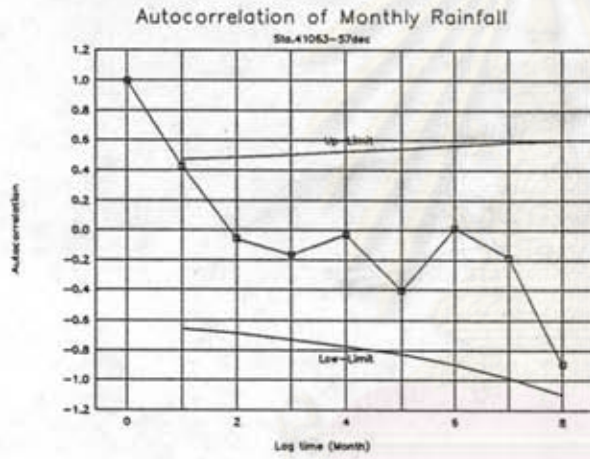
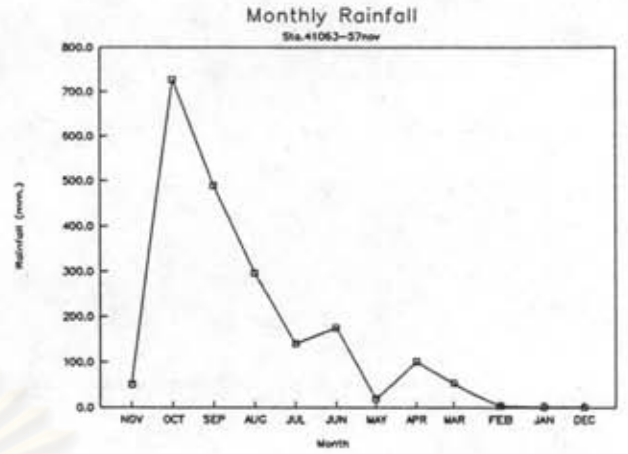
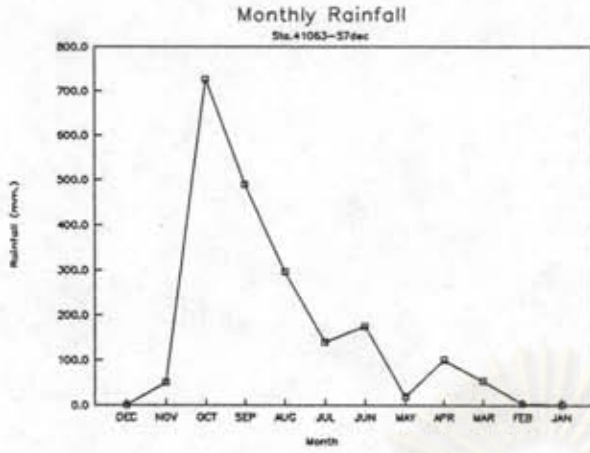


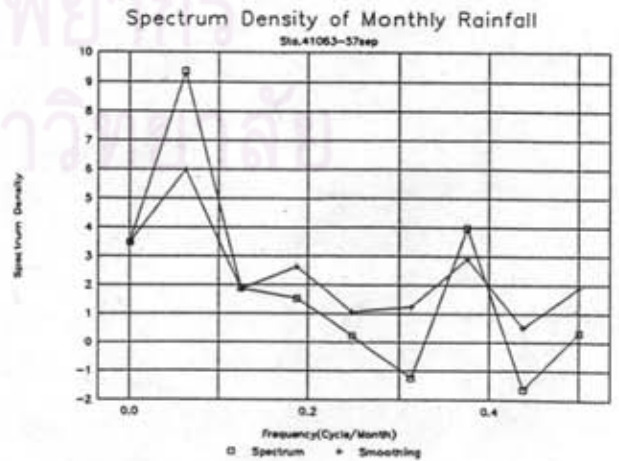
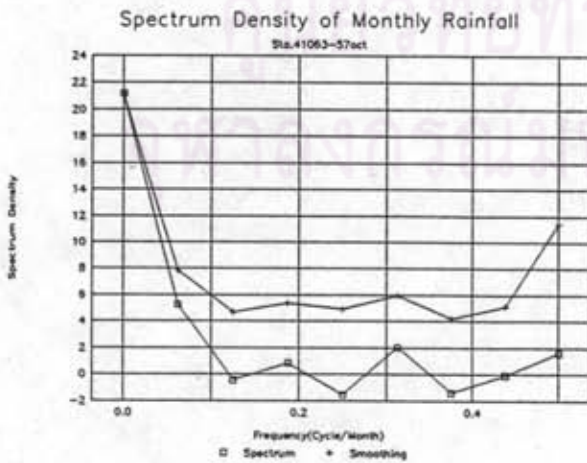
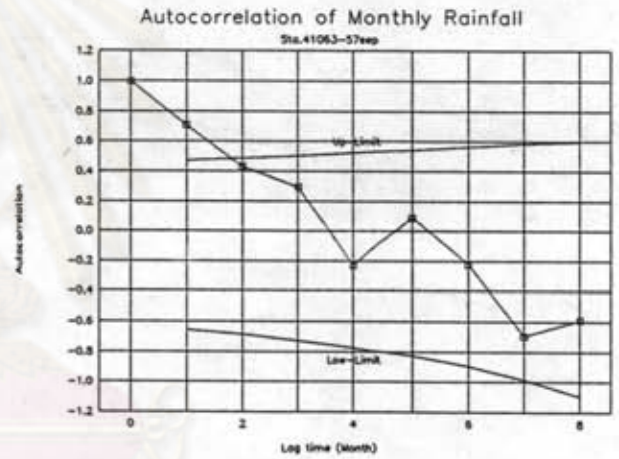
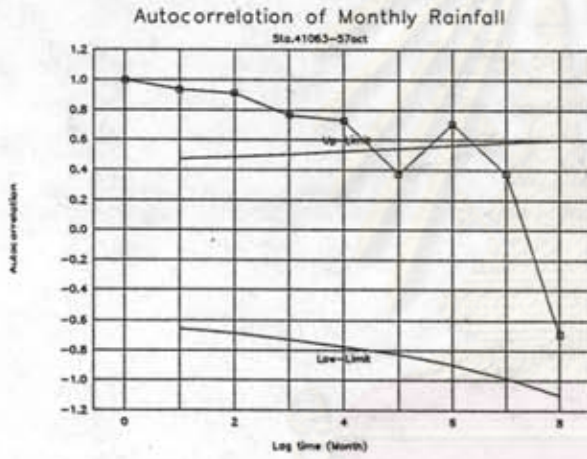
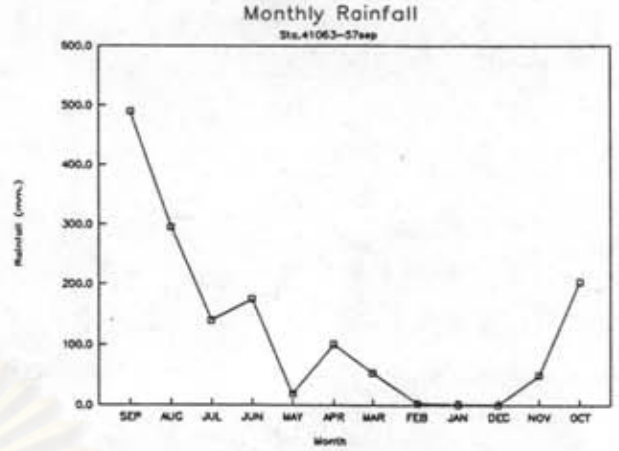
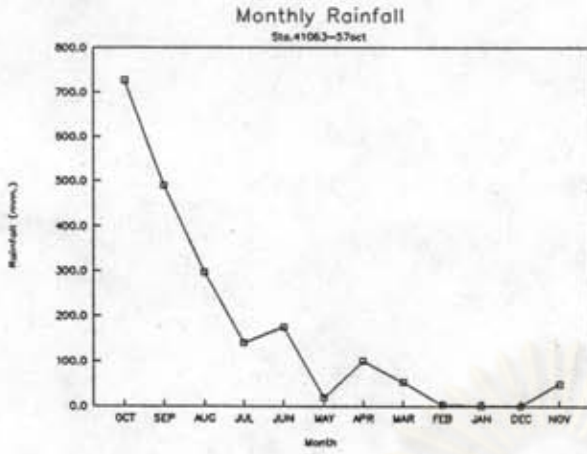


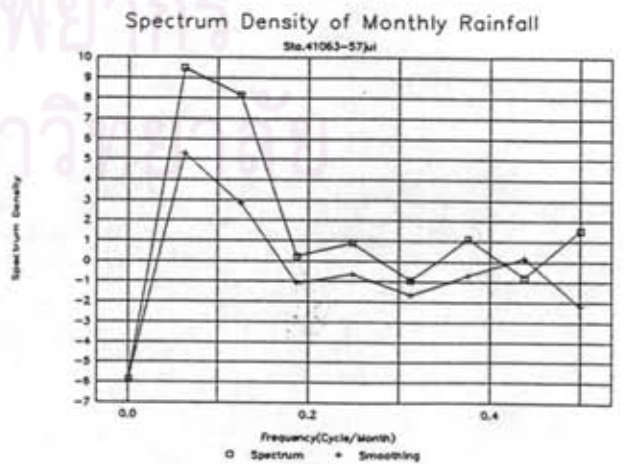
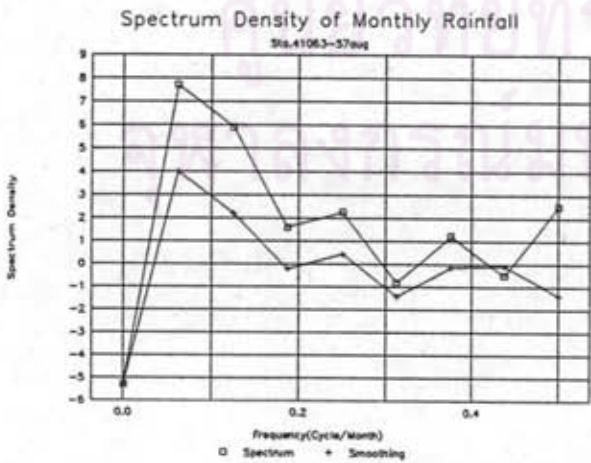
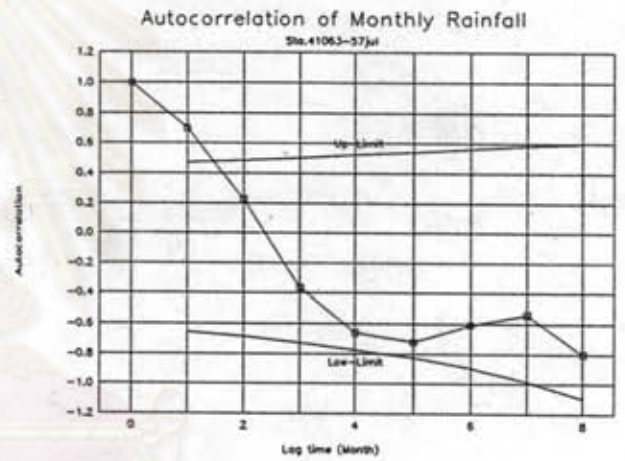
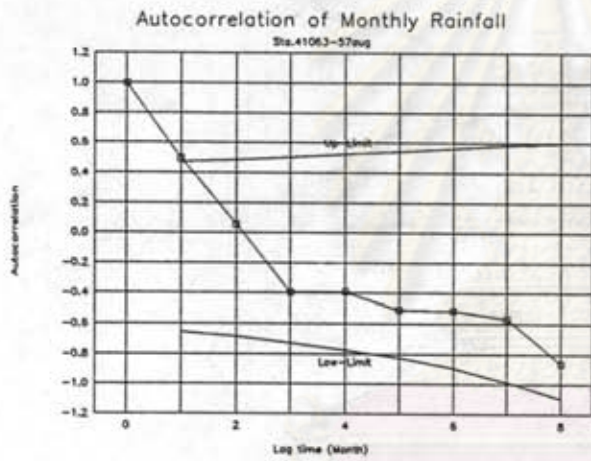
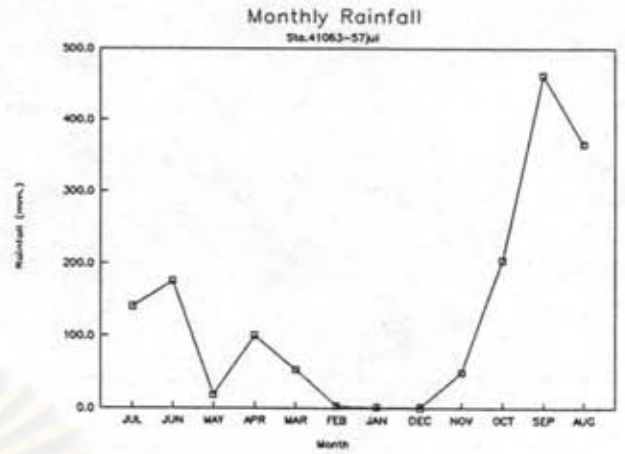
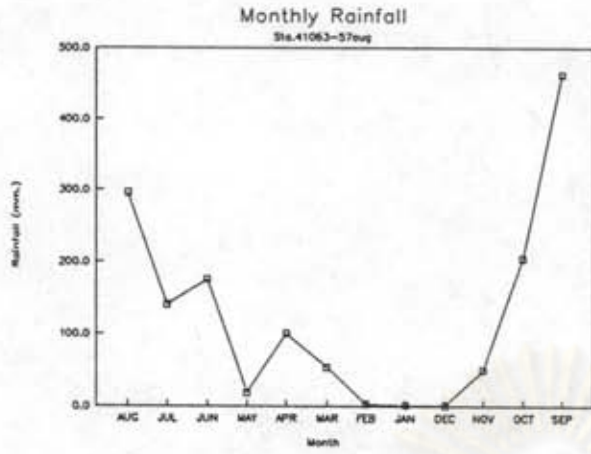


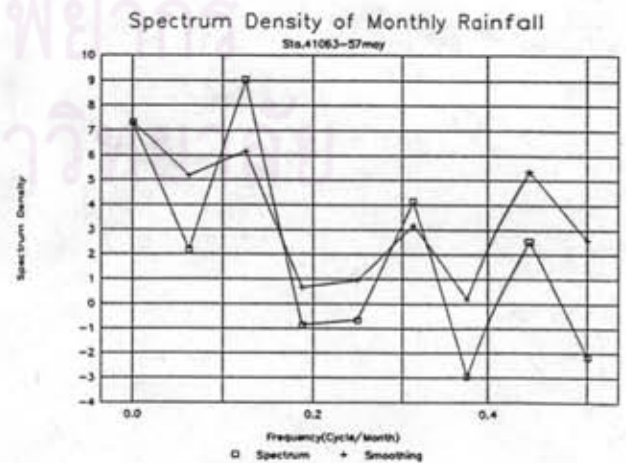
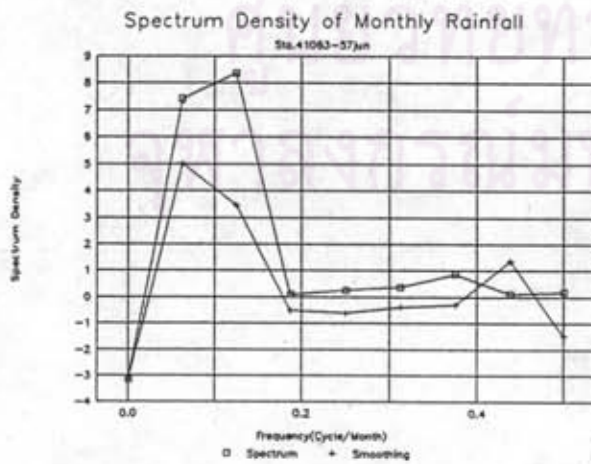
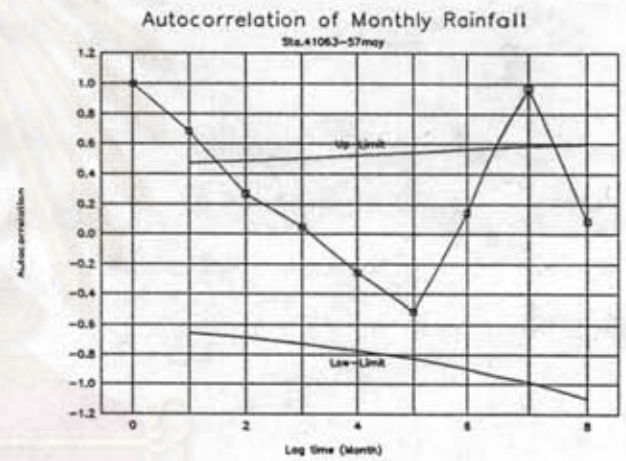
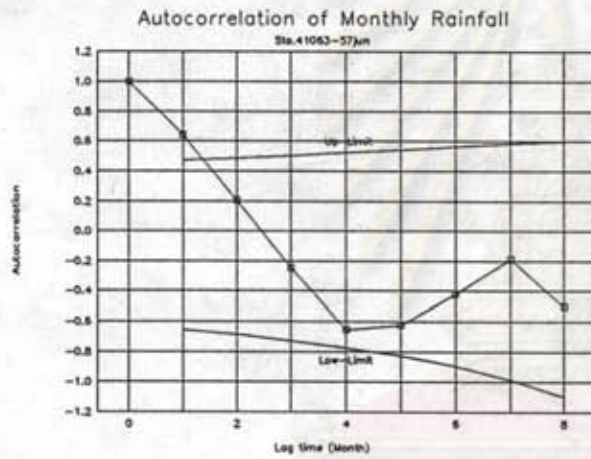
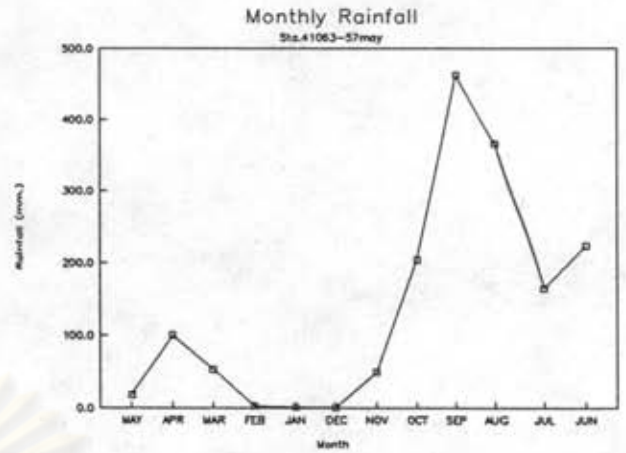
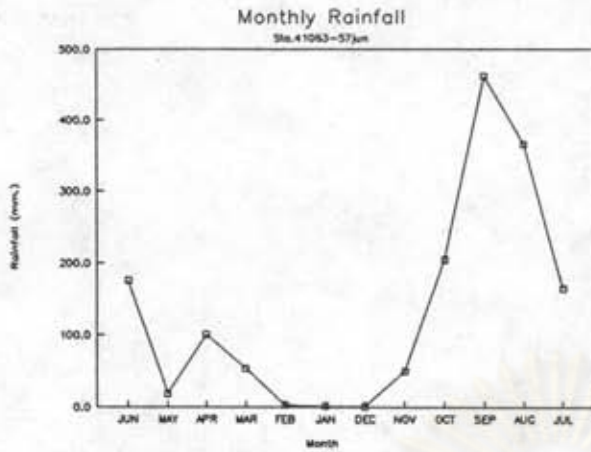


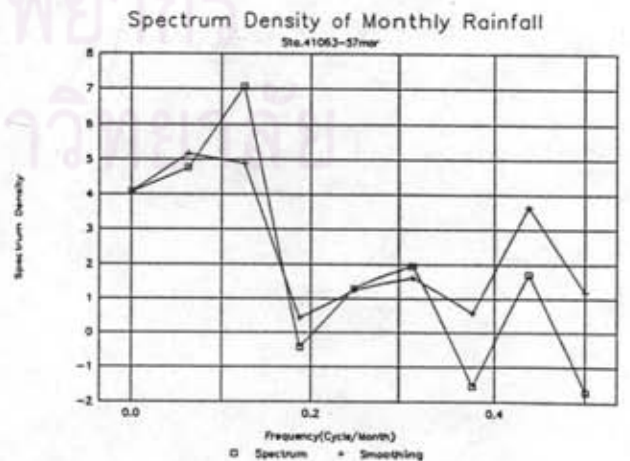
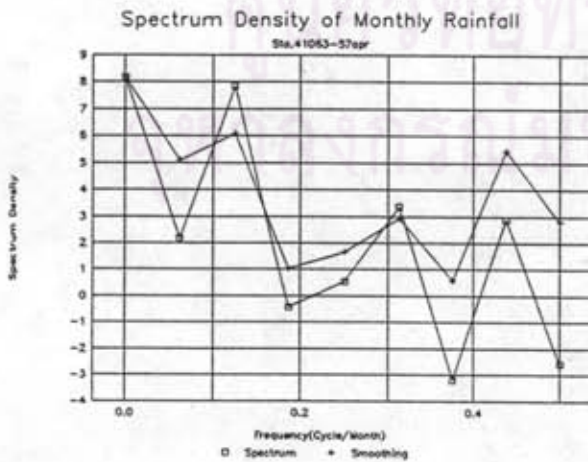
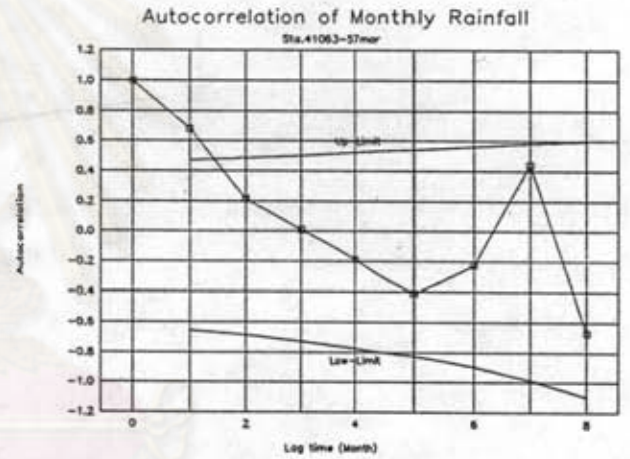
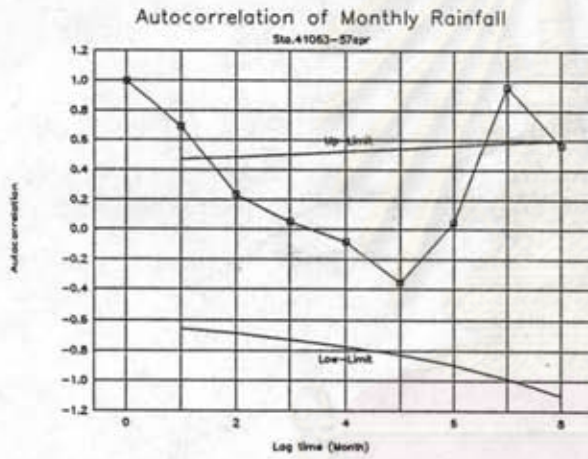
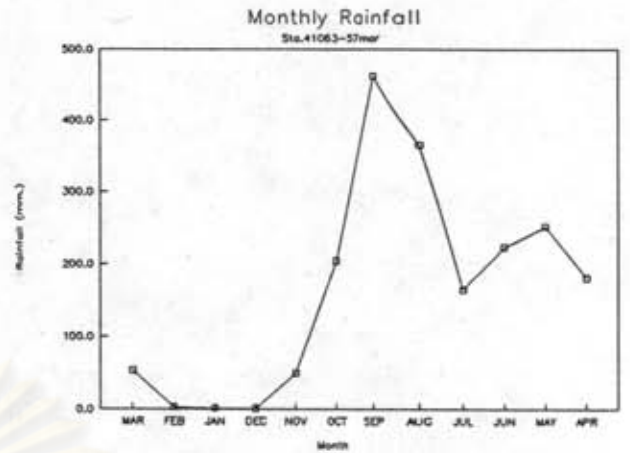
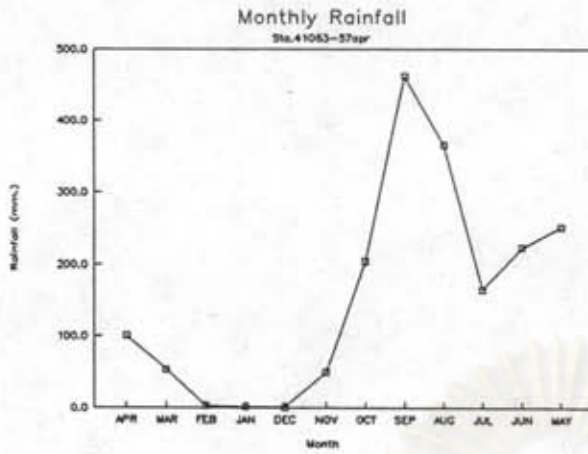


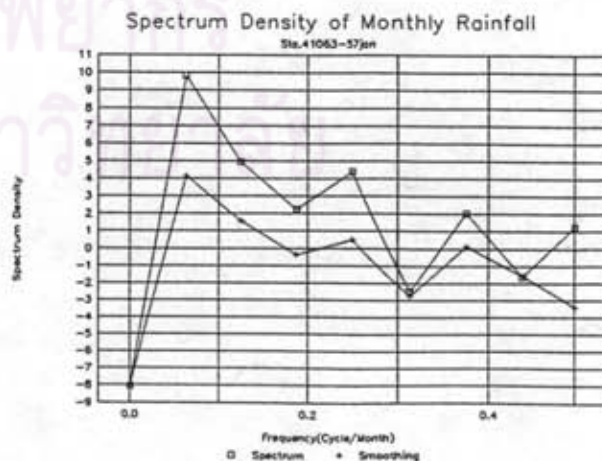
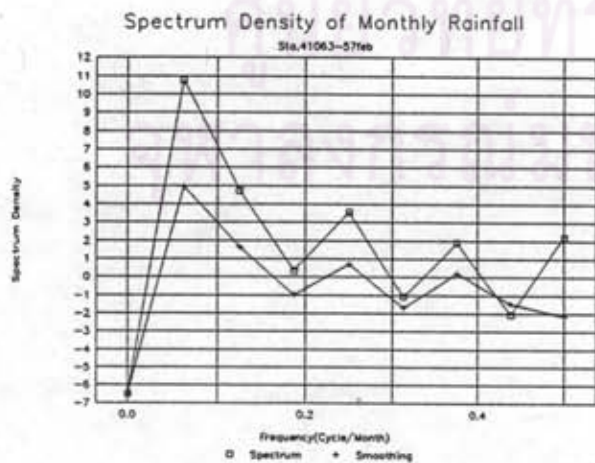
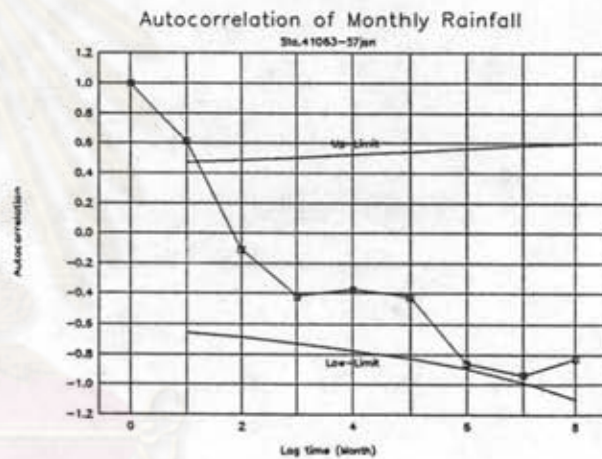
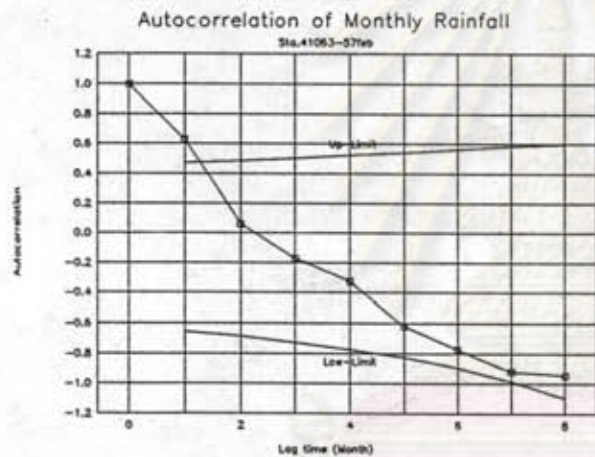
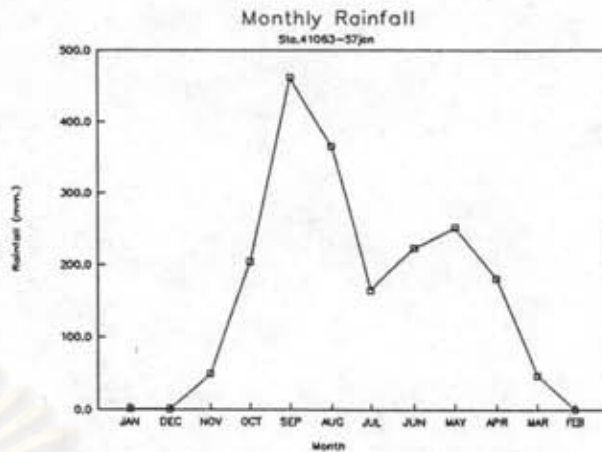
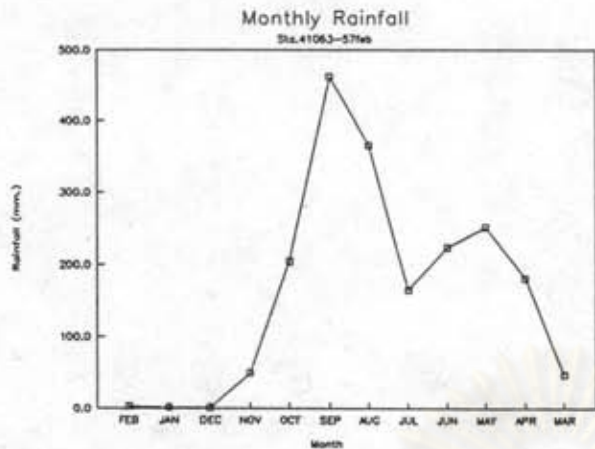


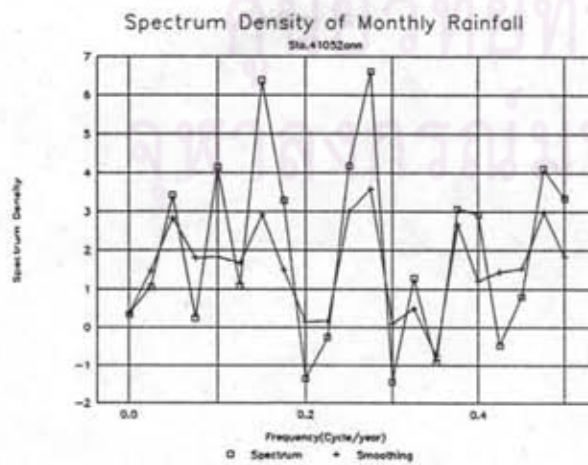
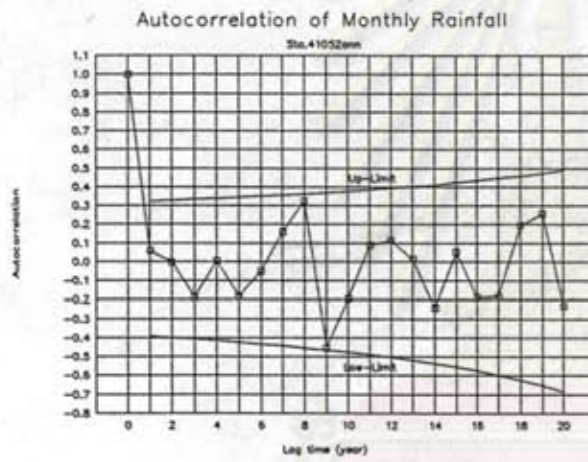
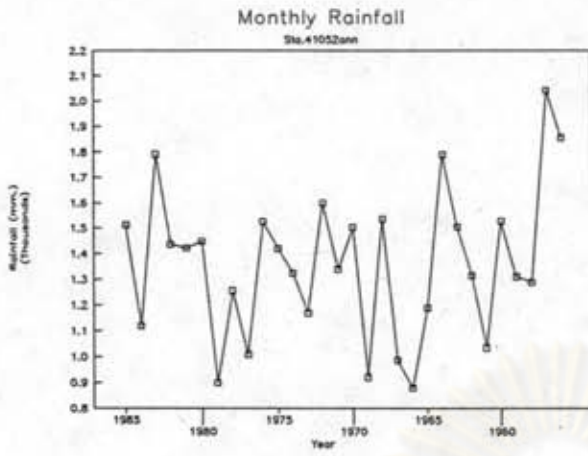




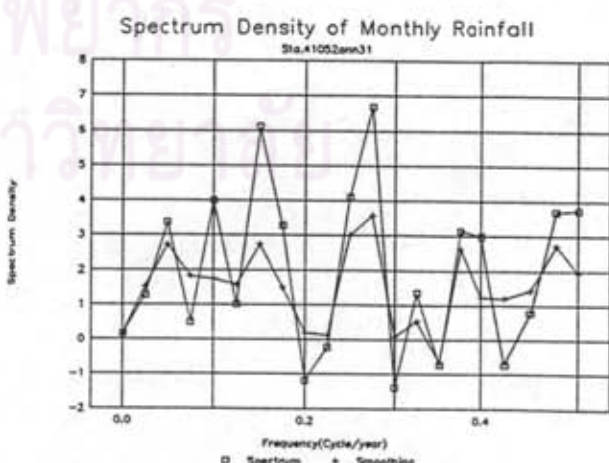
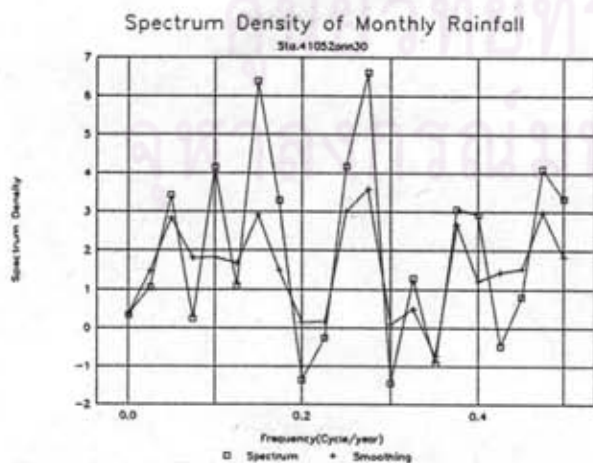
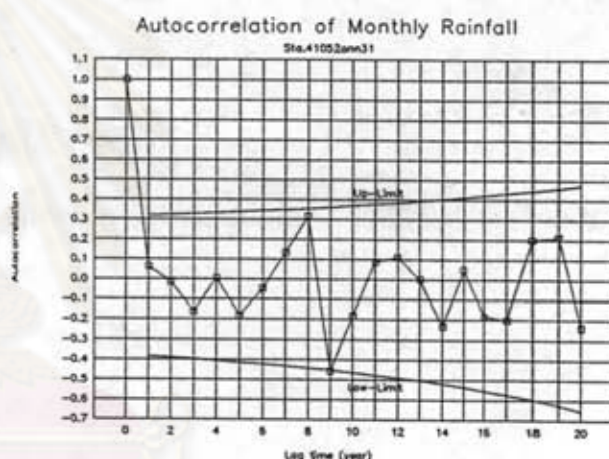
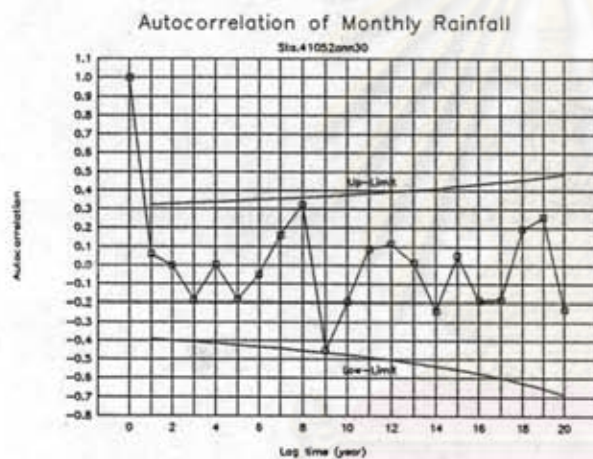
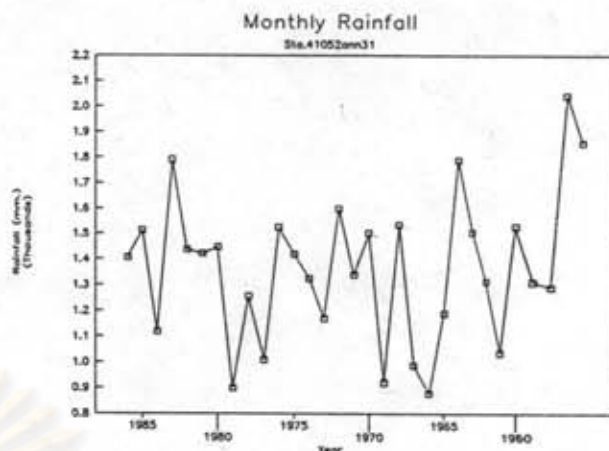
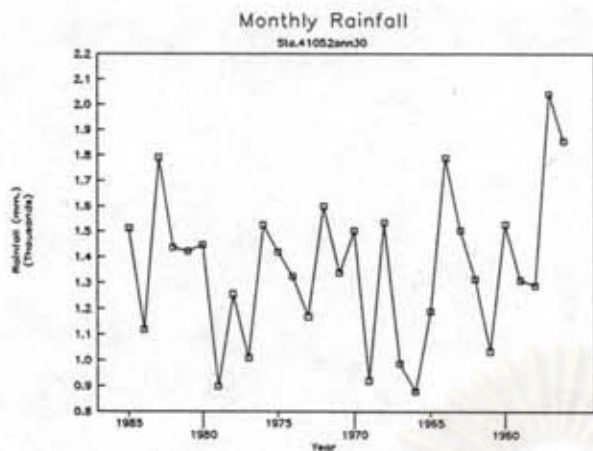


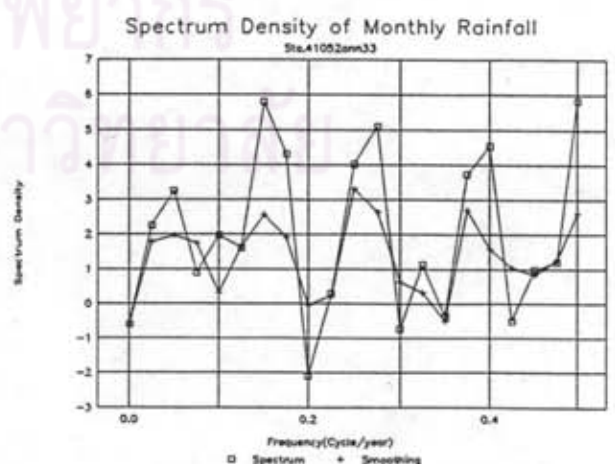
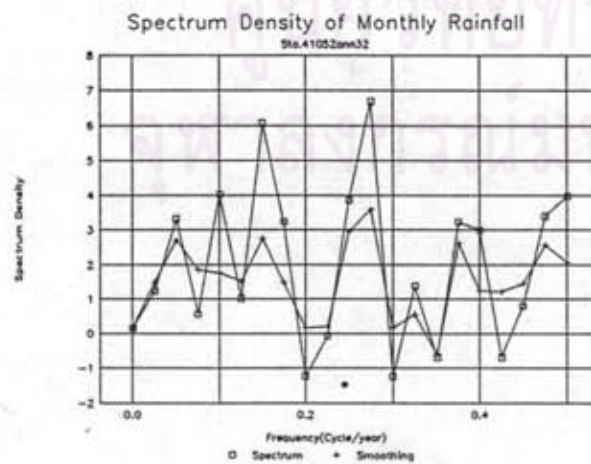
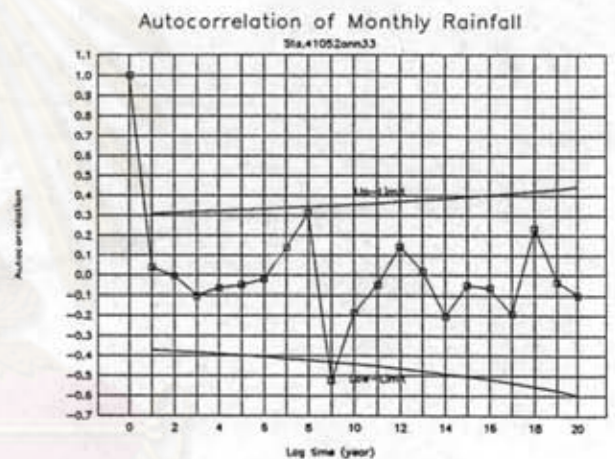
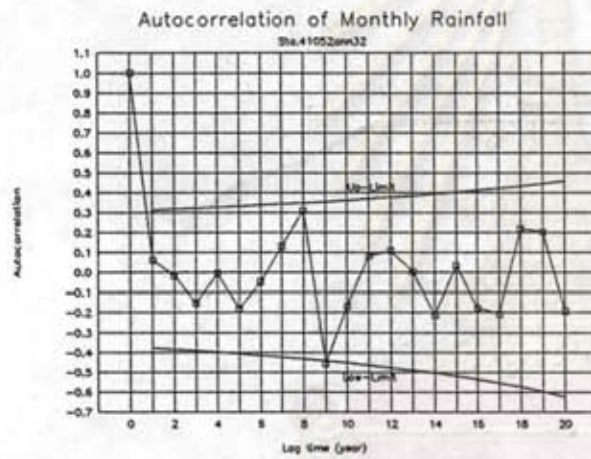
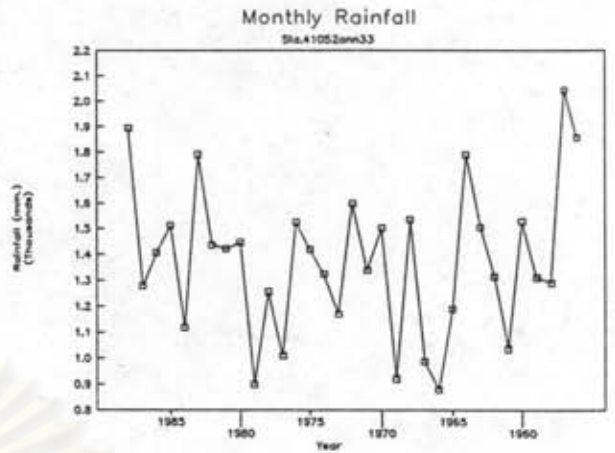
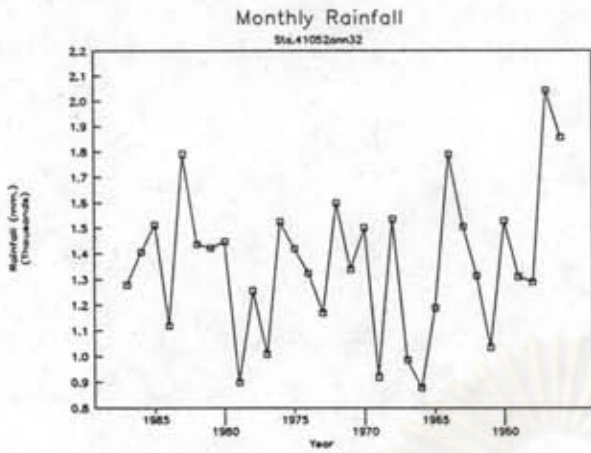




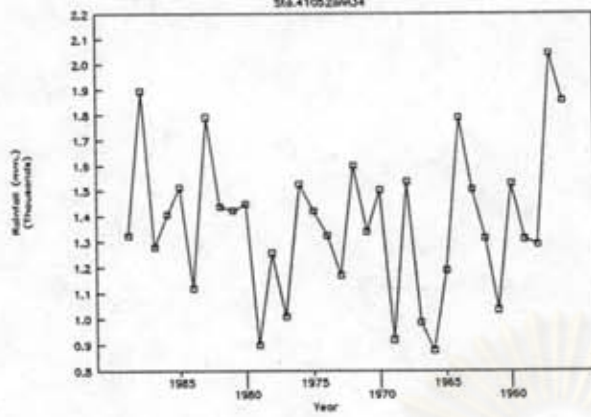


รูป ค - 3 ผลการวิเคราะห์อนุกรมชุดต่าง ๆ ของสถานีฝนเขตนมบุรี (41052)

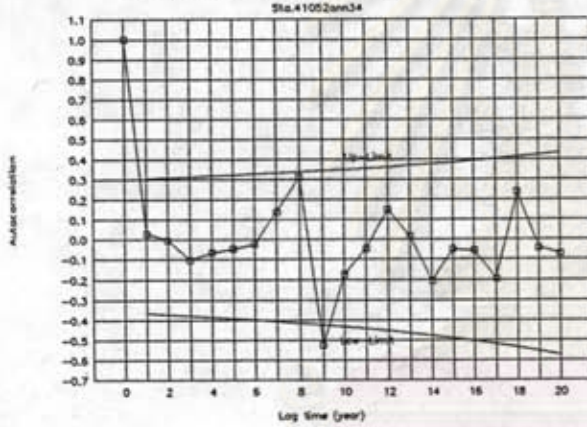




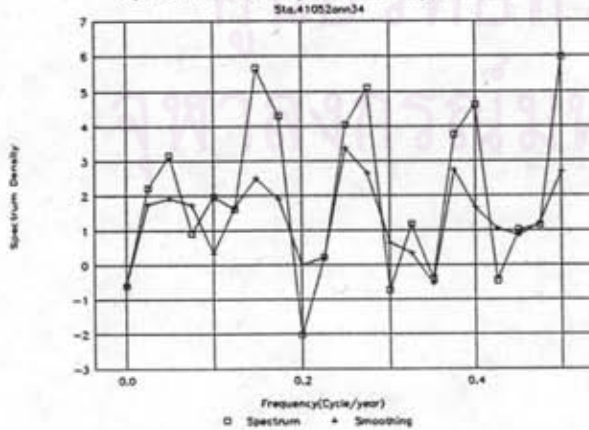
Monthly Rainfall

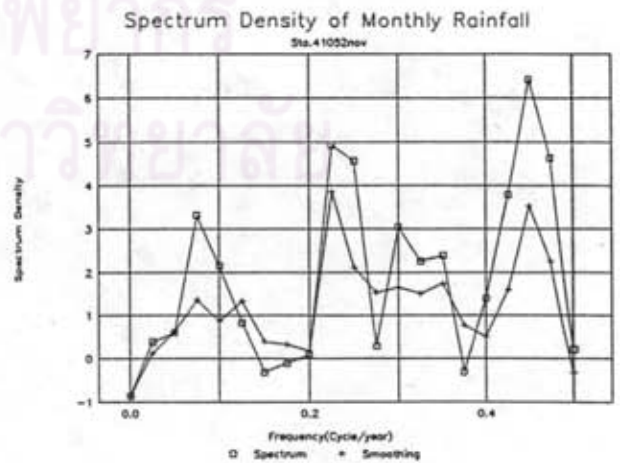
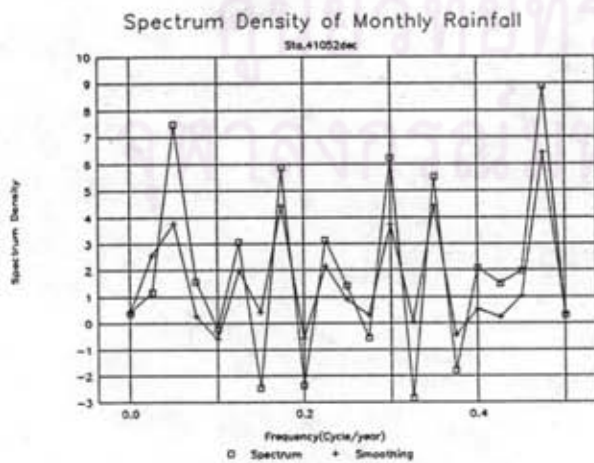
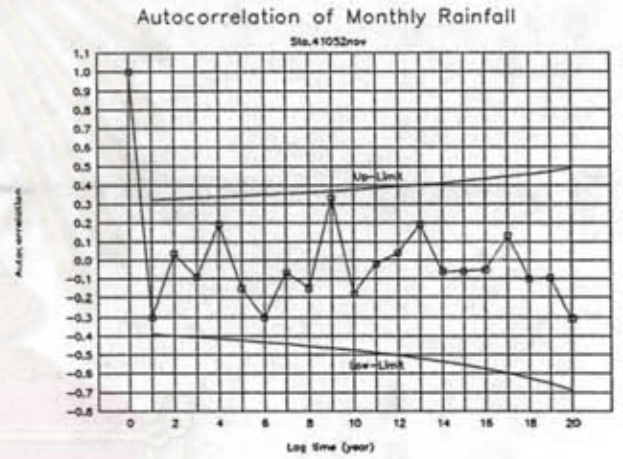
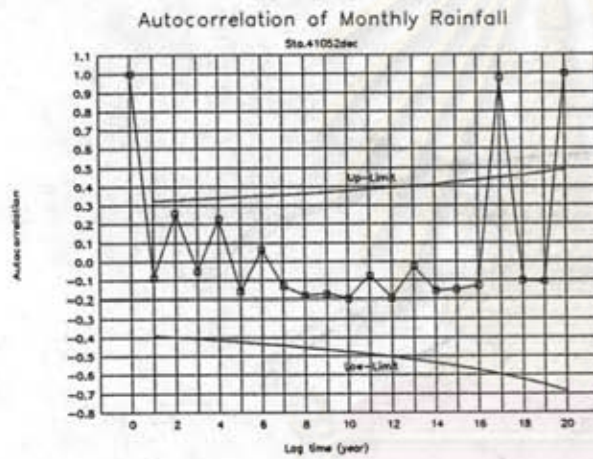
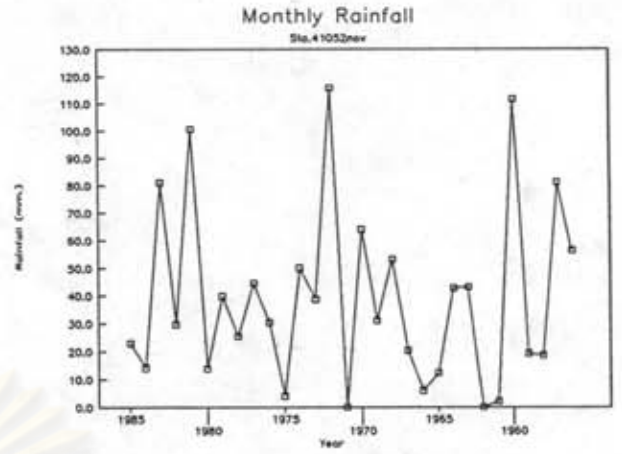
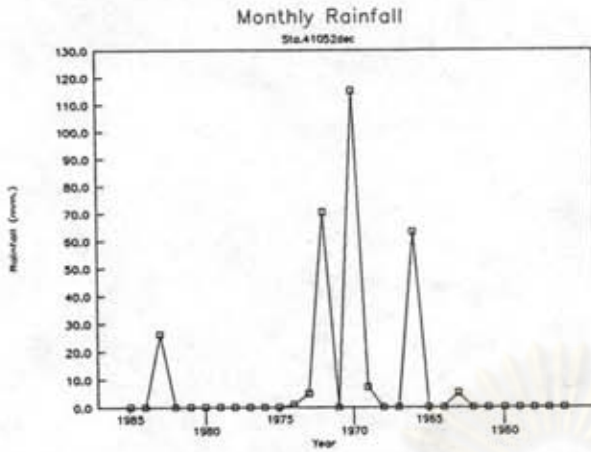


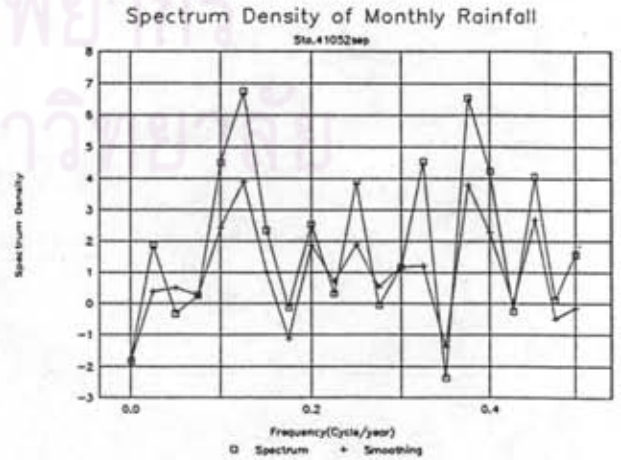
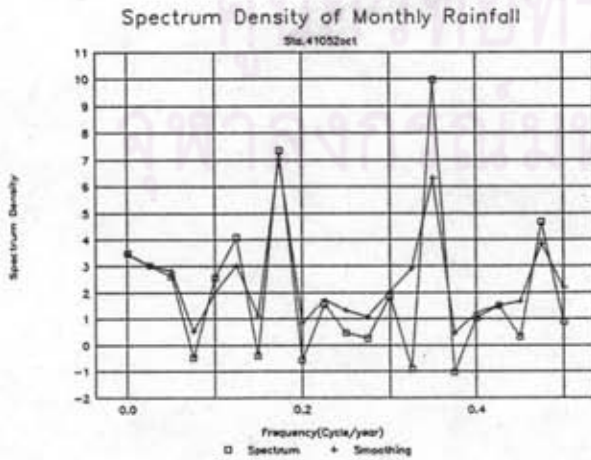
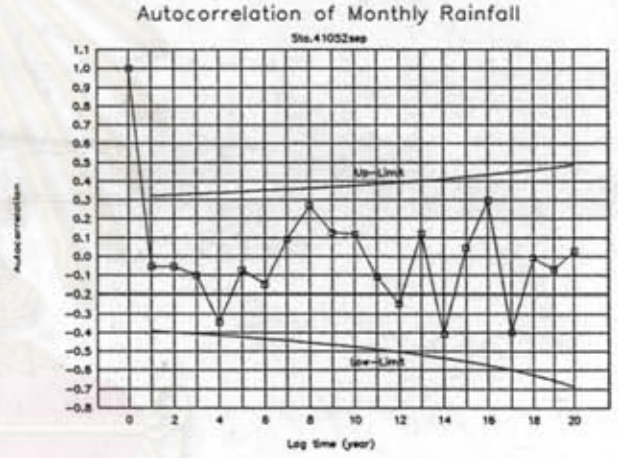
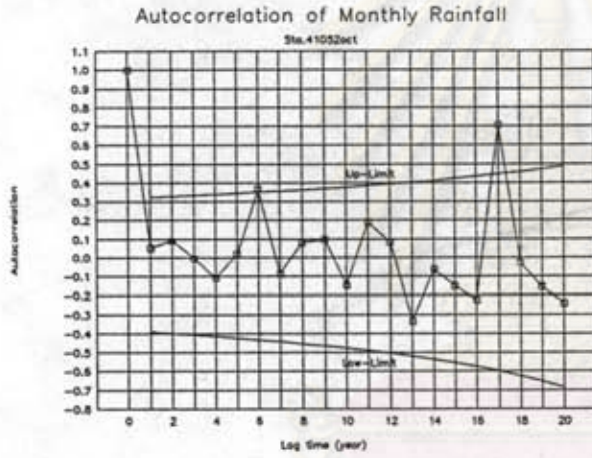
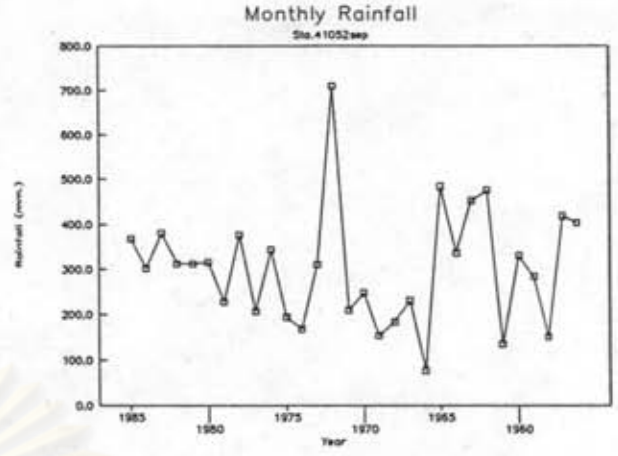
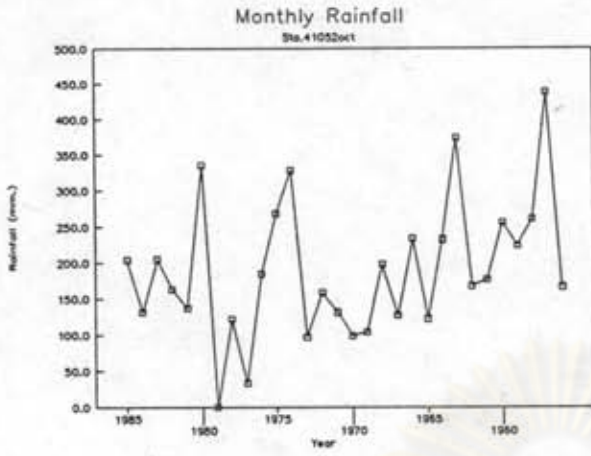
Autocorrelation of Monthly Rainfall

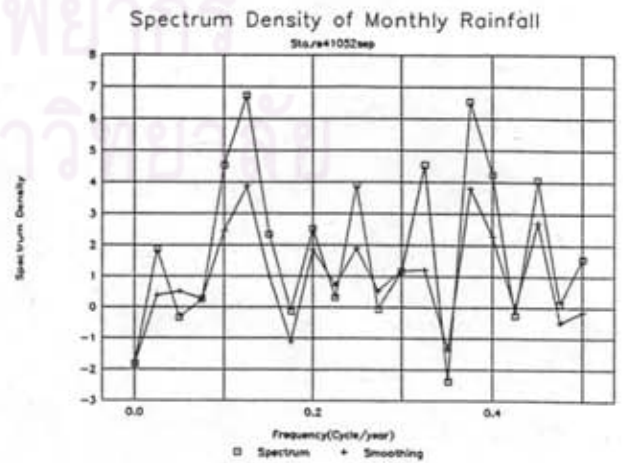
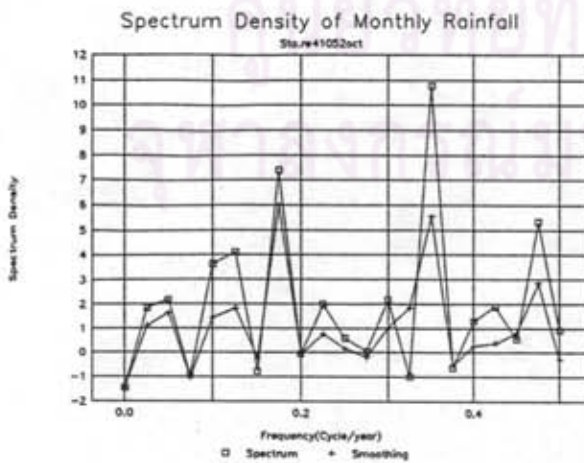
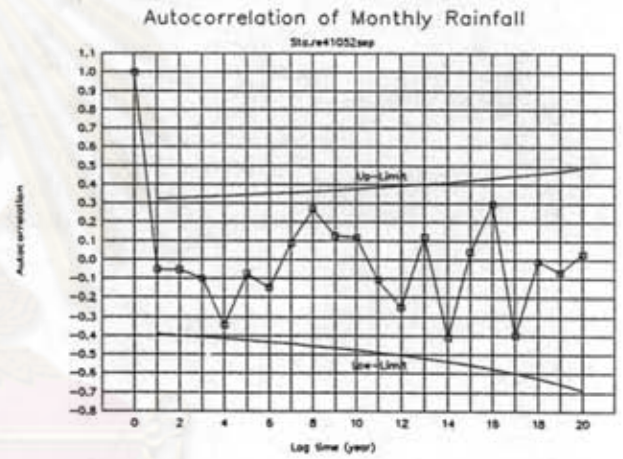
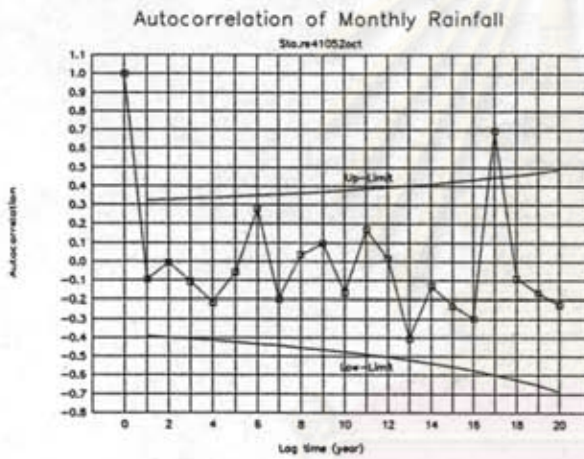
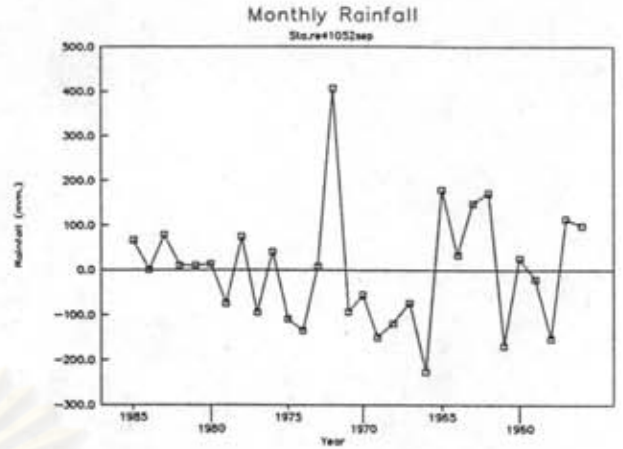
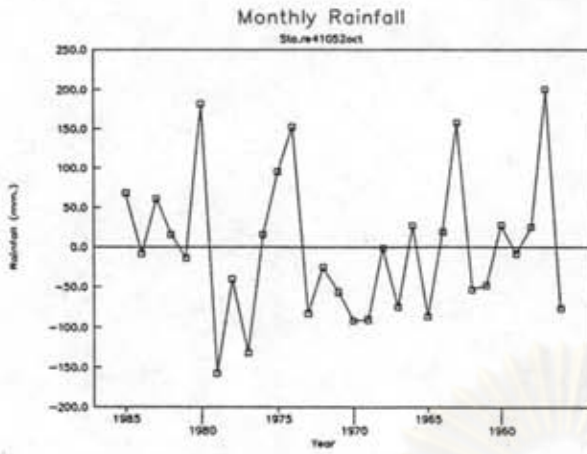


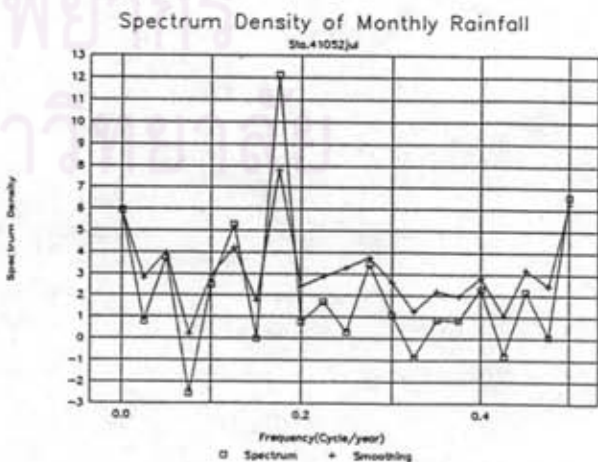
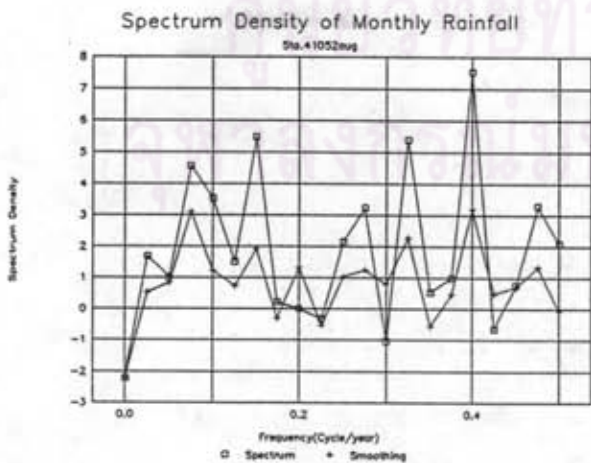
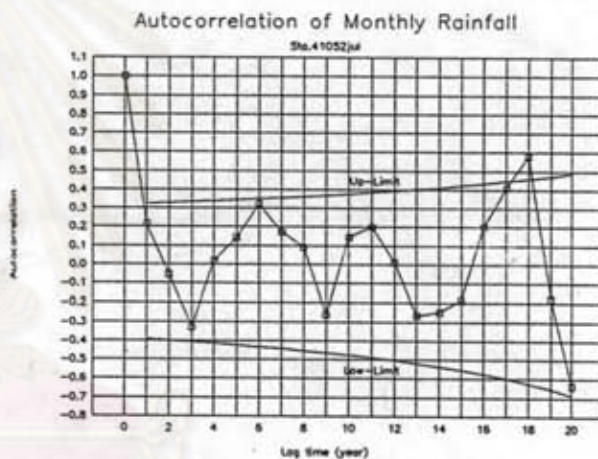
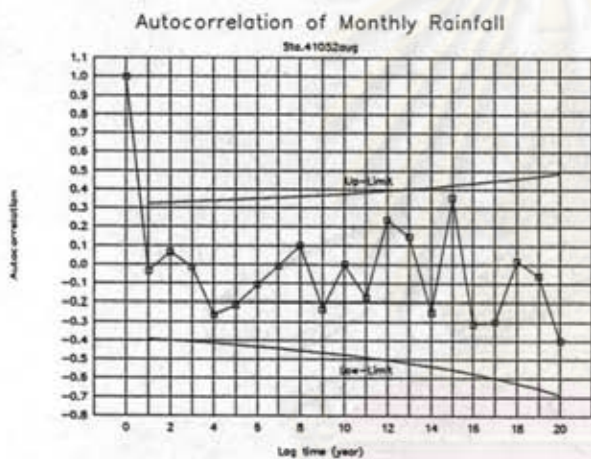
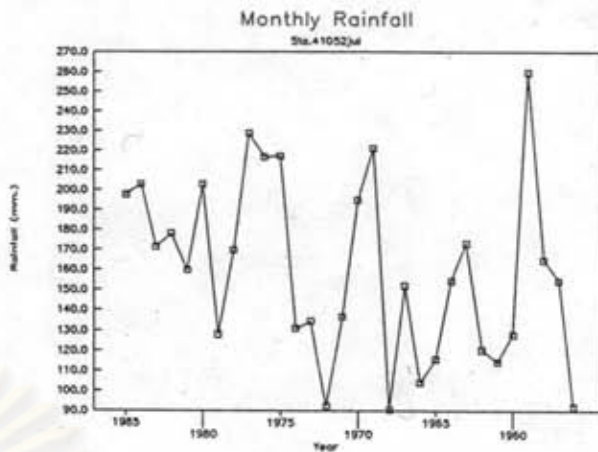
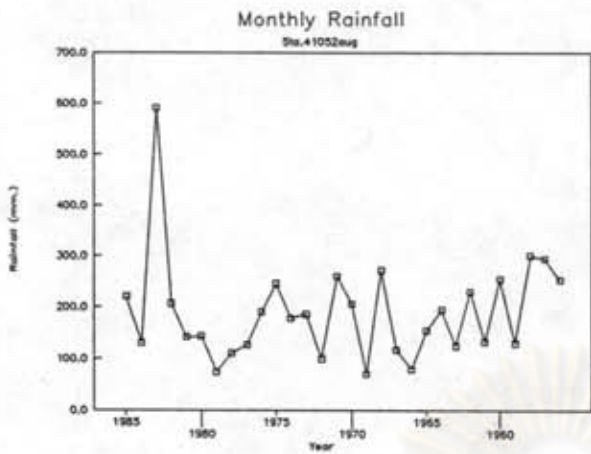
Spectrum Density of Monthly Rainfall

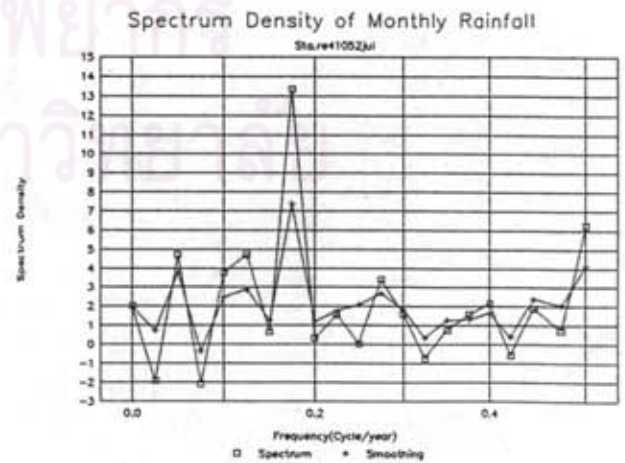
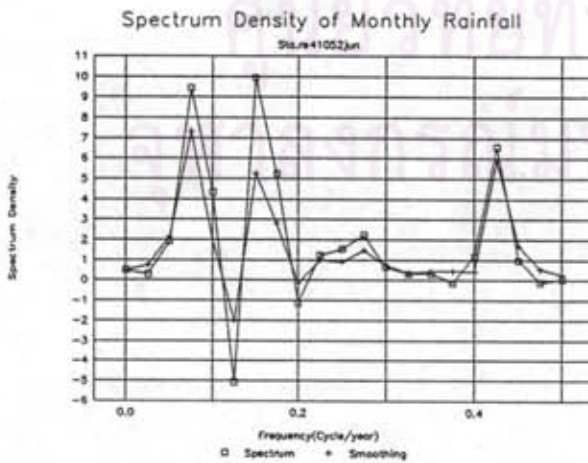
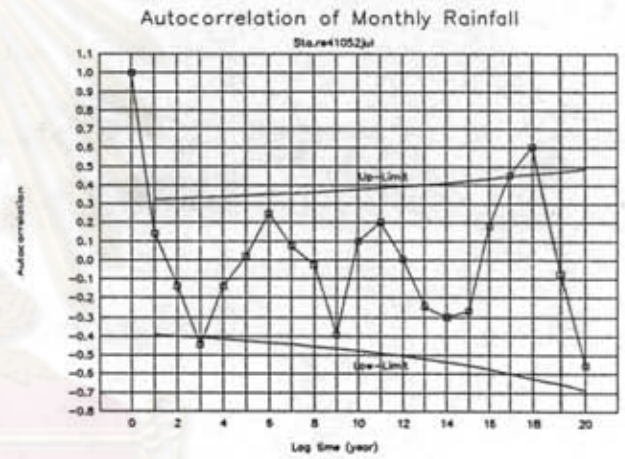
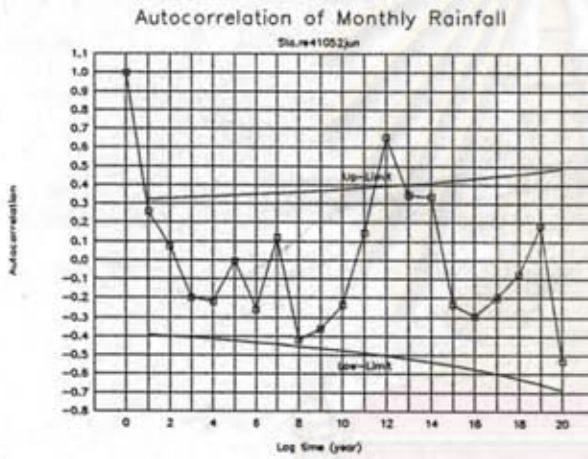
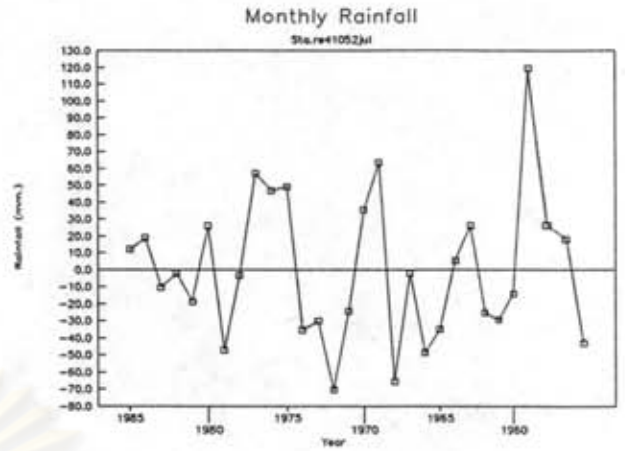
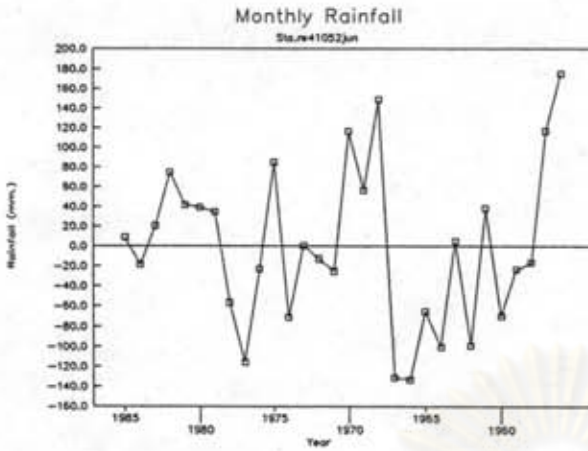


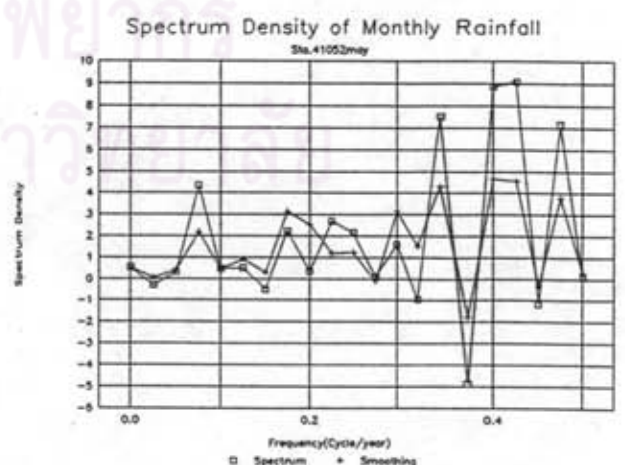
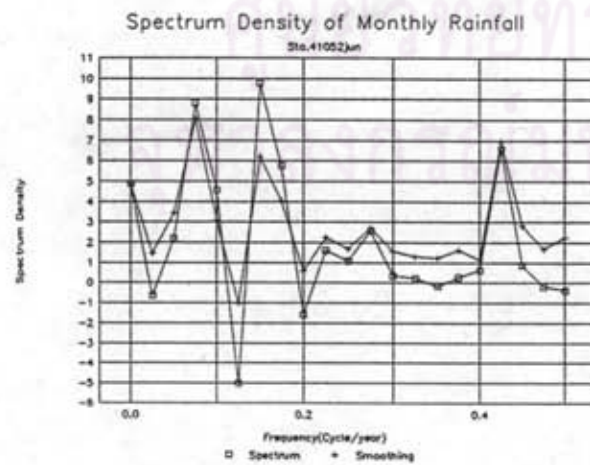
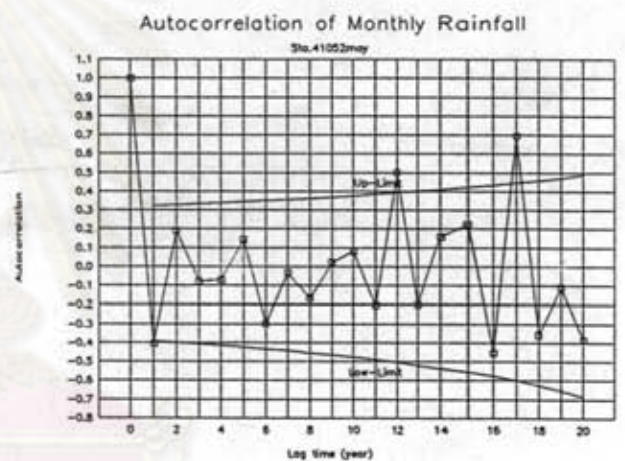
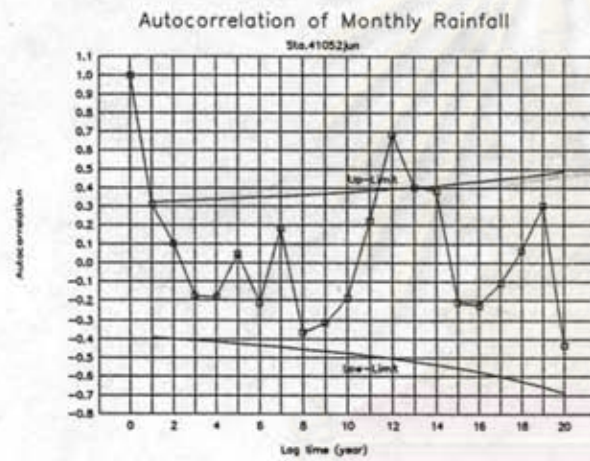
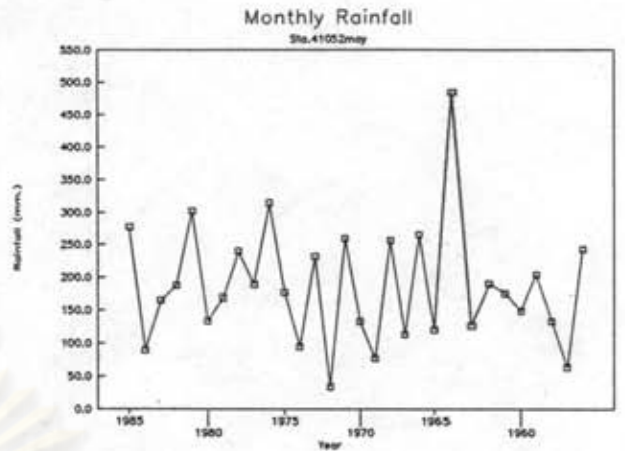
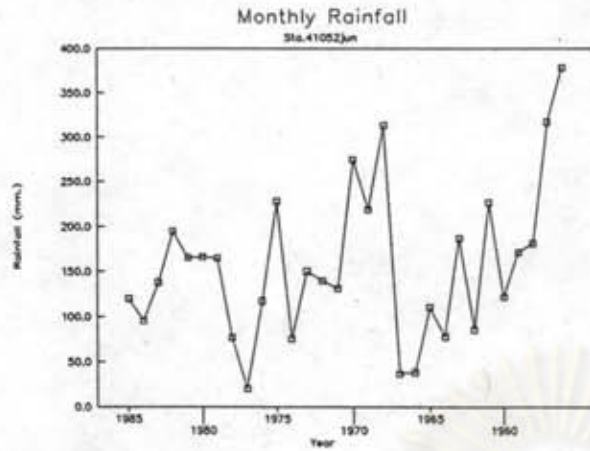


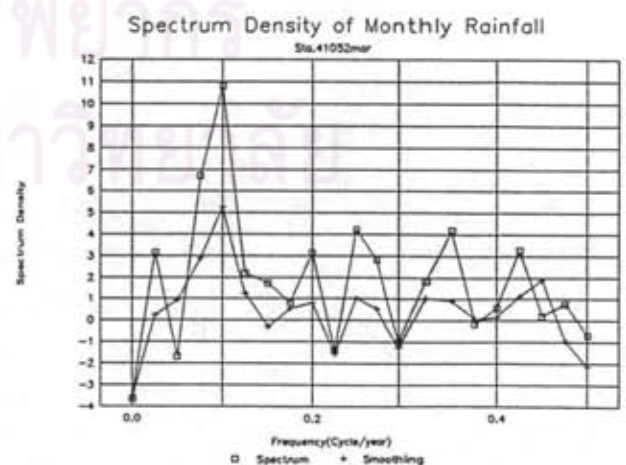
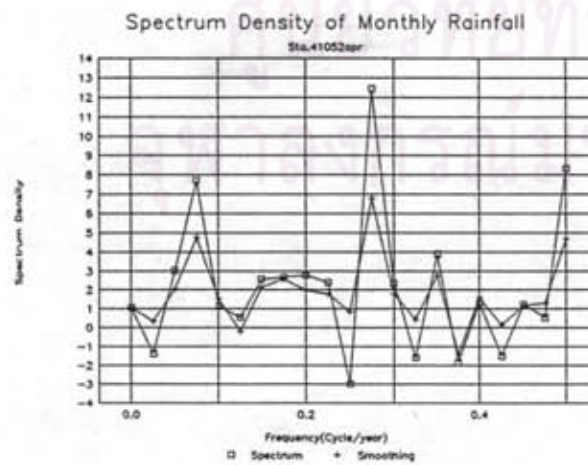
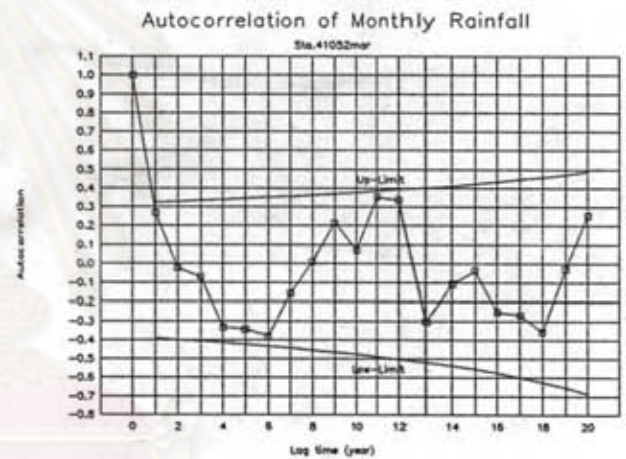
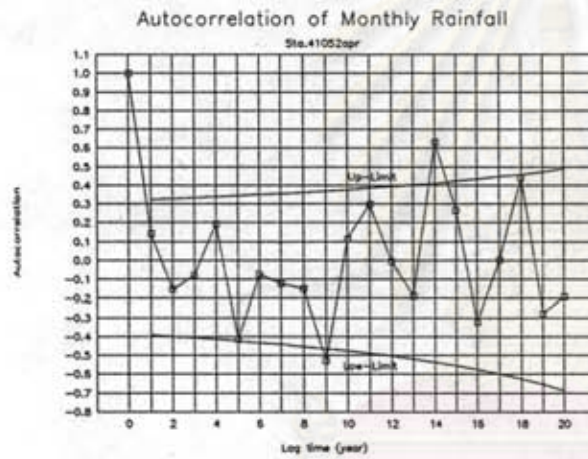
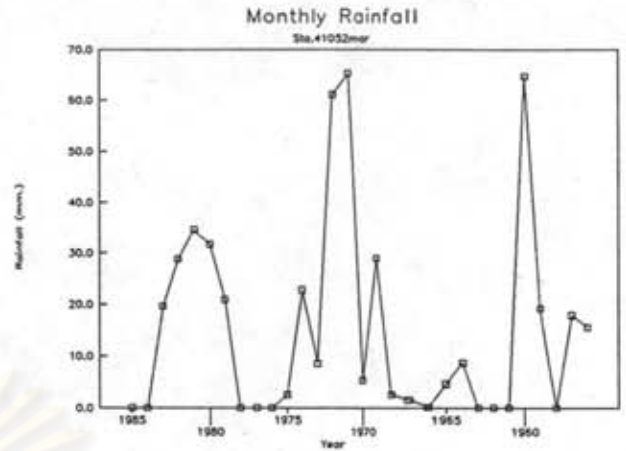
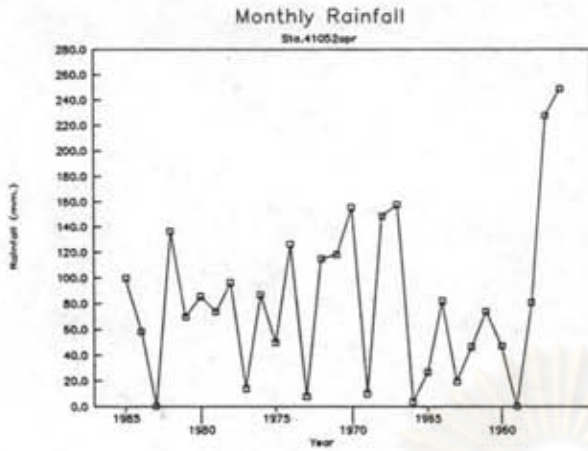


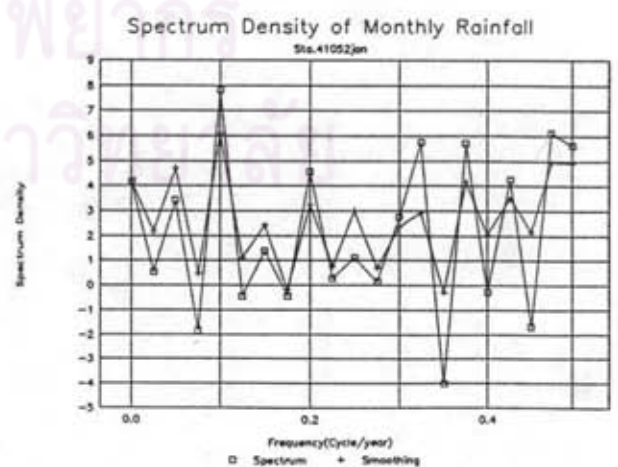
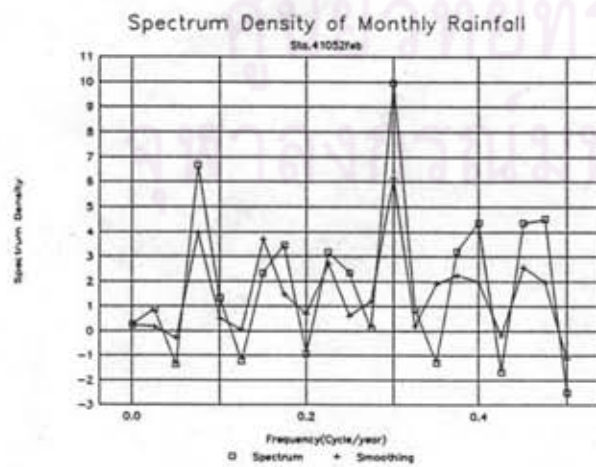
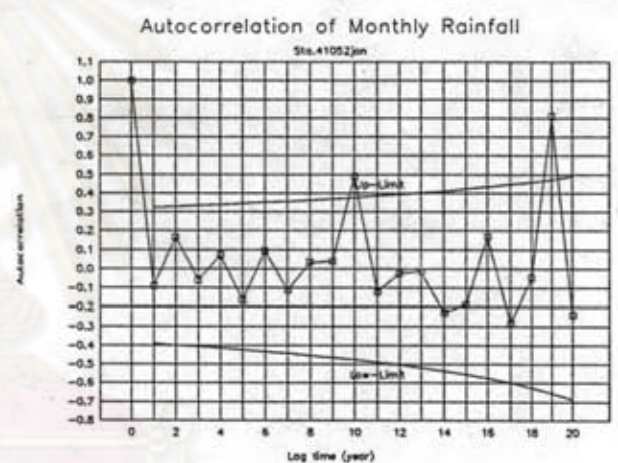
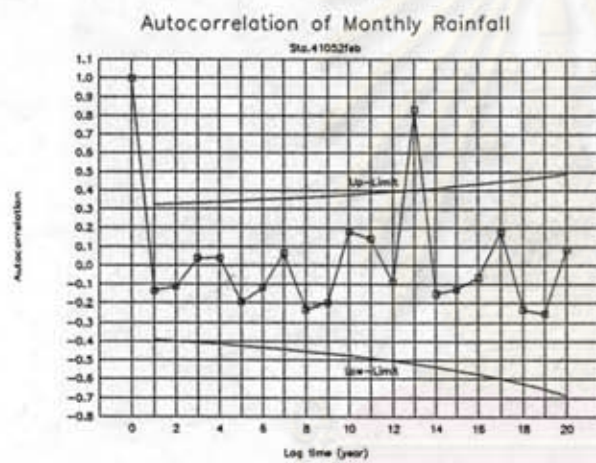
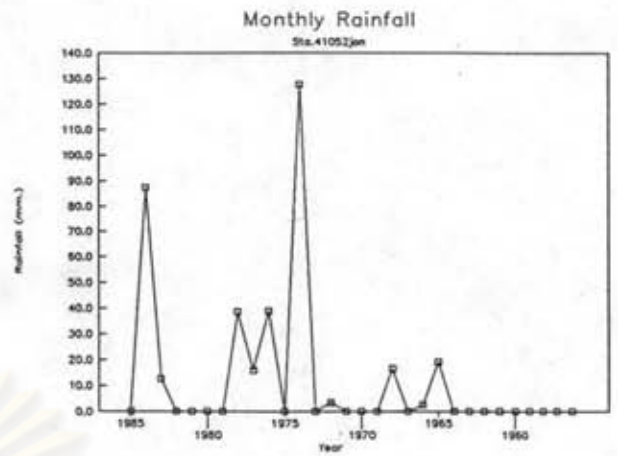
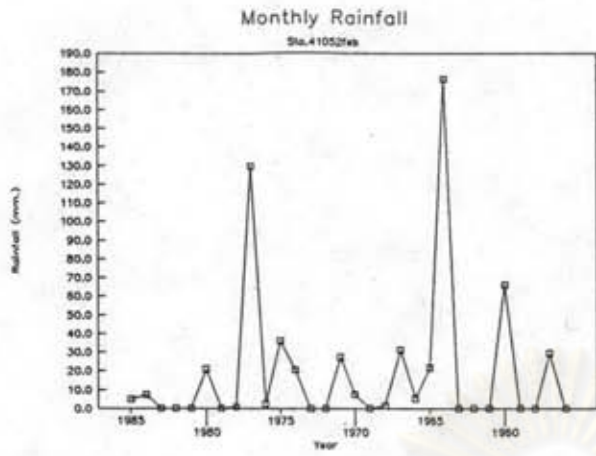


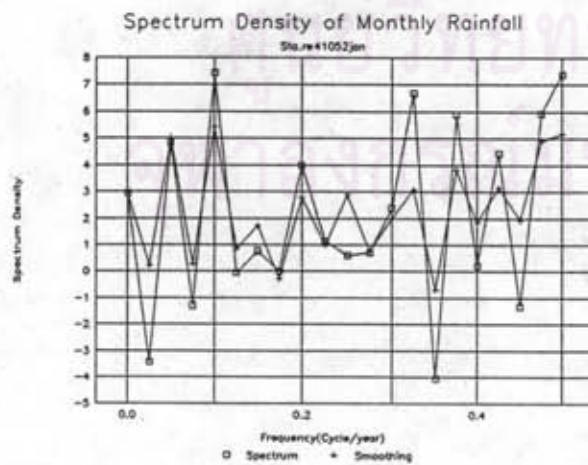
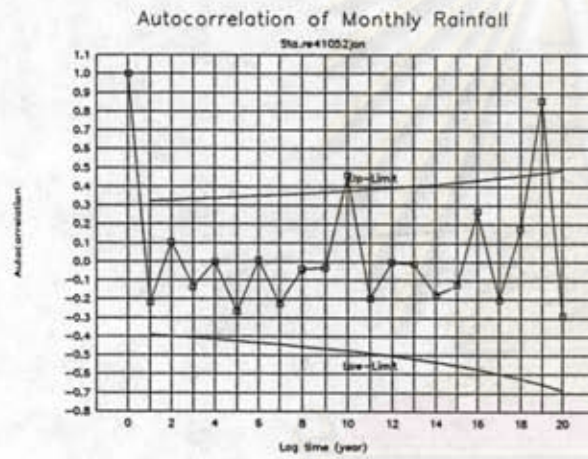
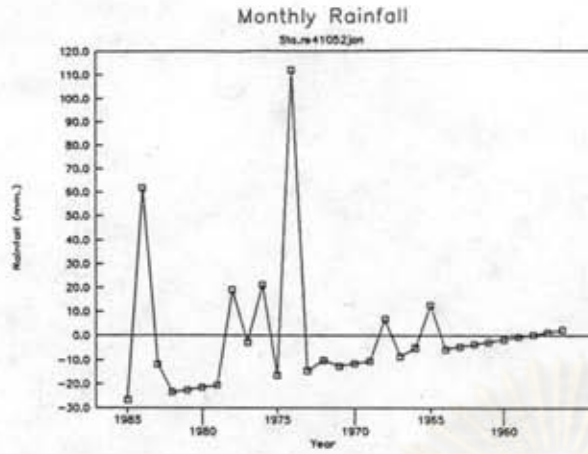


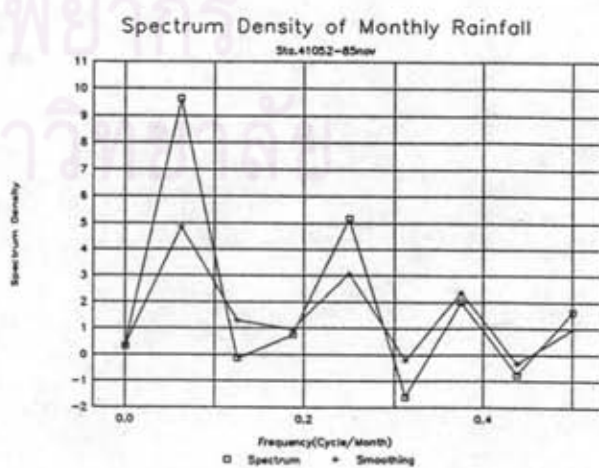
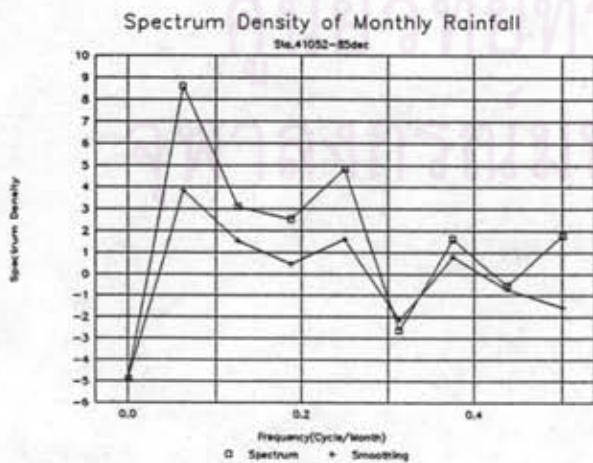
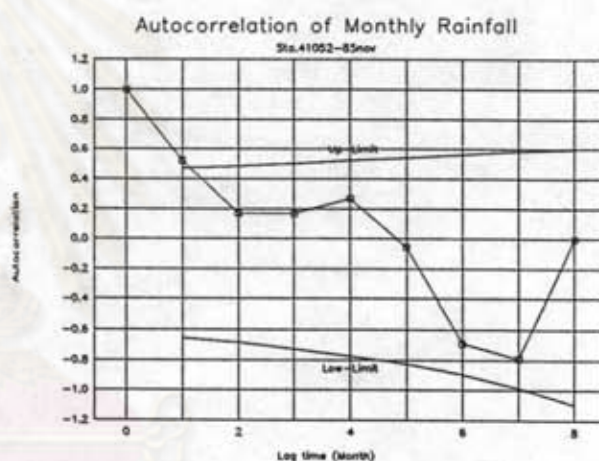
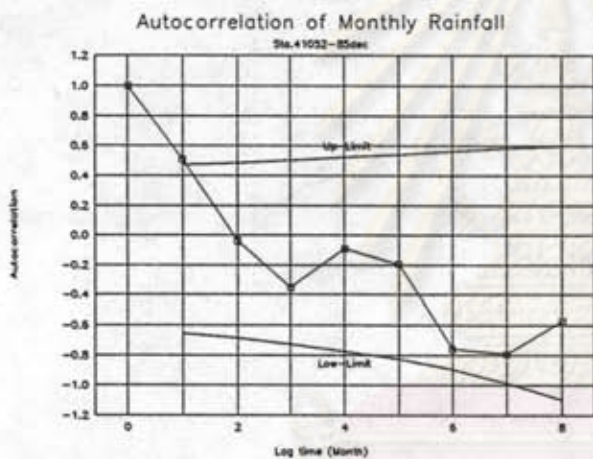
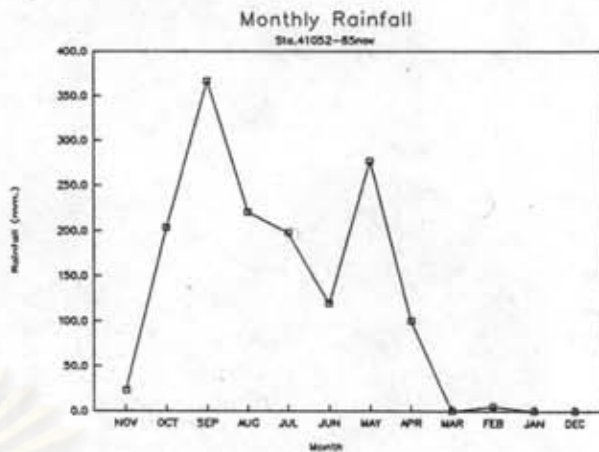
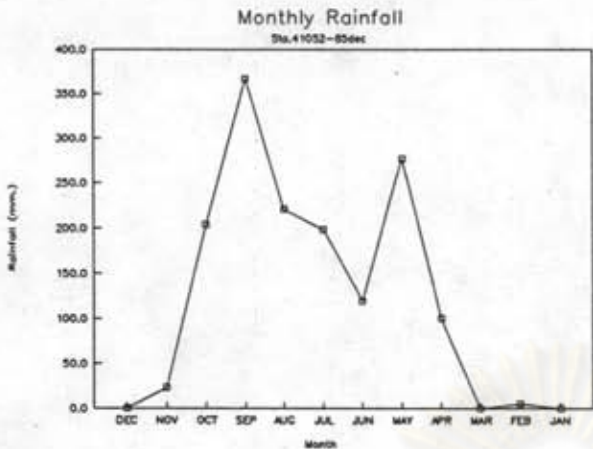


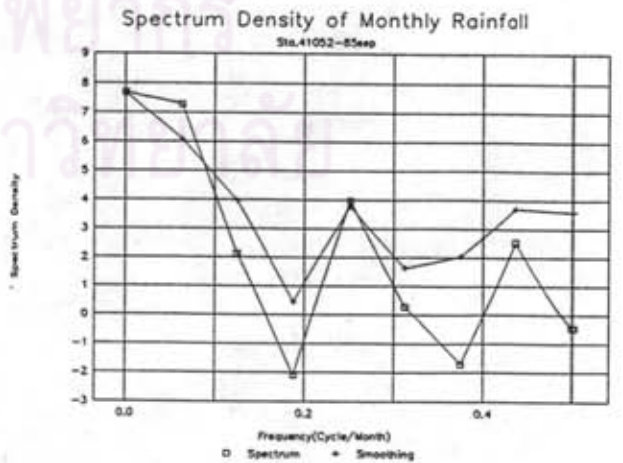
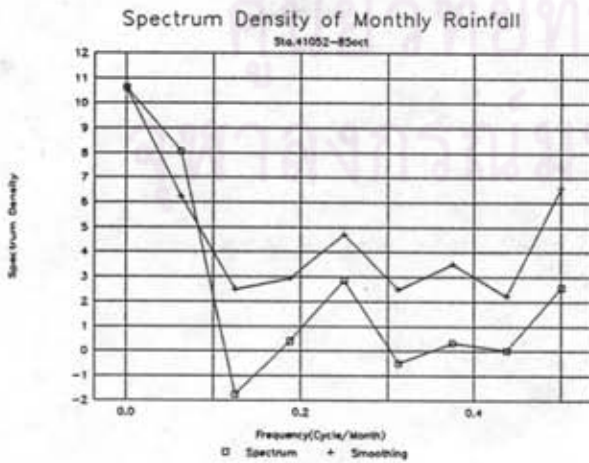
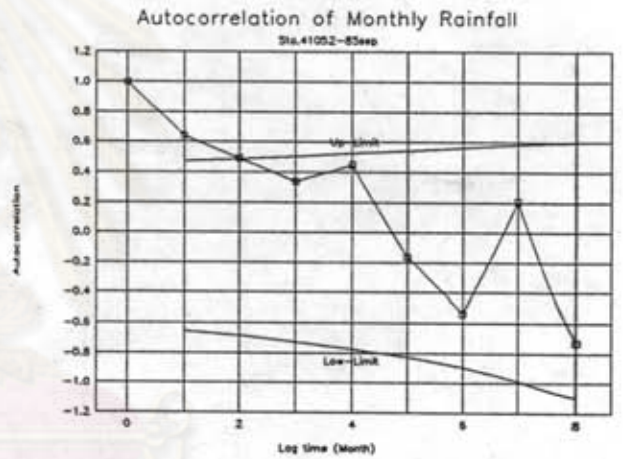
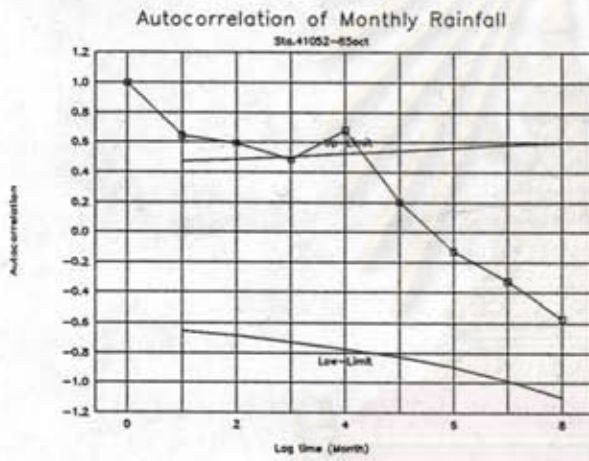
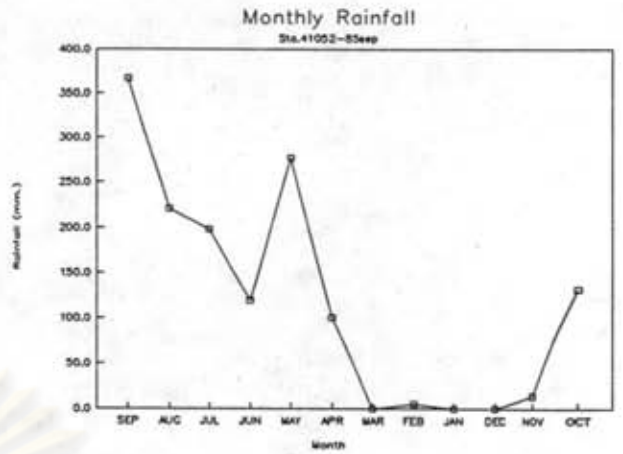
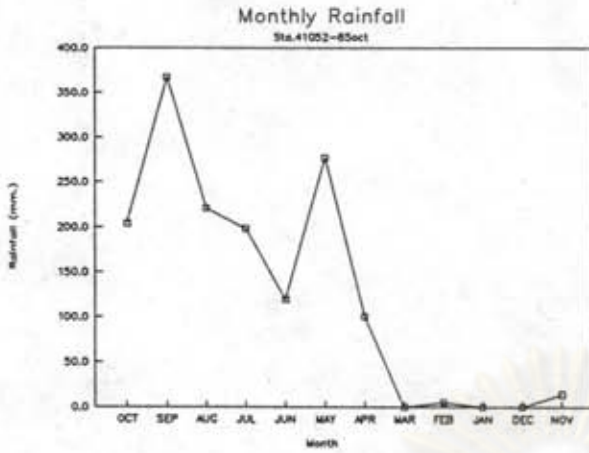


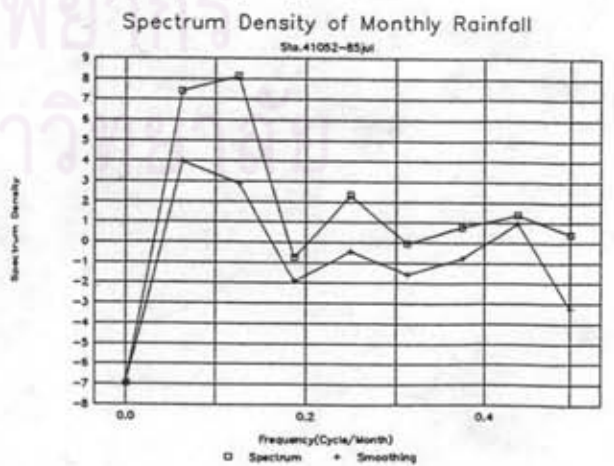
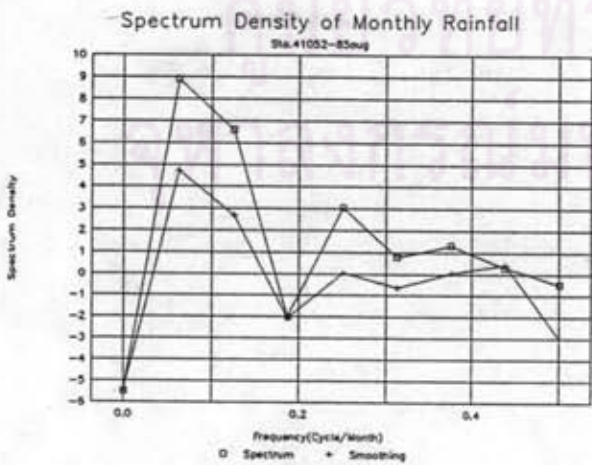
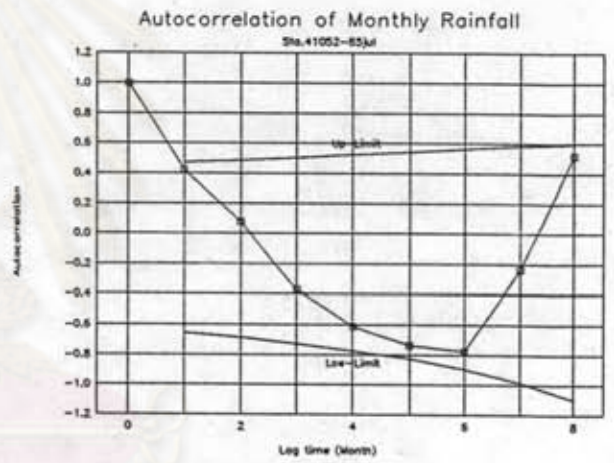
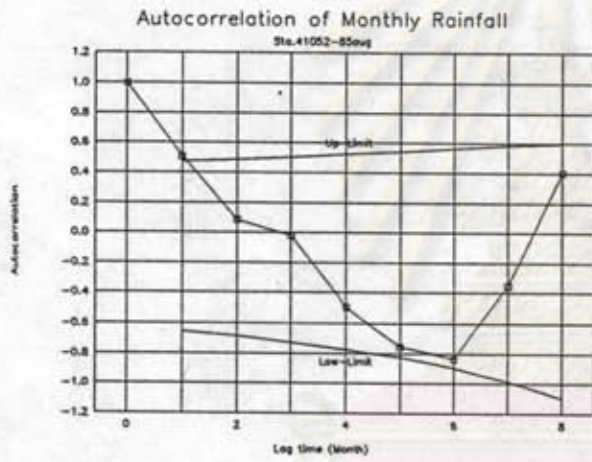
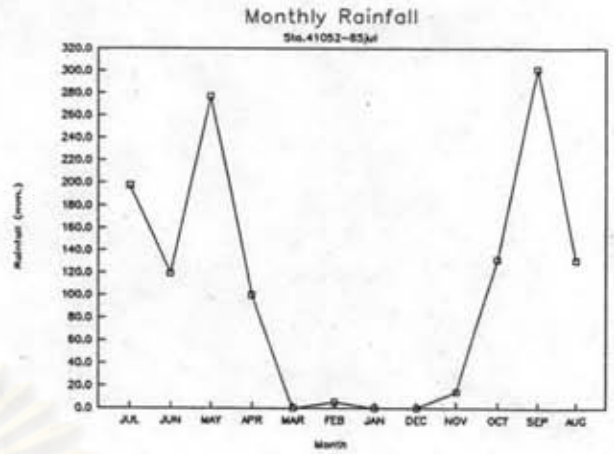
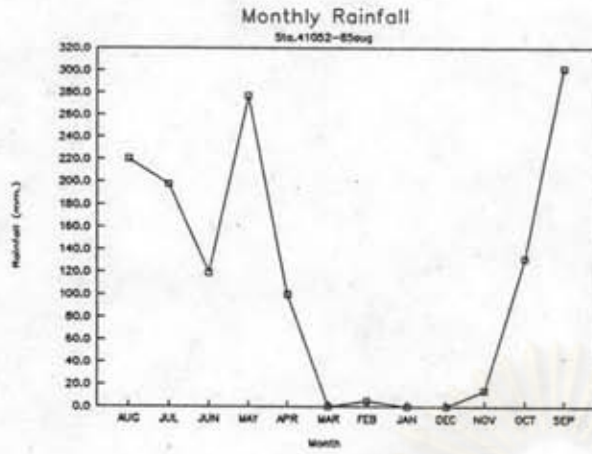


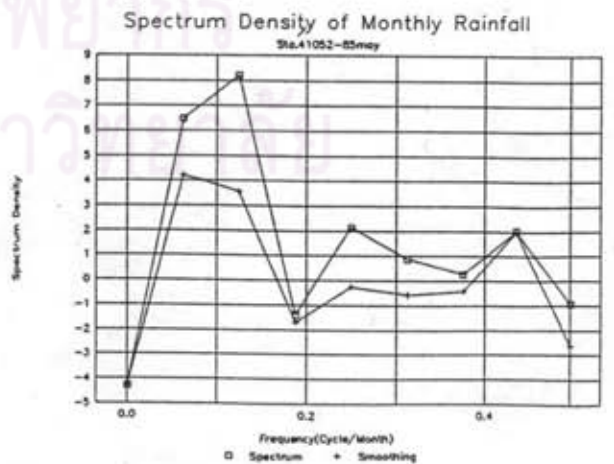
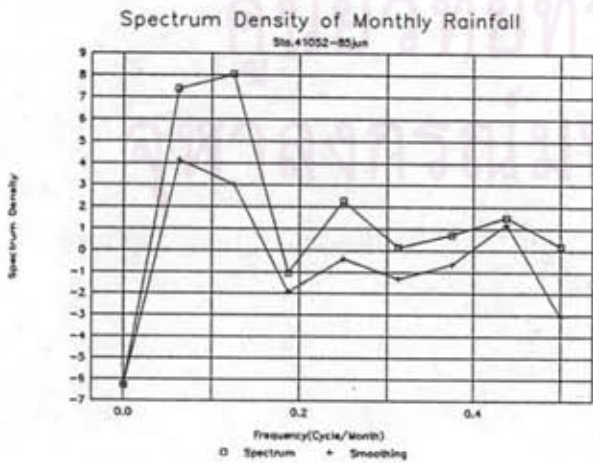
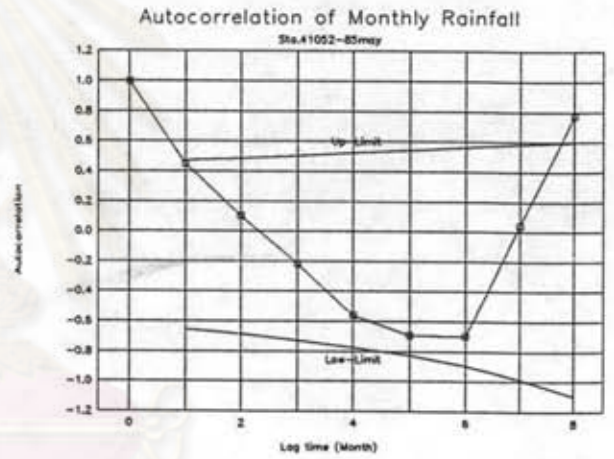
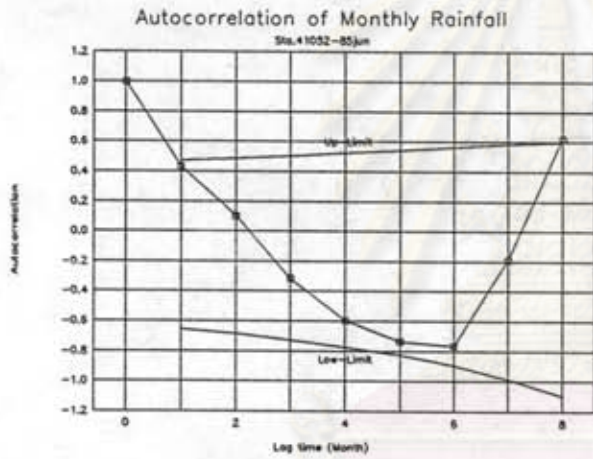
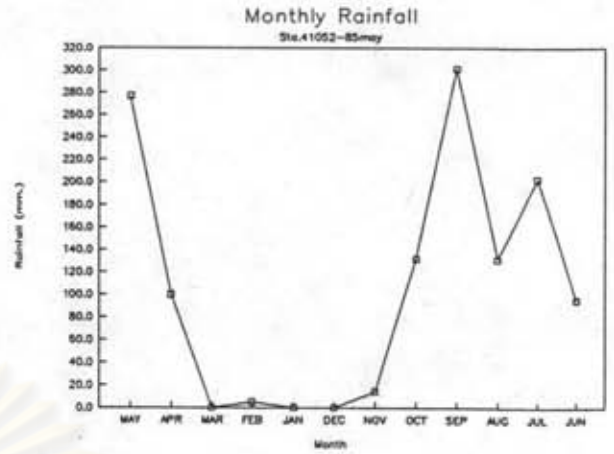
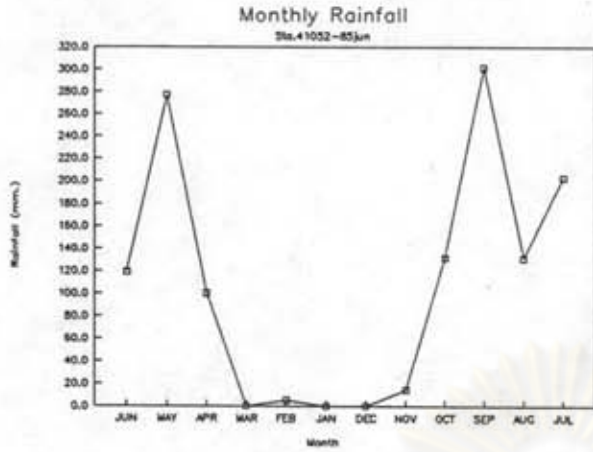


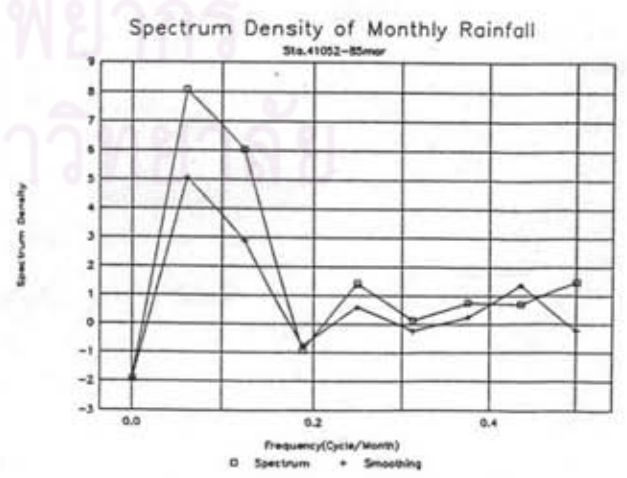
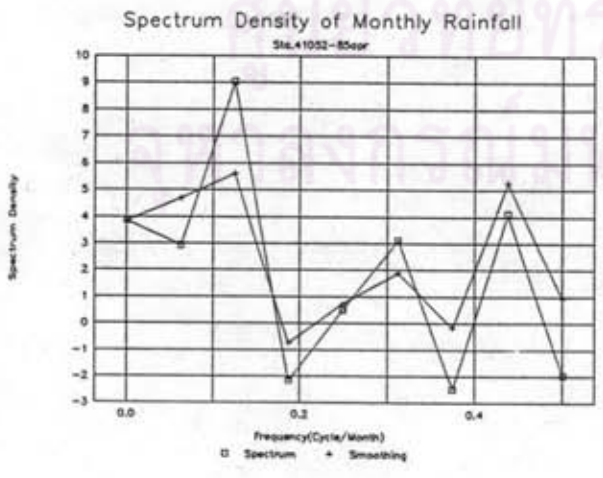
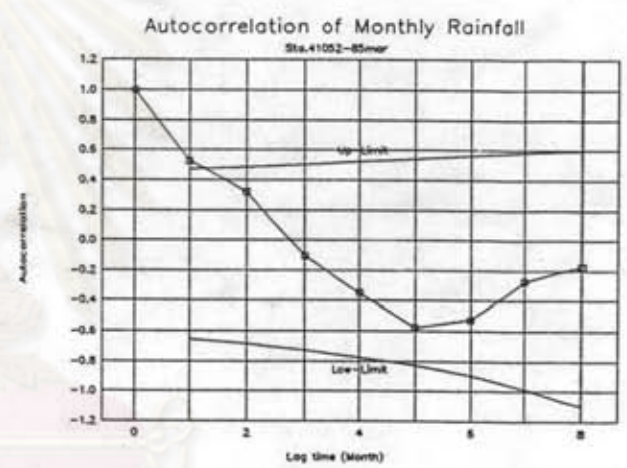
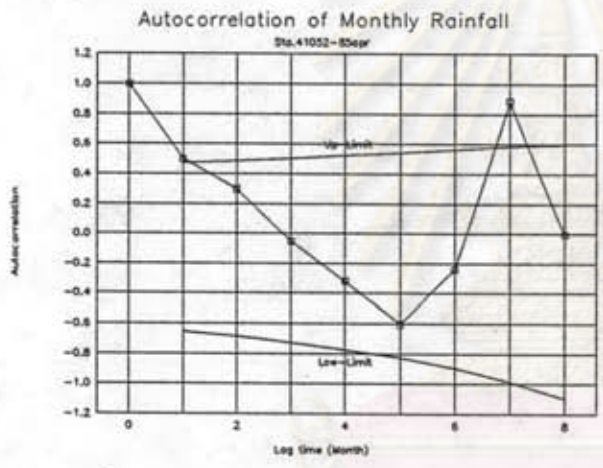
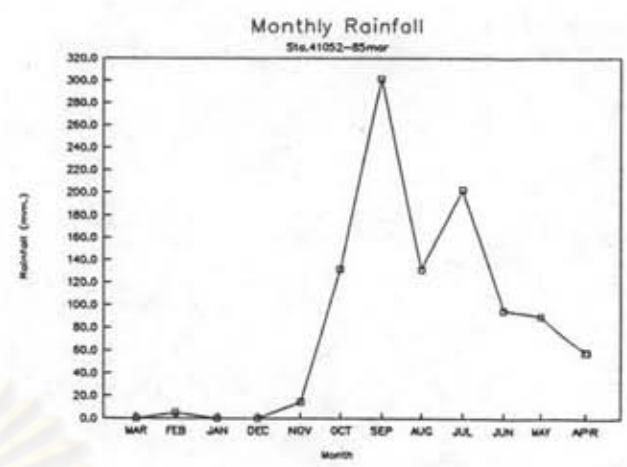
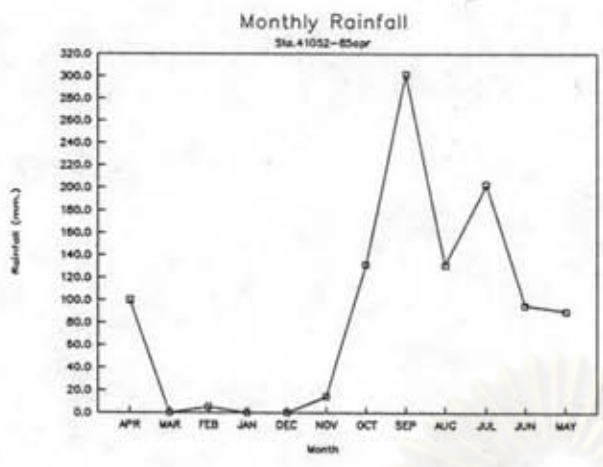


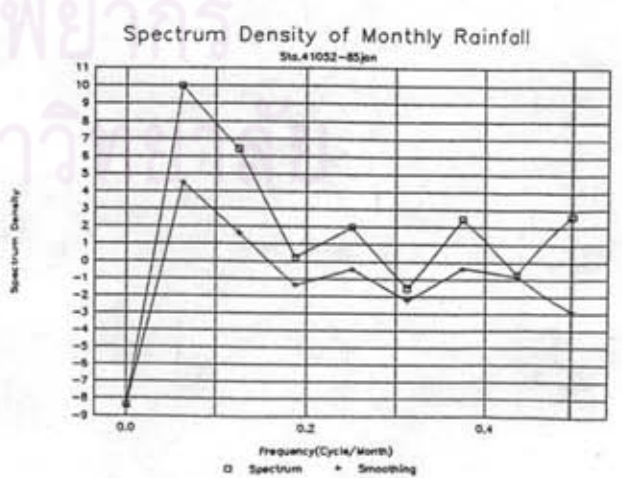
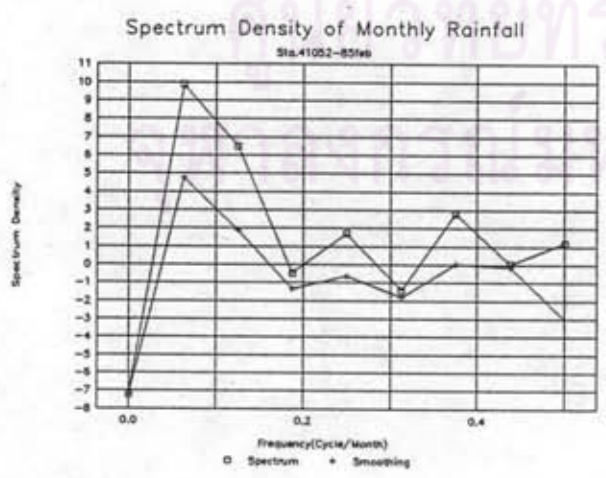
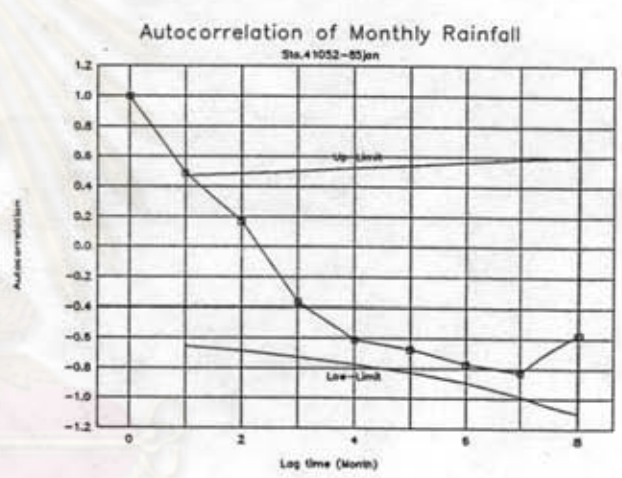
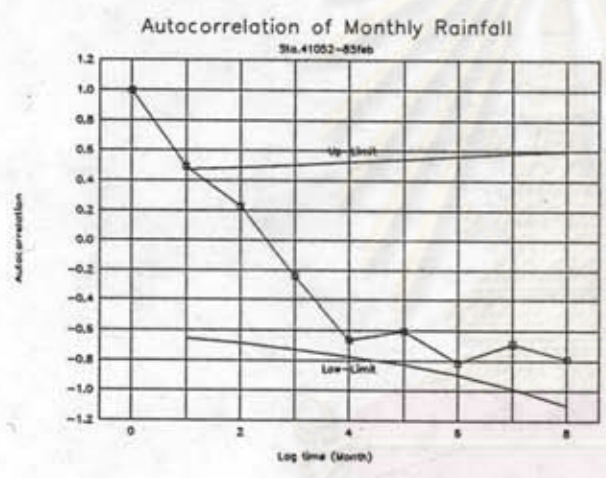
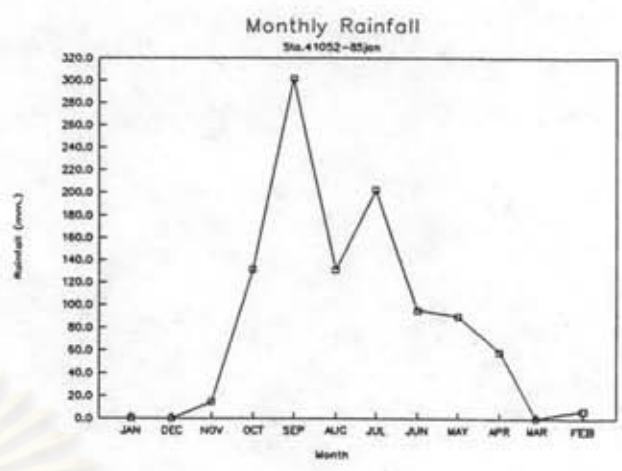
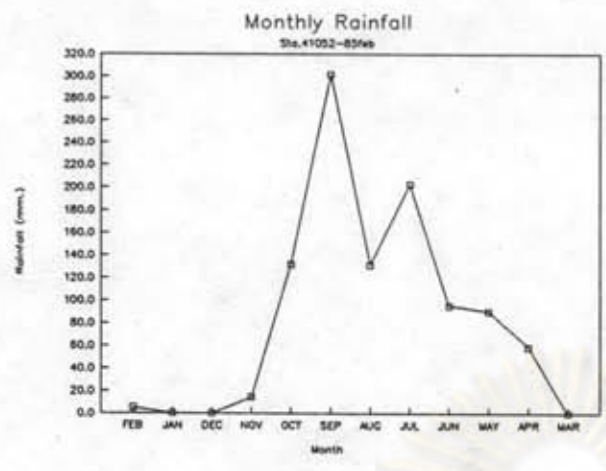


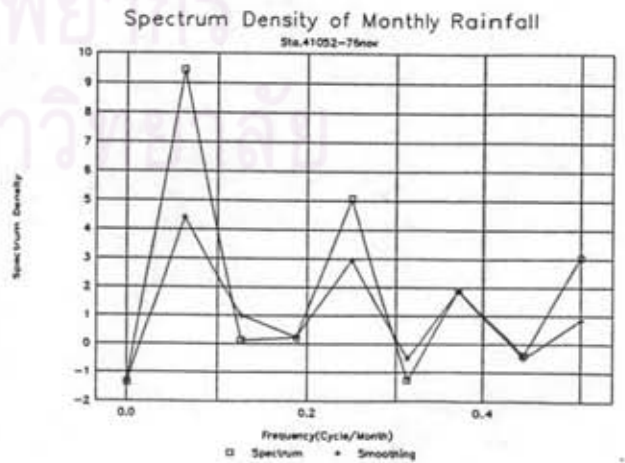
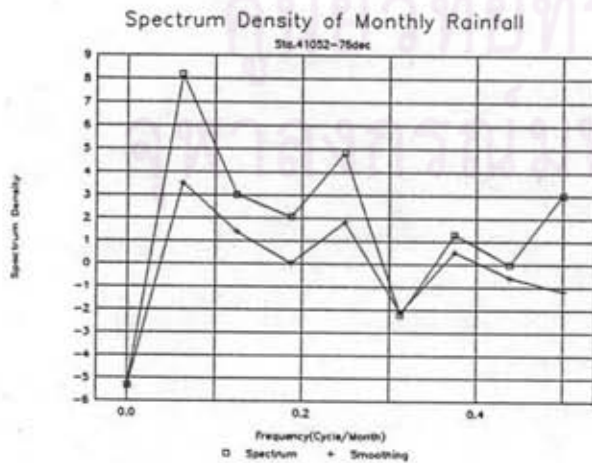
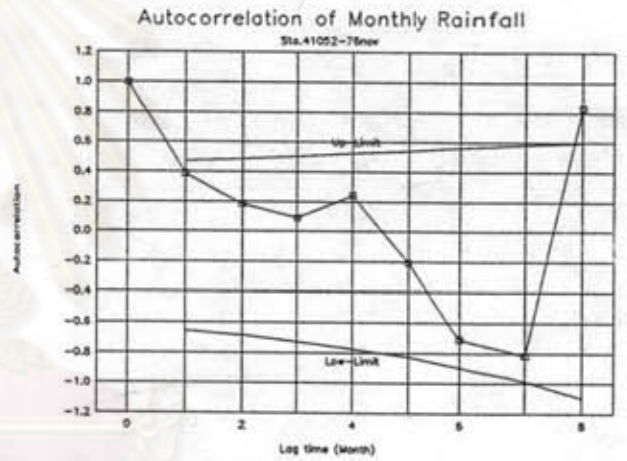
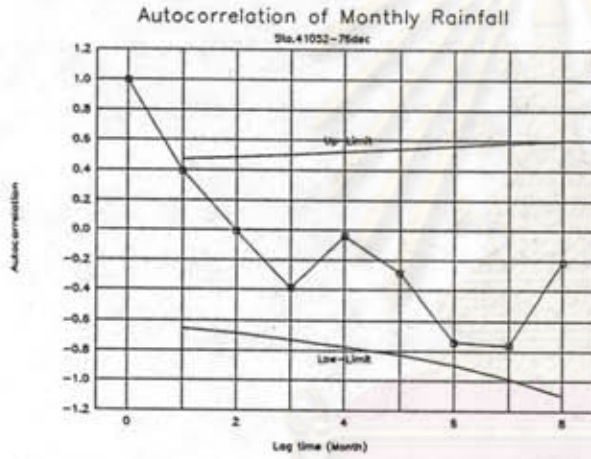
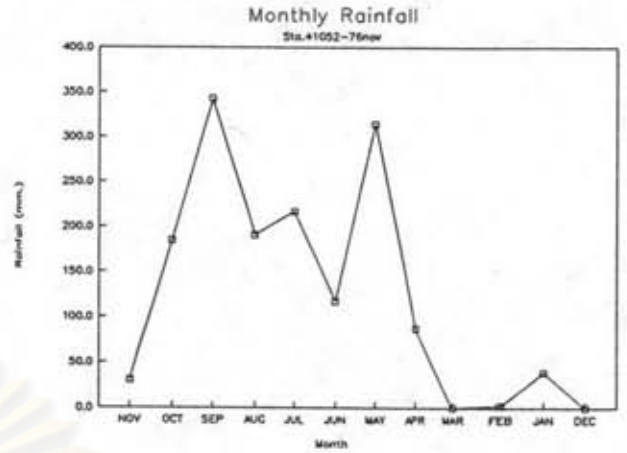
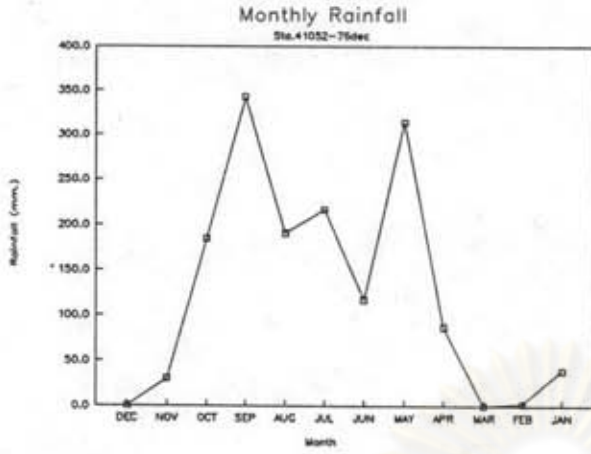


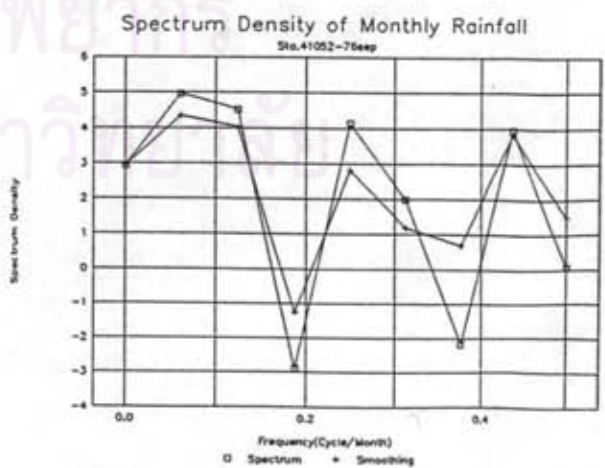
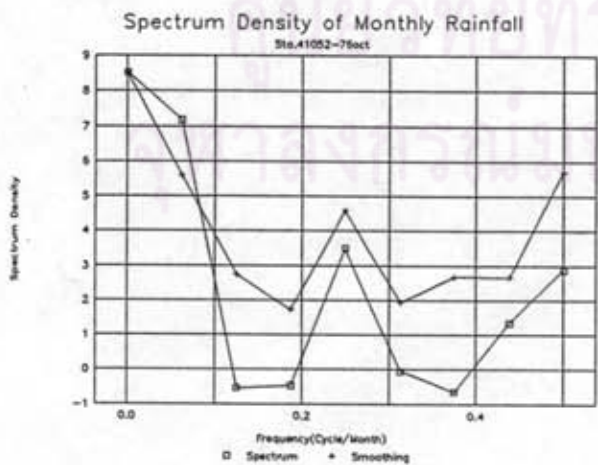
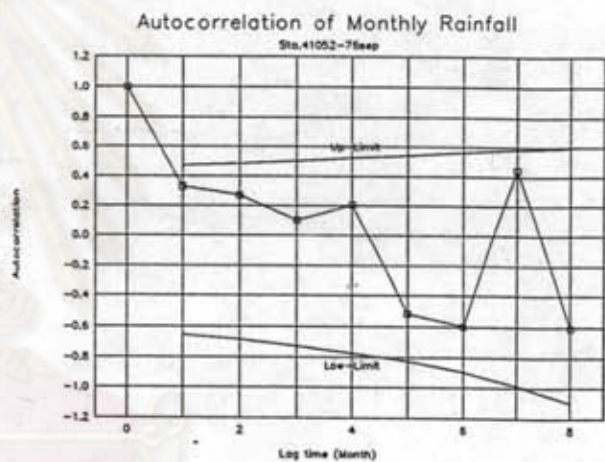
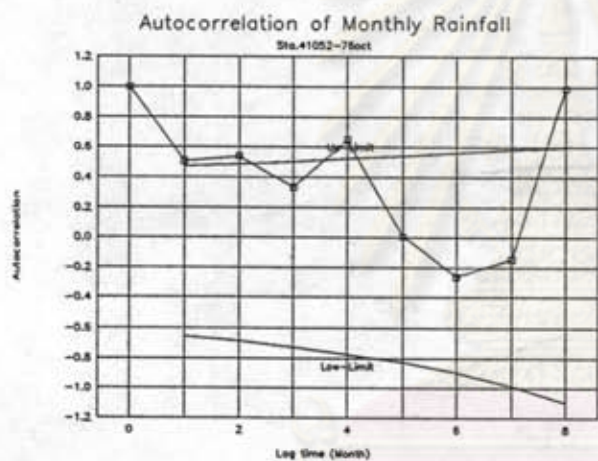
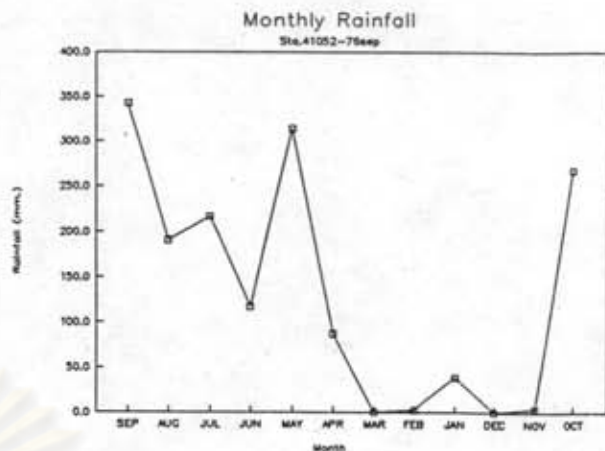
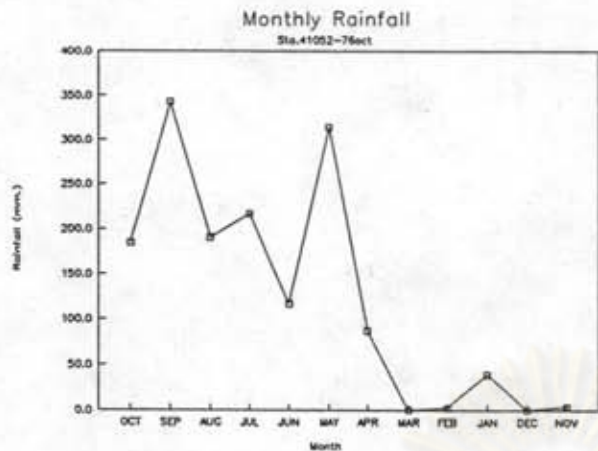


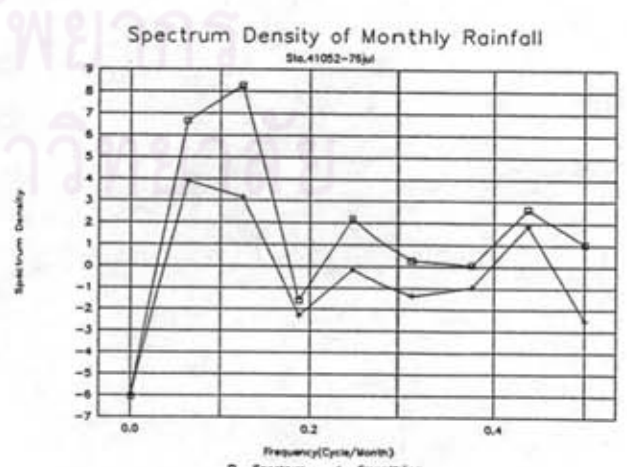
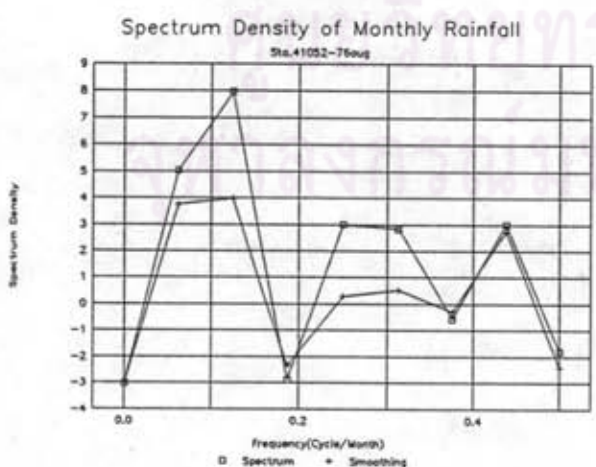
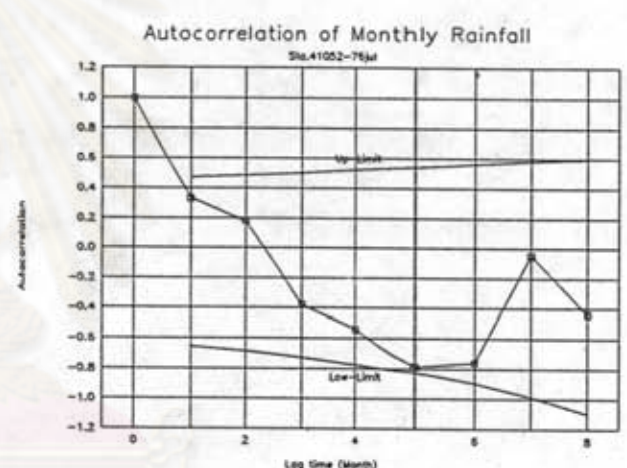
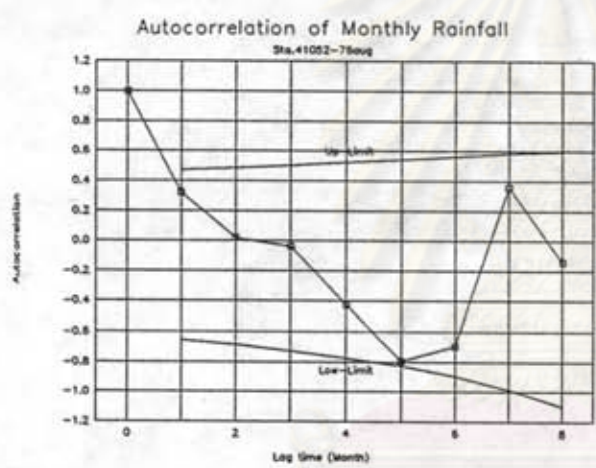
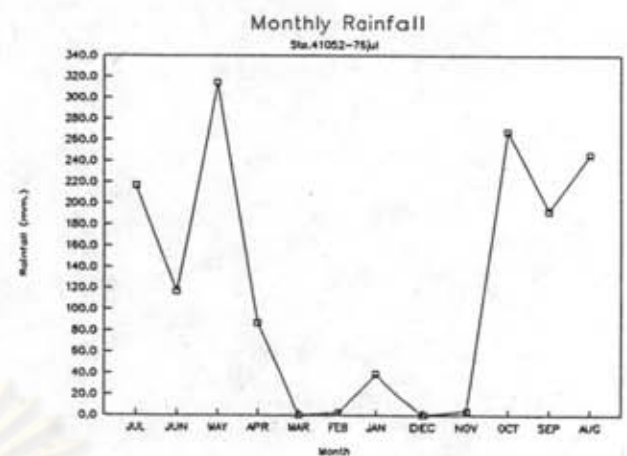
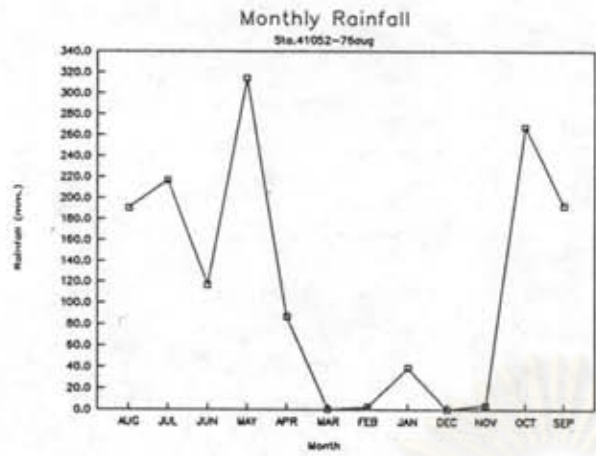


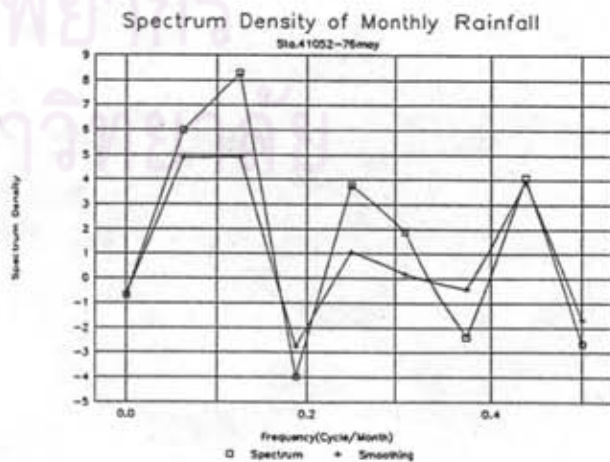
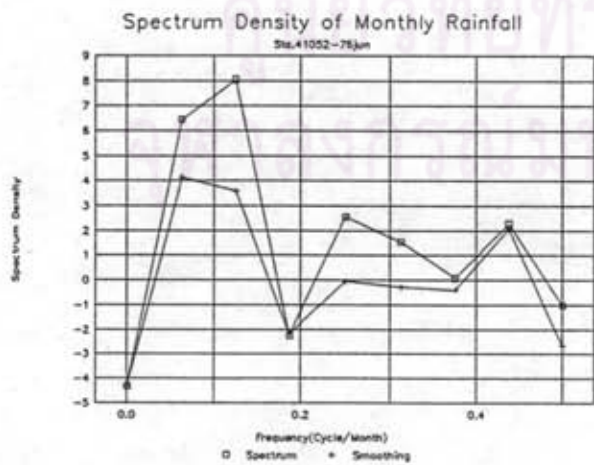
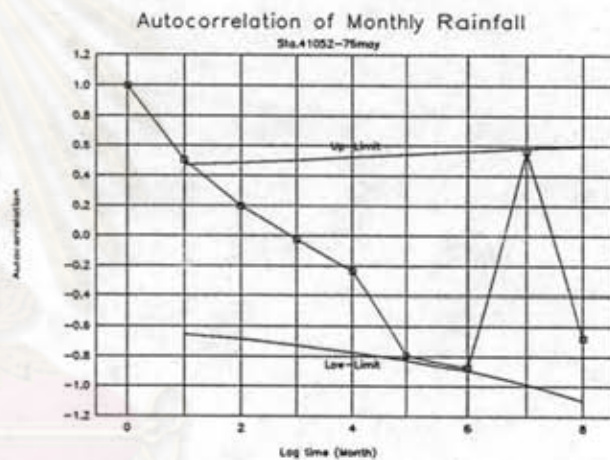
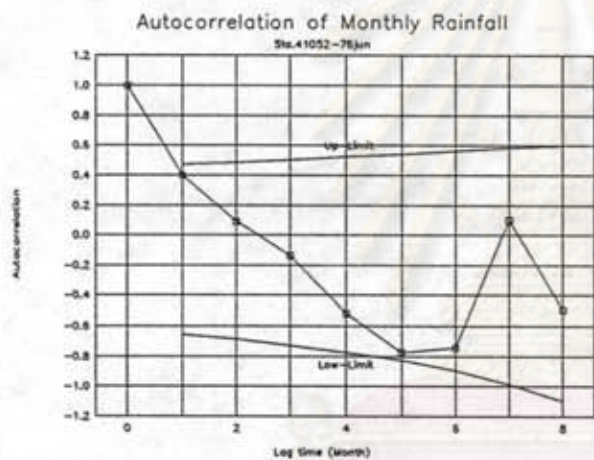
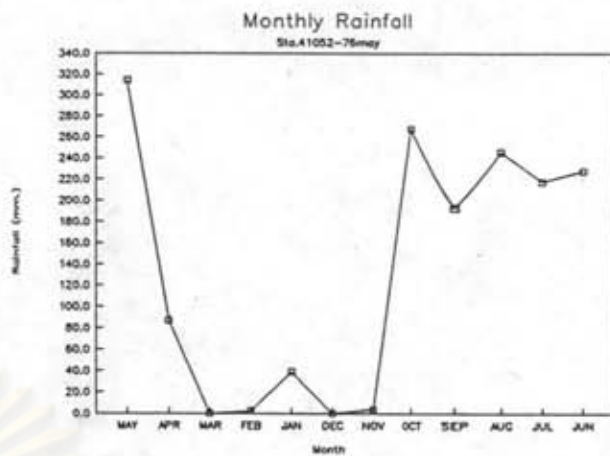
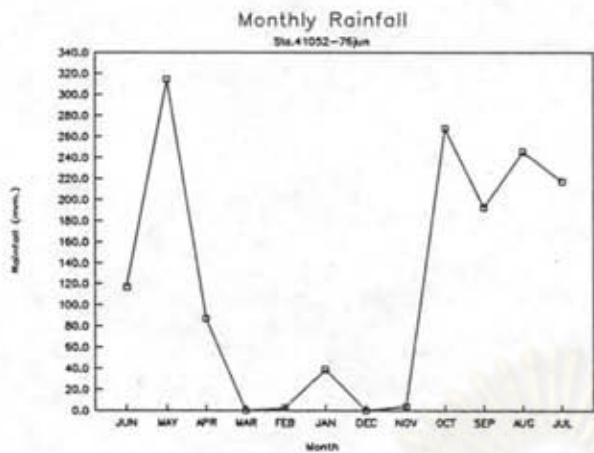


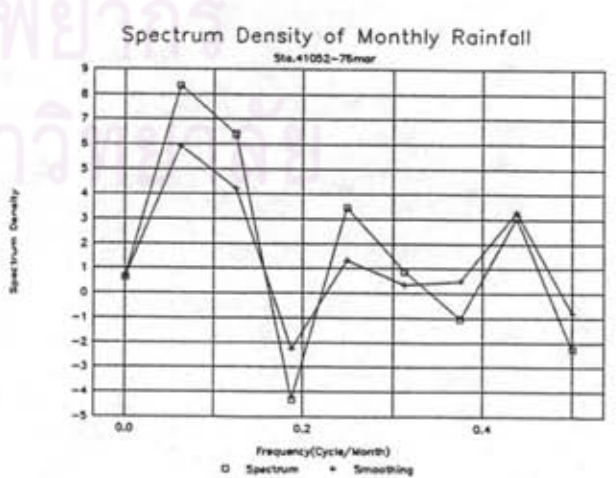
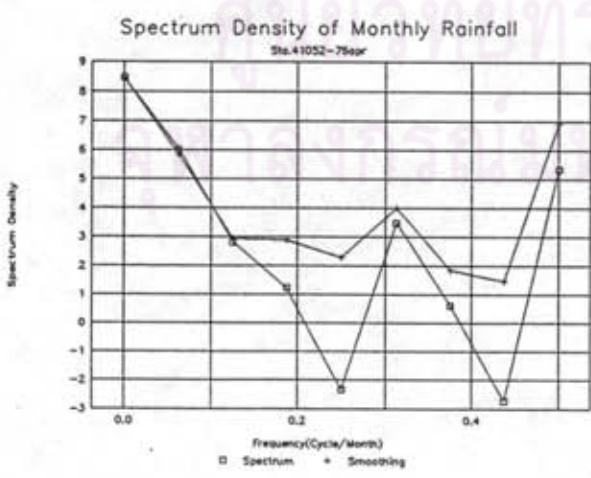
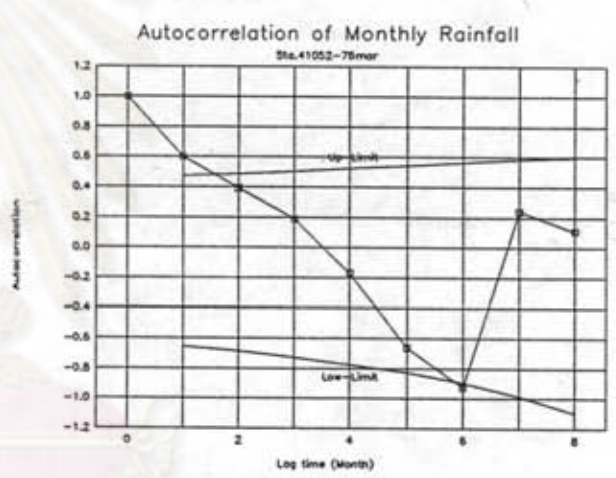
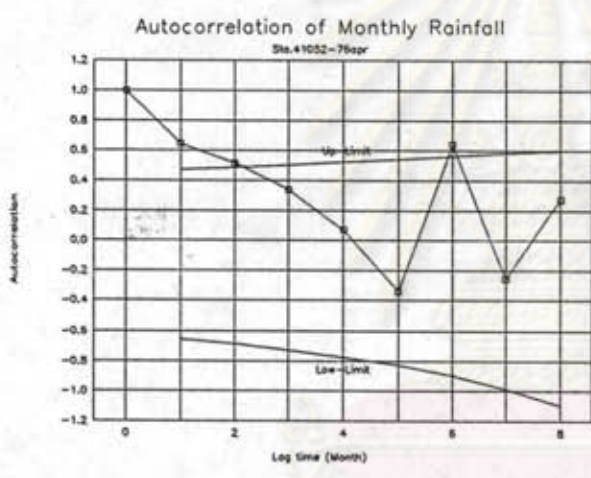
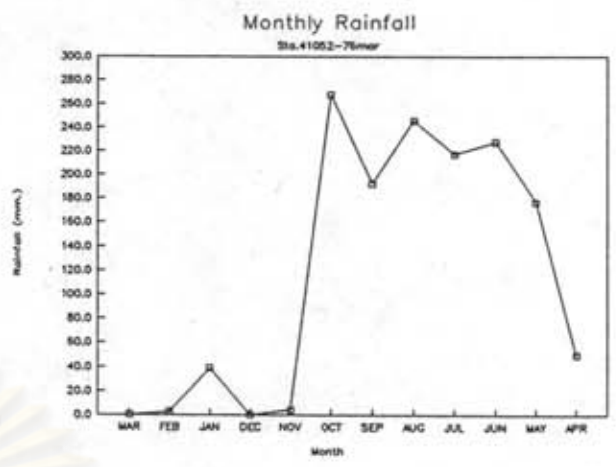
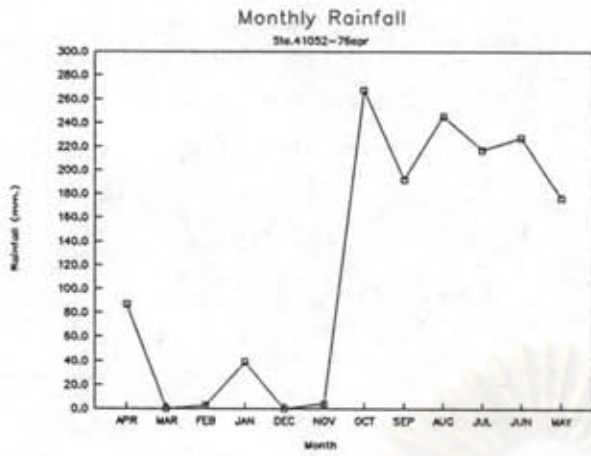


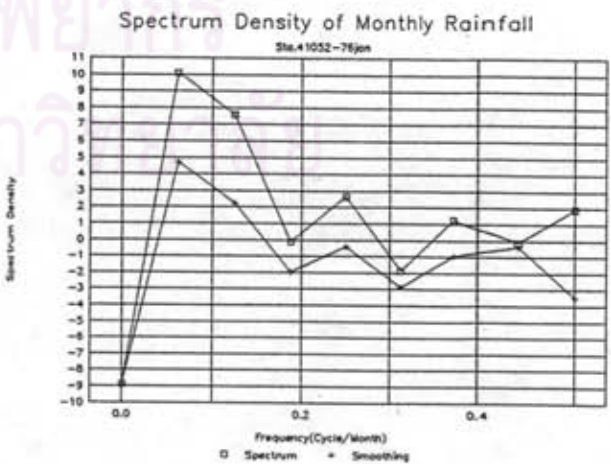
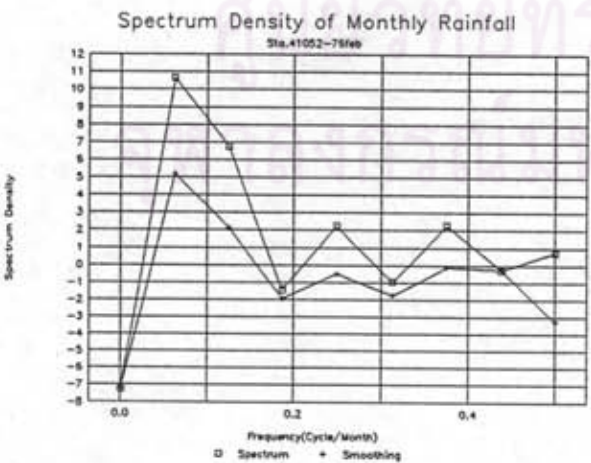
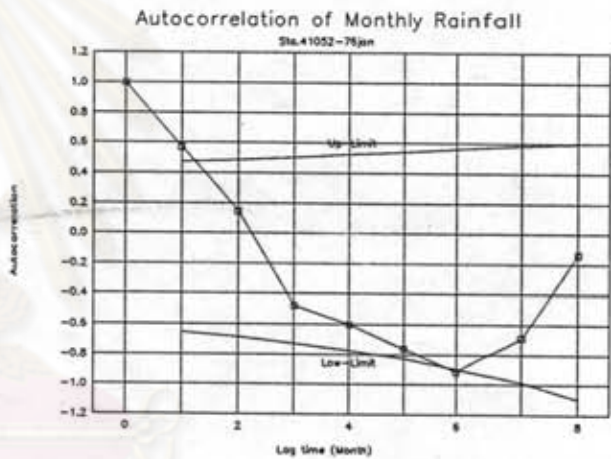
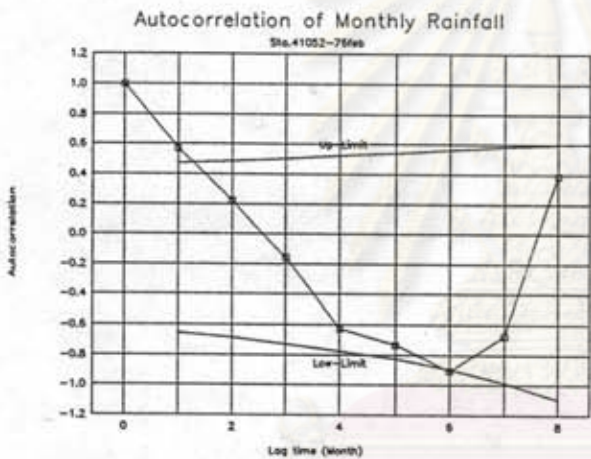
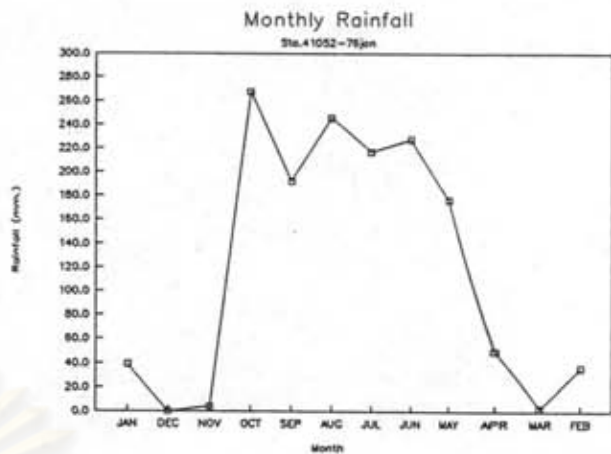
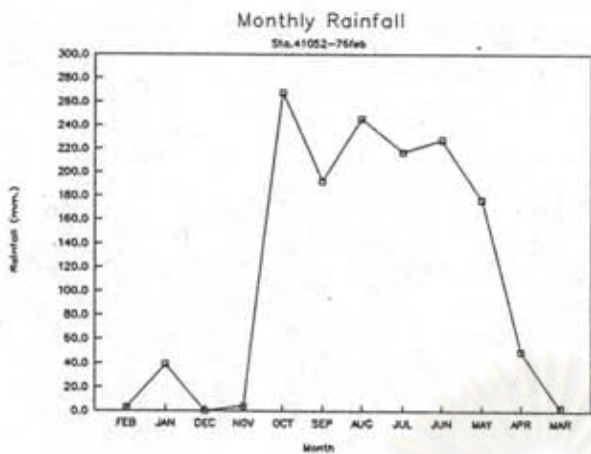


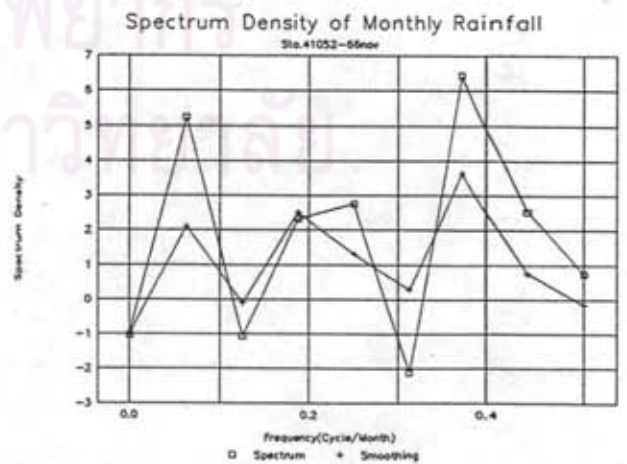
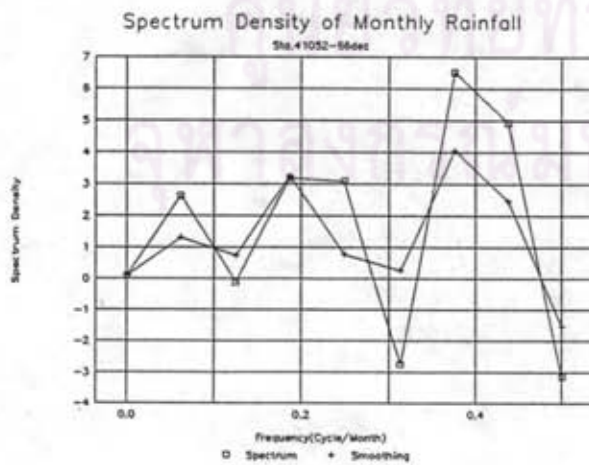
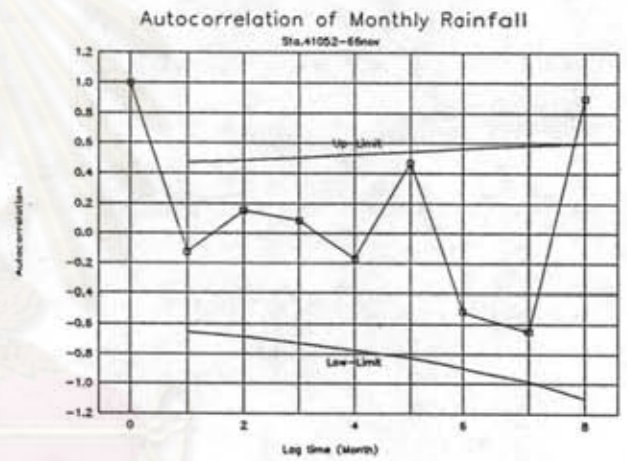
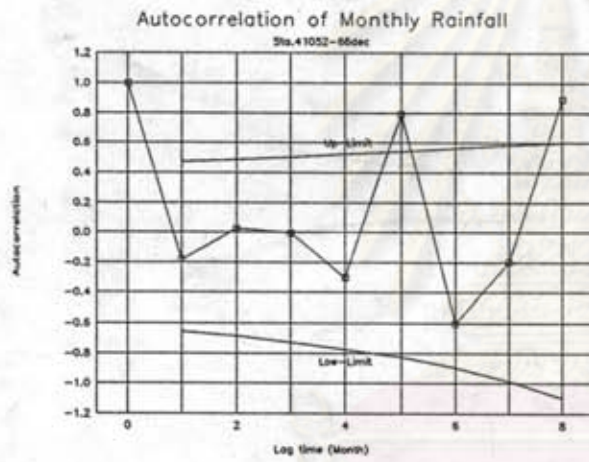
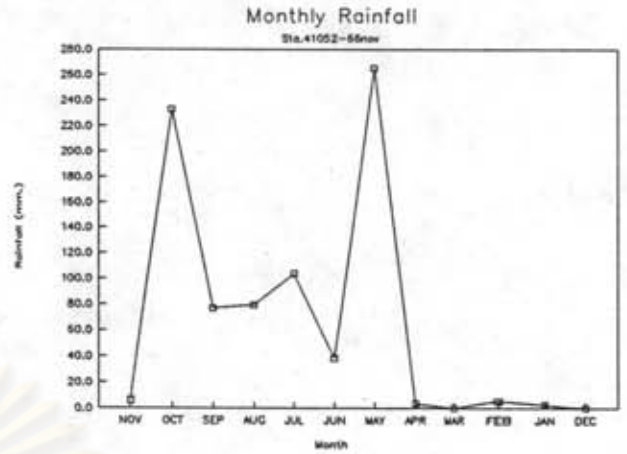
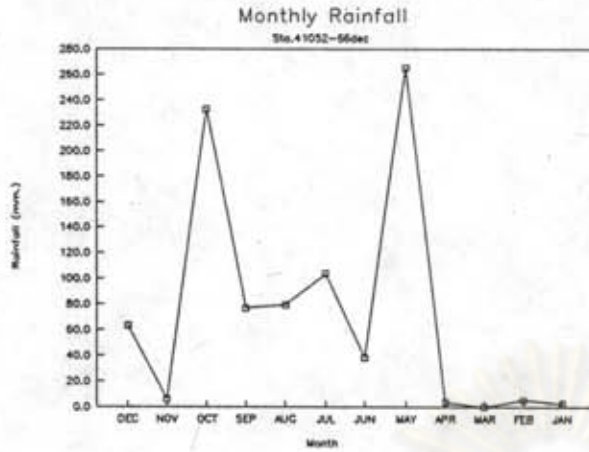


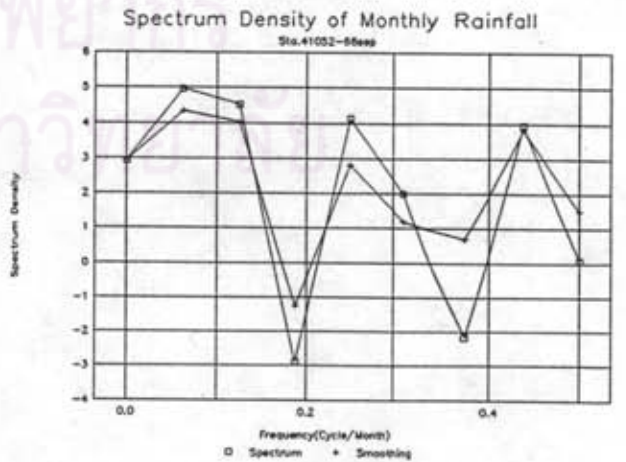
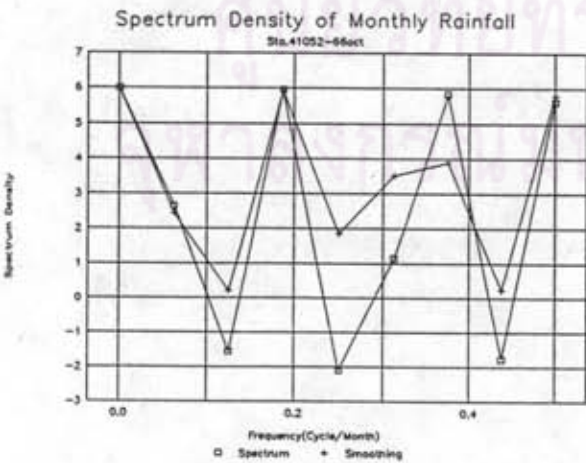
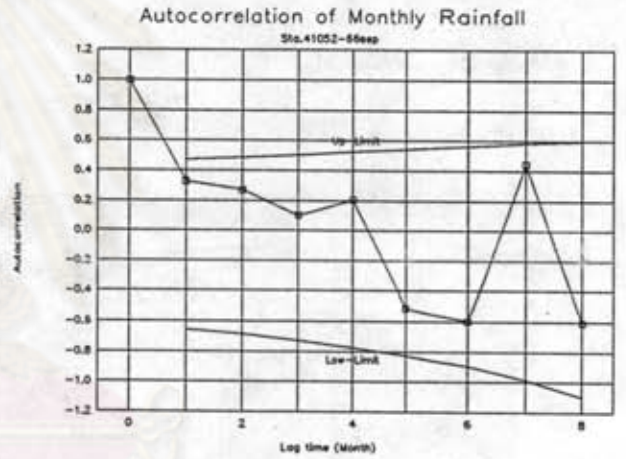
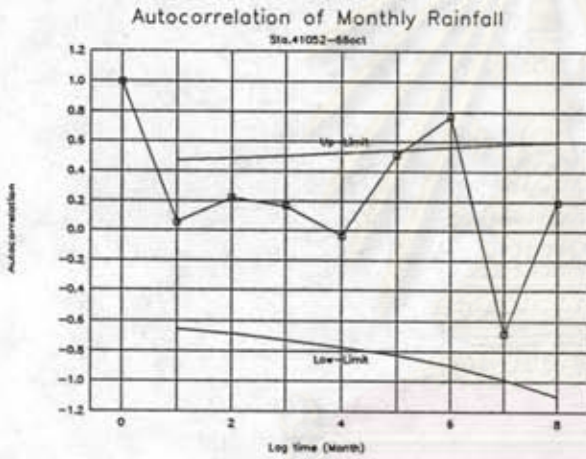
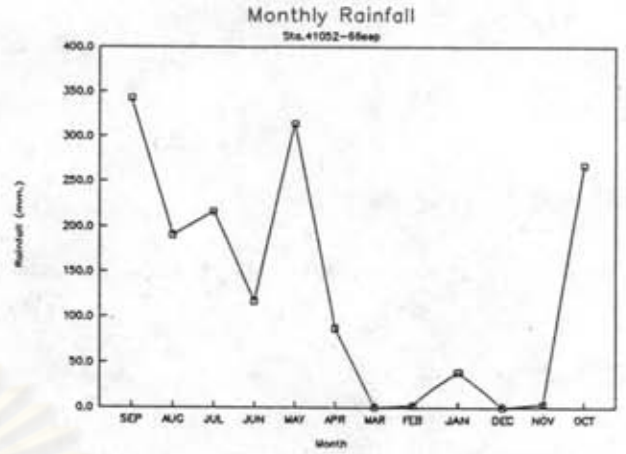
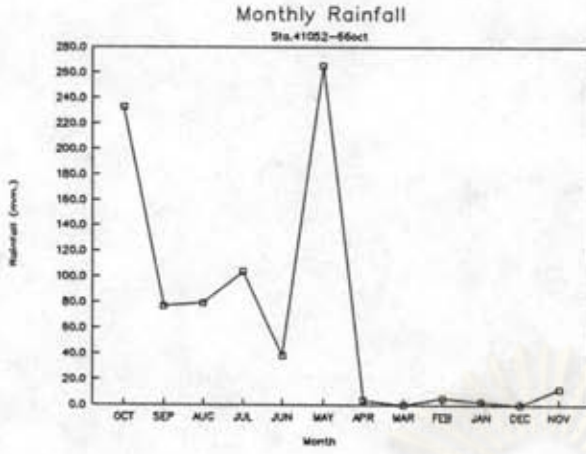


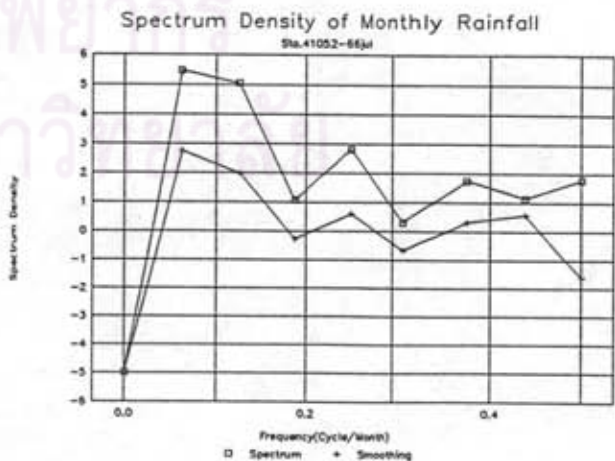
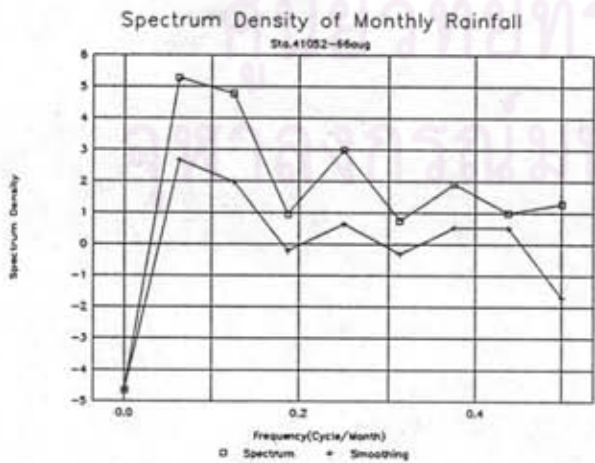
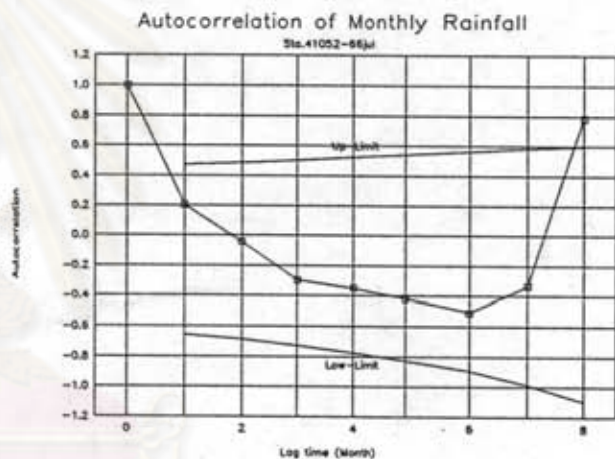
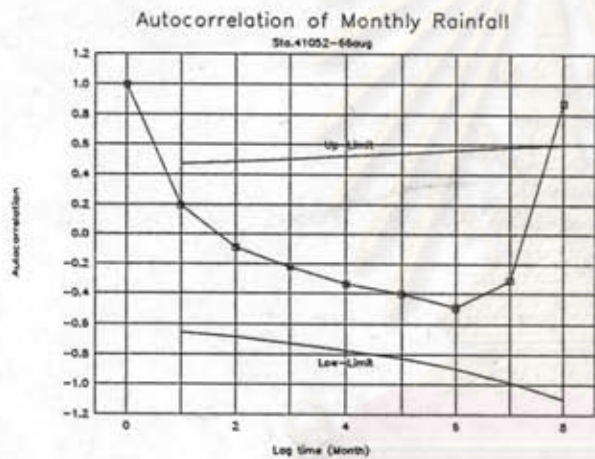
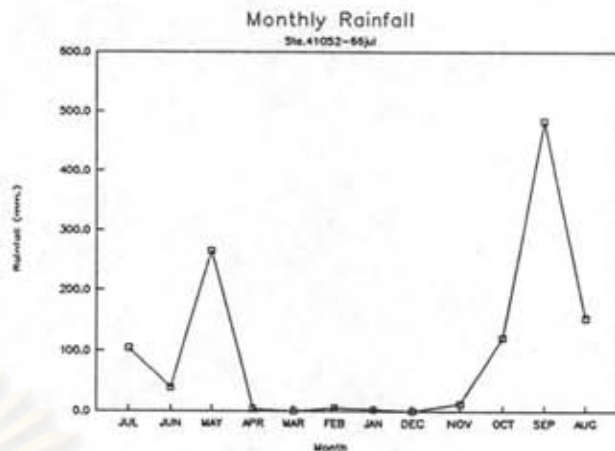
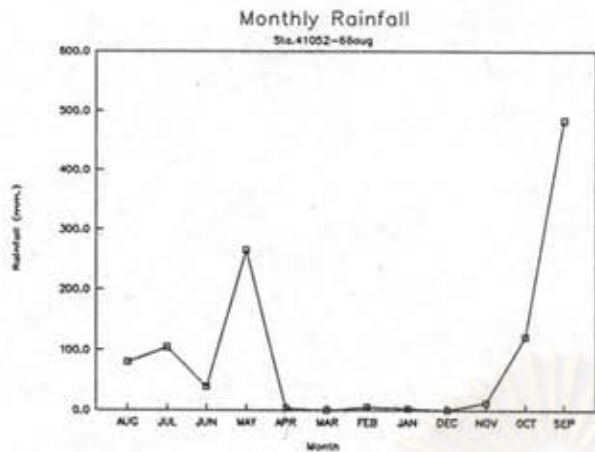




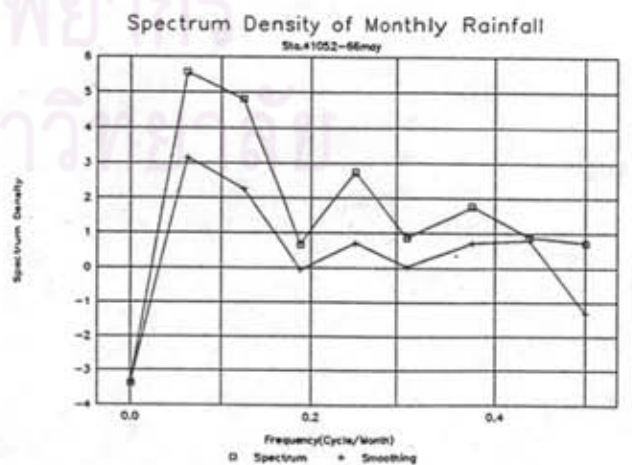
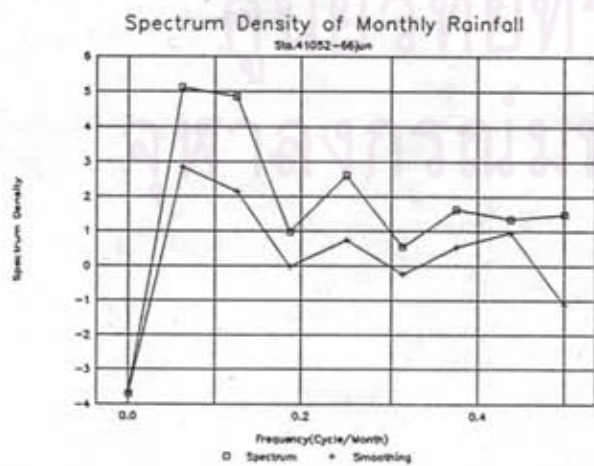
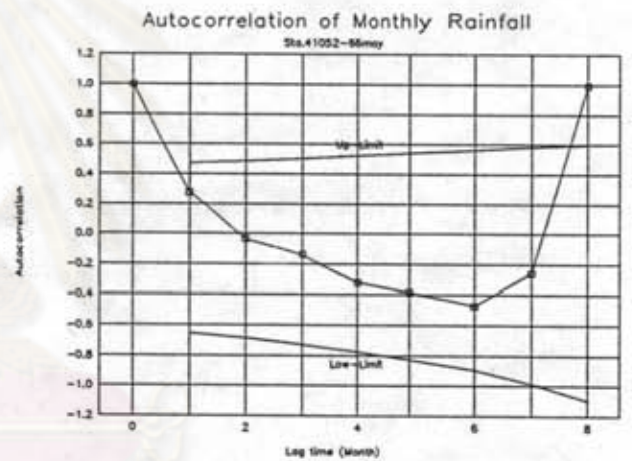
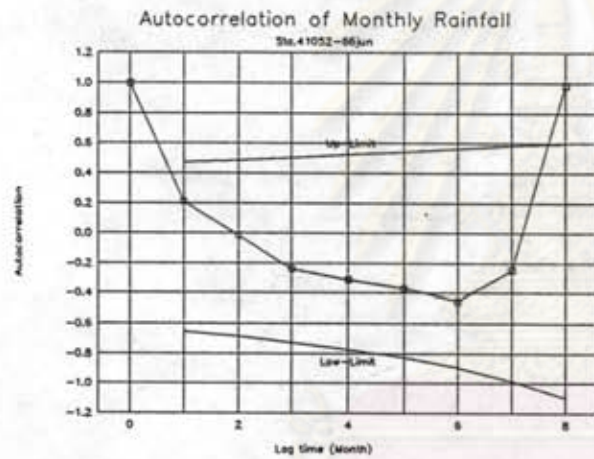
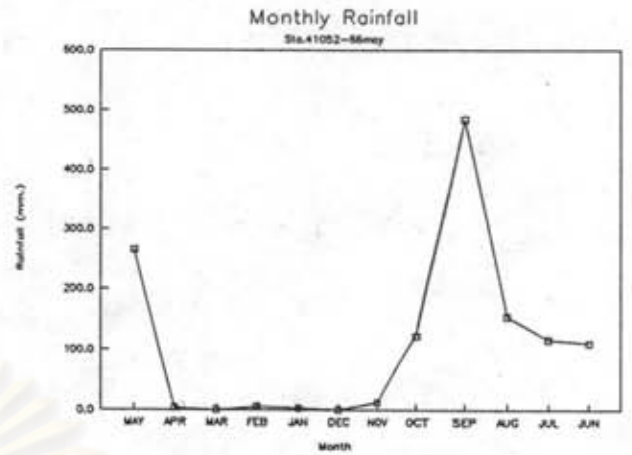
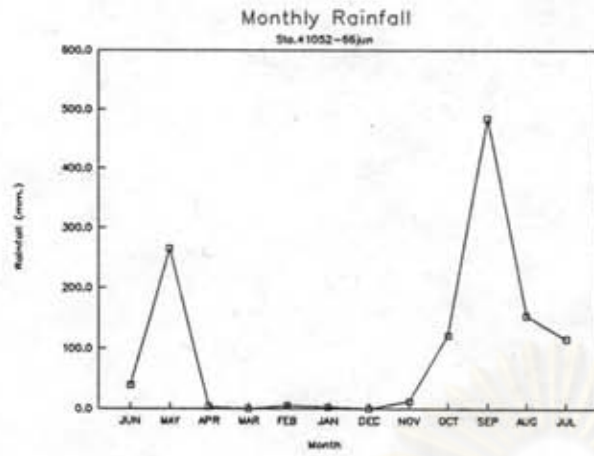


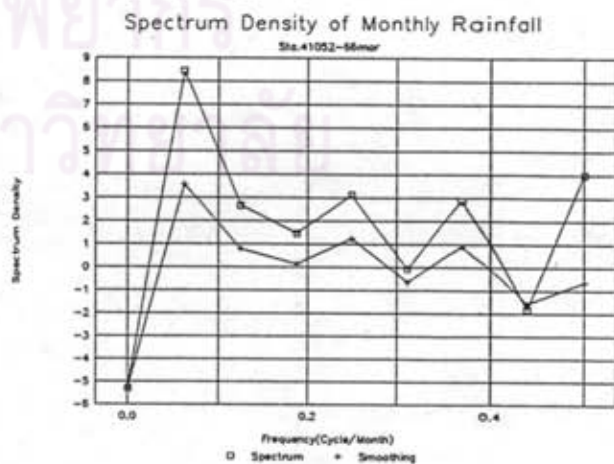
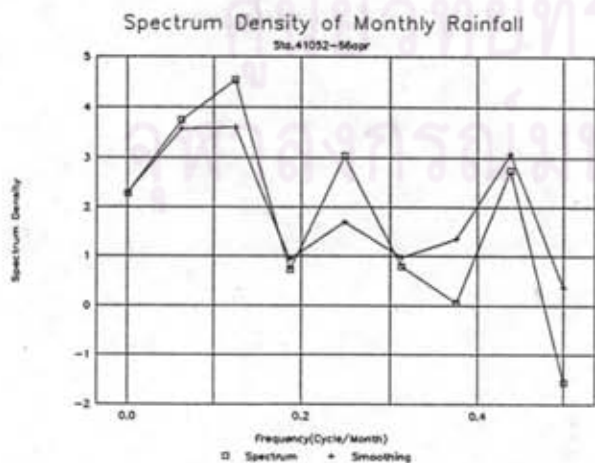
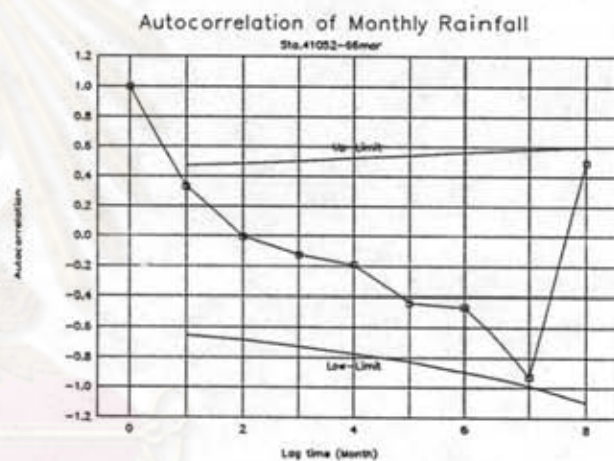
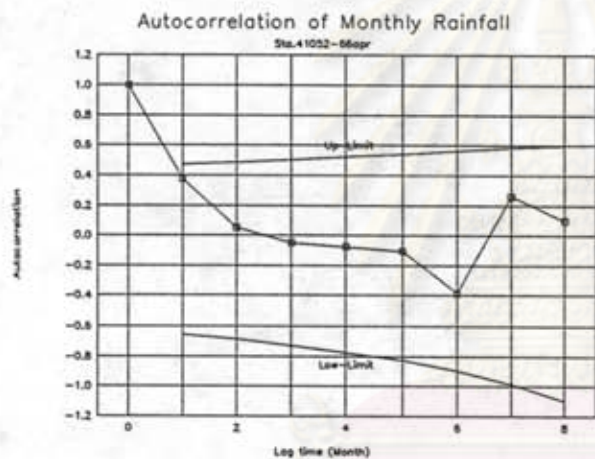
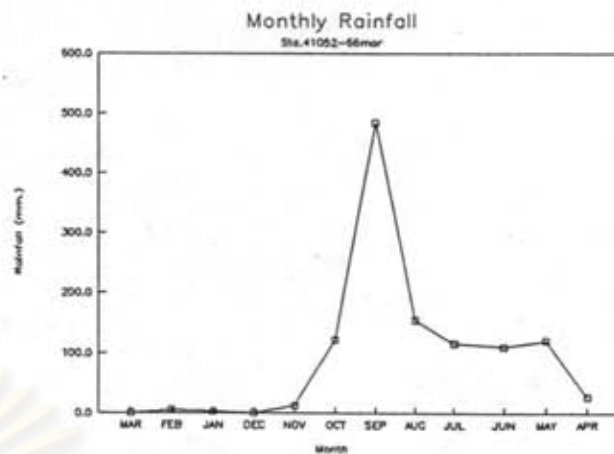
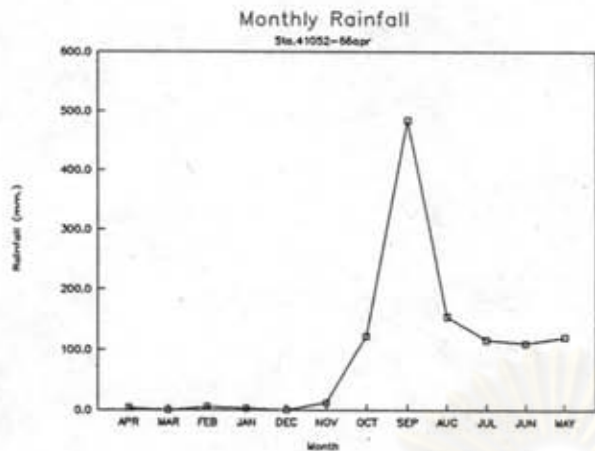


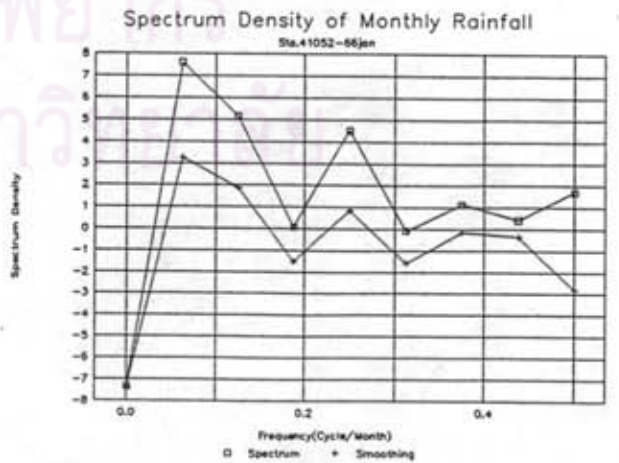
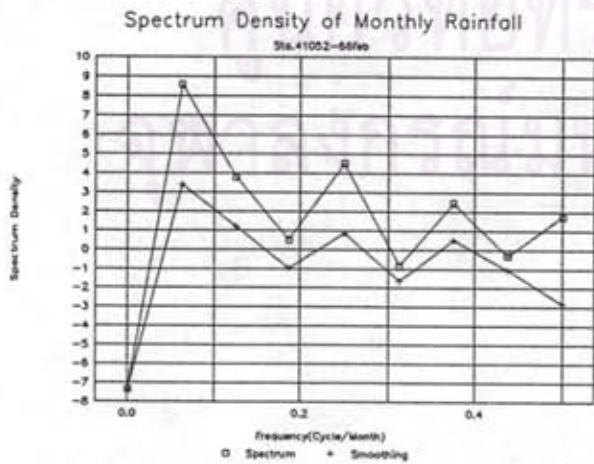
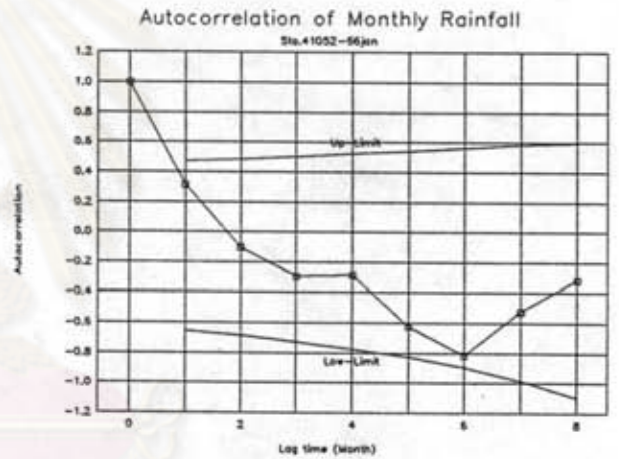
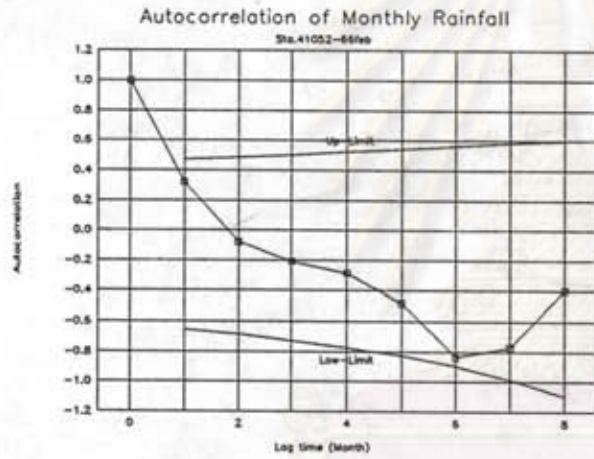
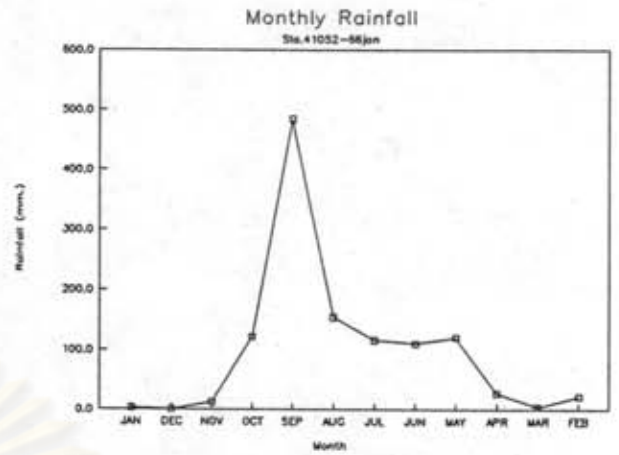
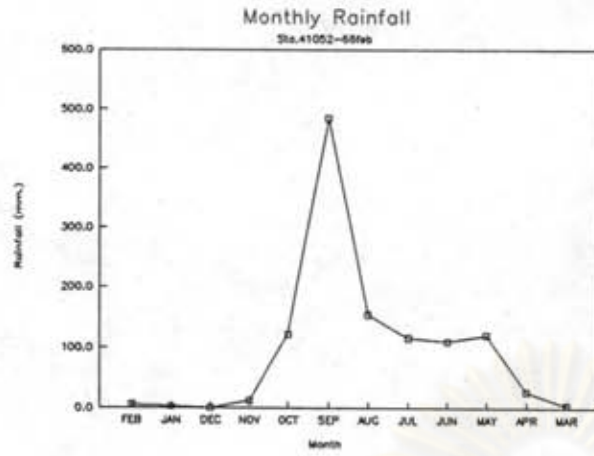


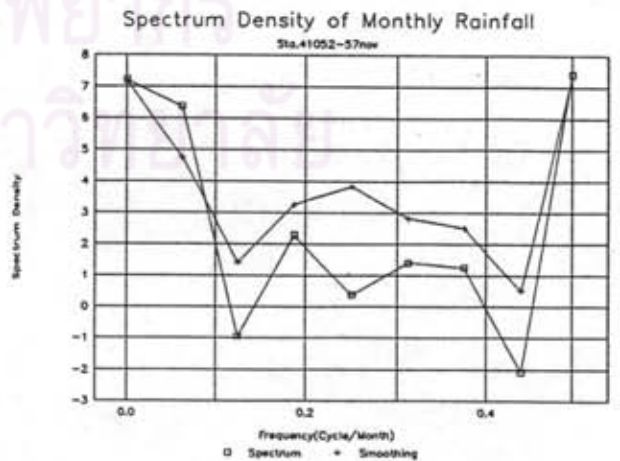
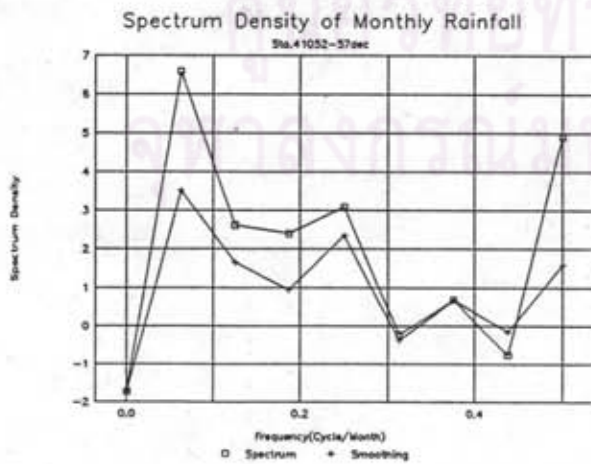
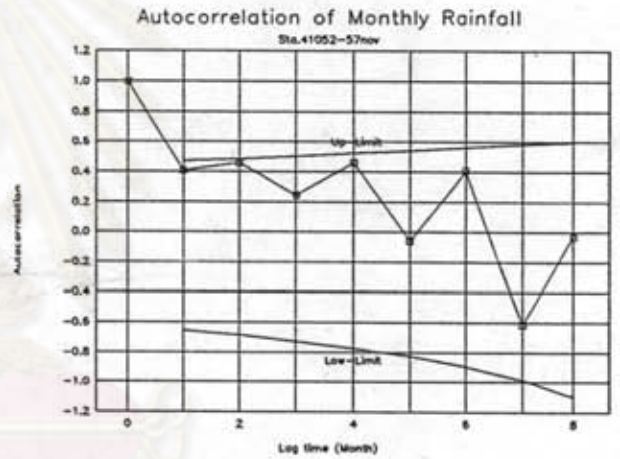
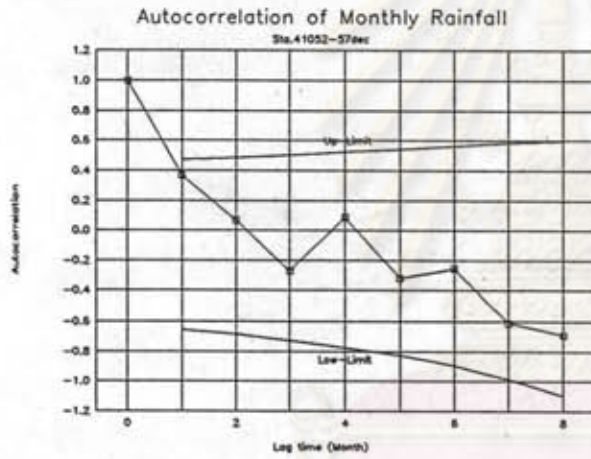
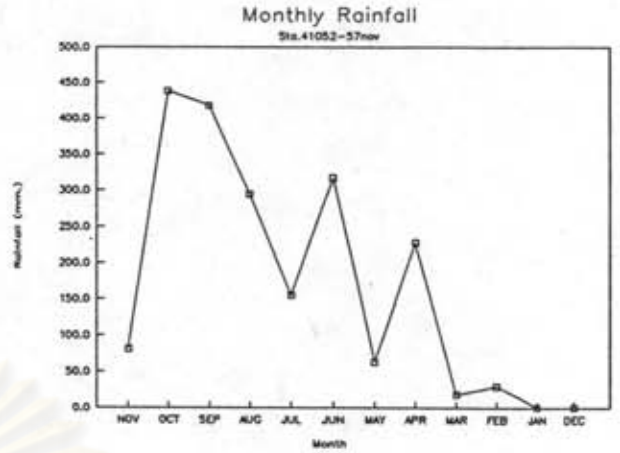
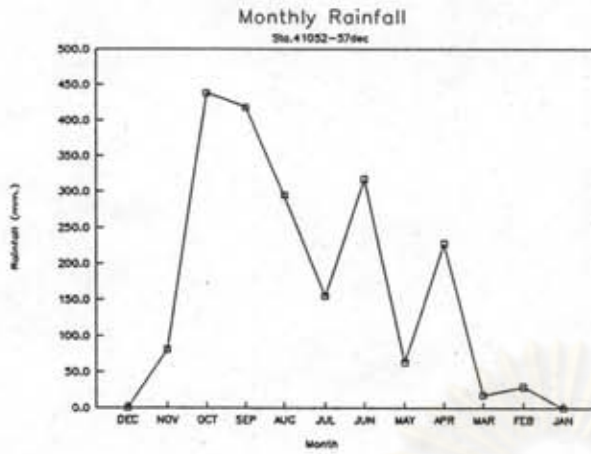


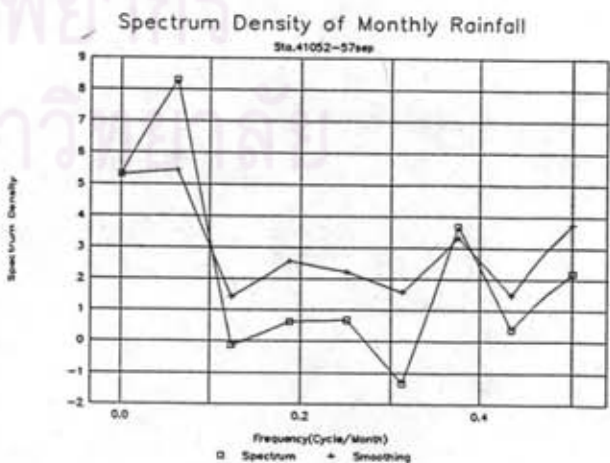
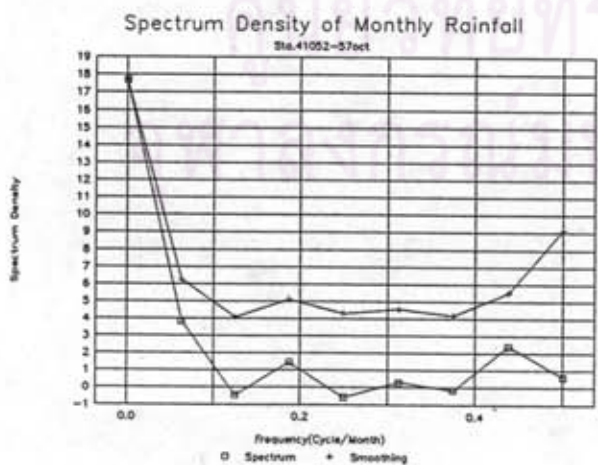
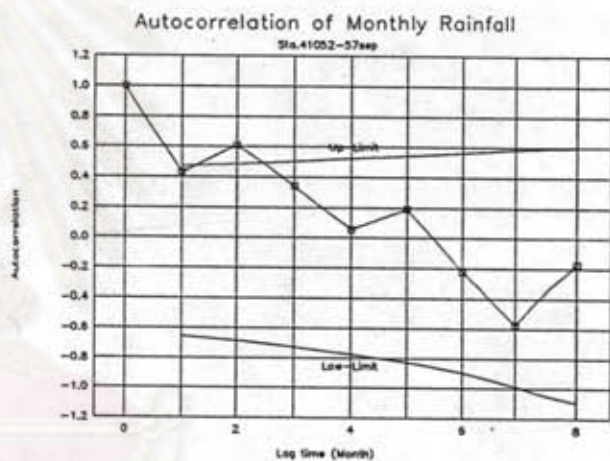
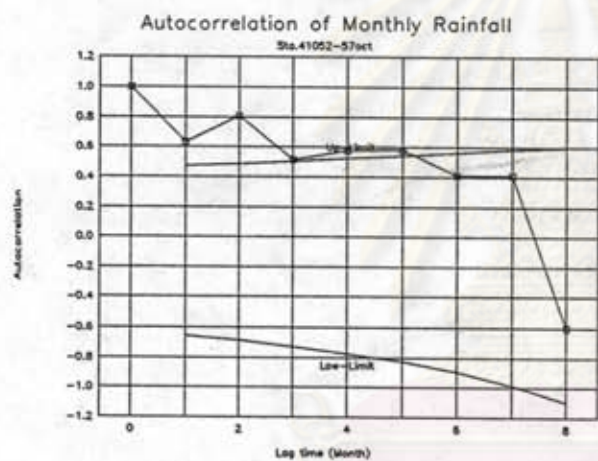
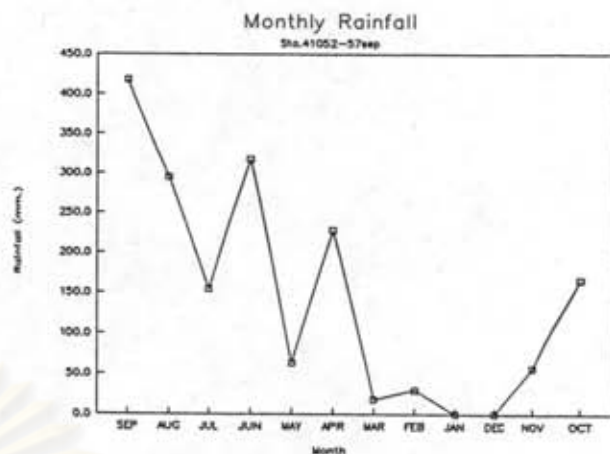
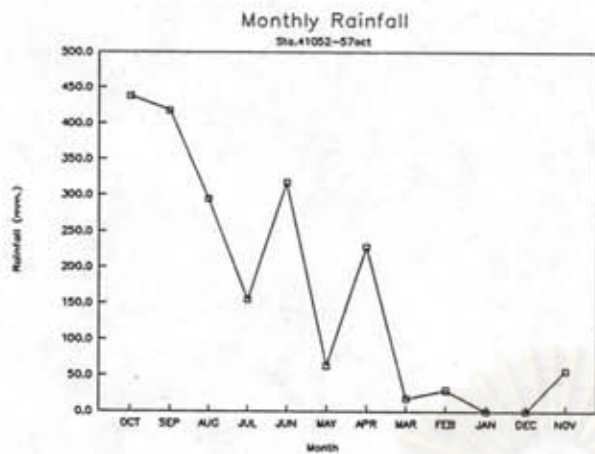
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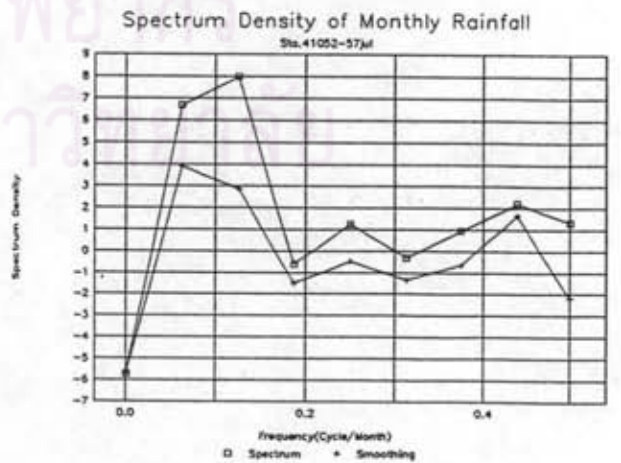
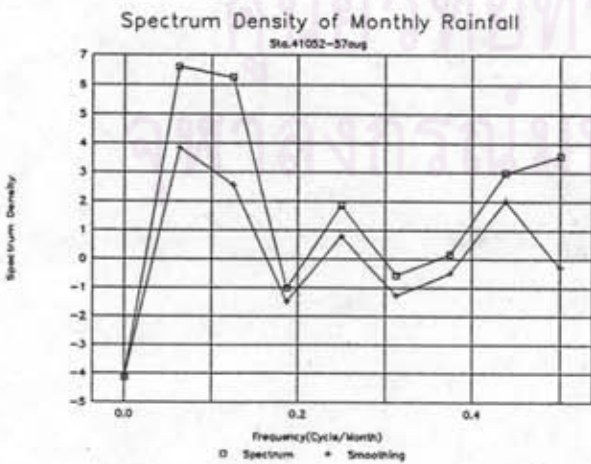
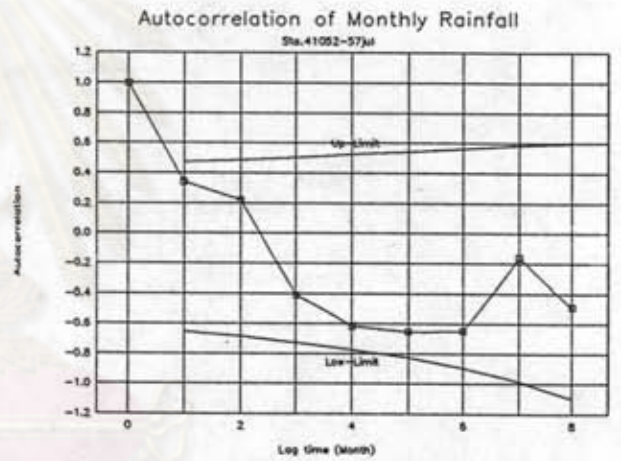
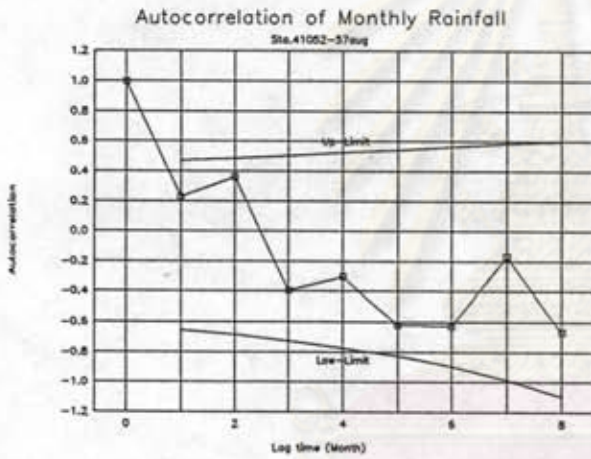
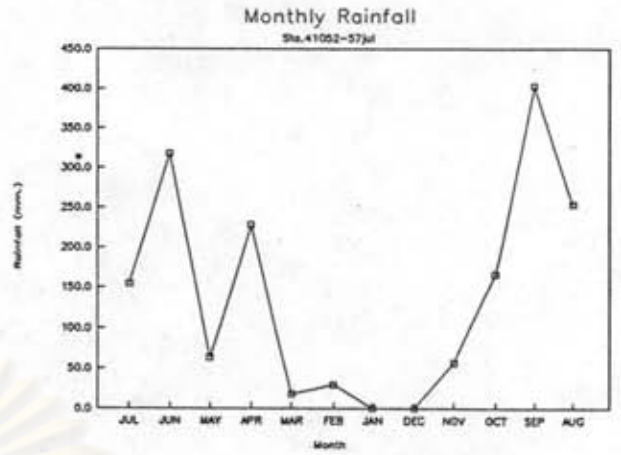
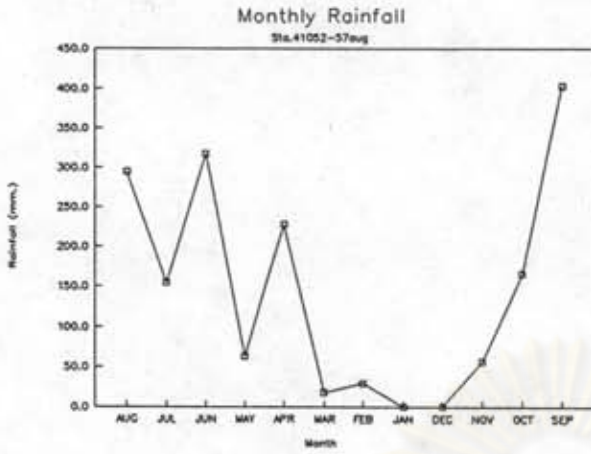


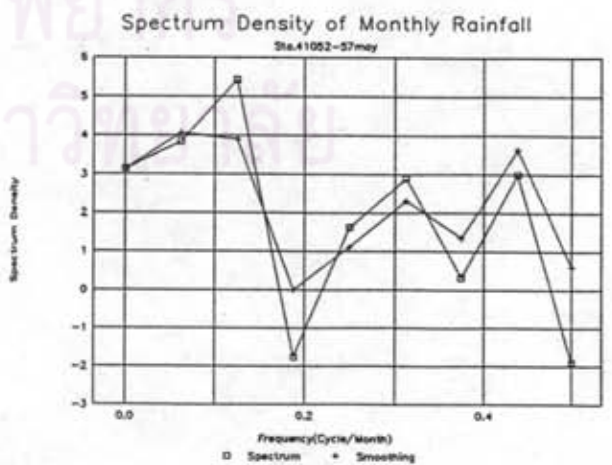
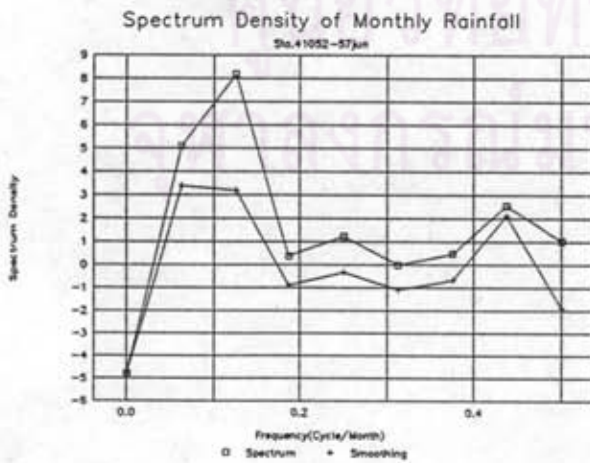
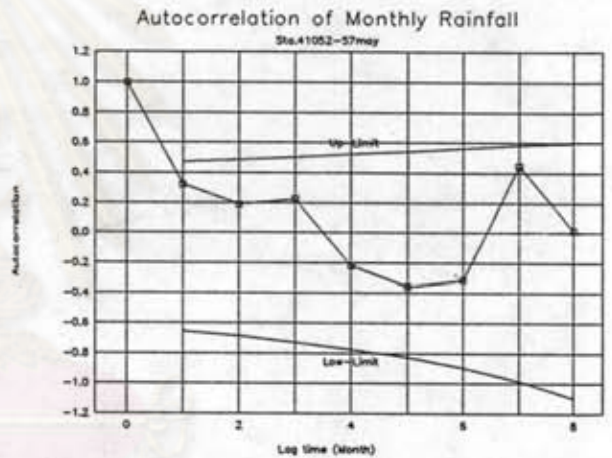
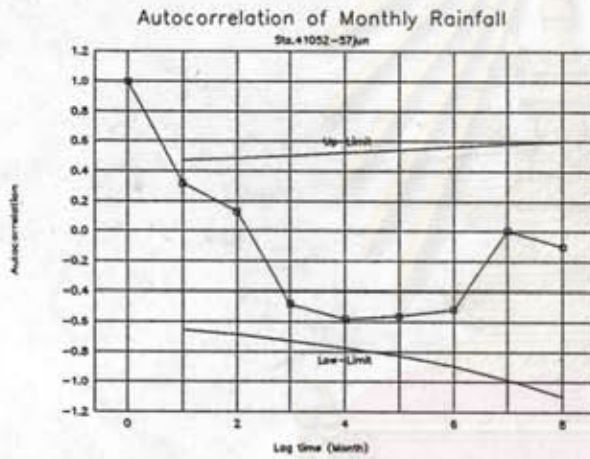
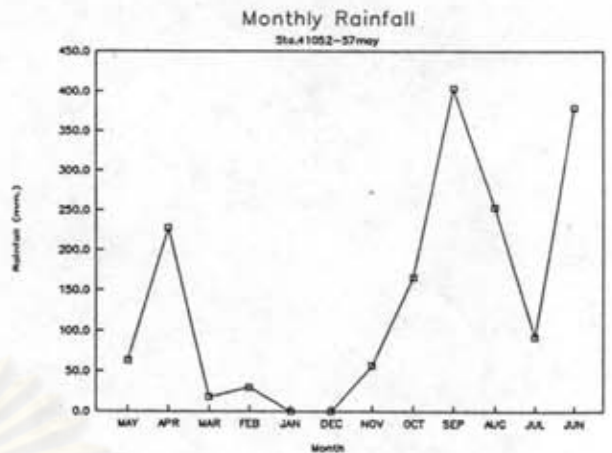
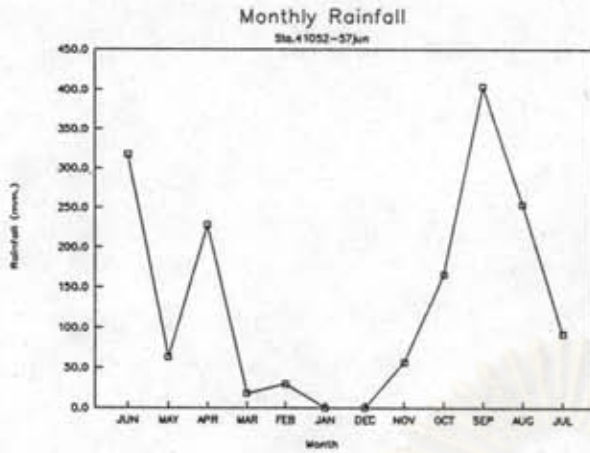


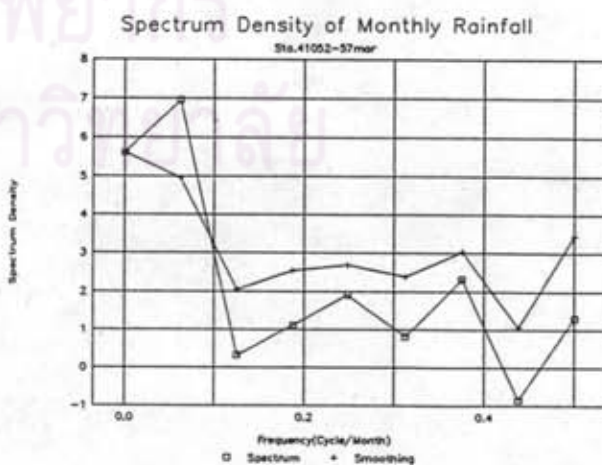
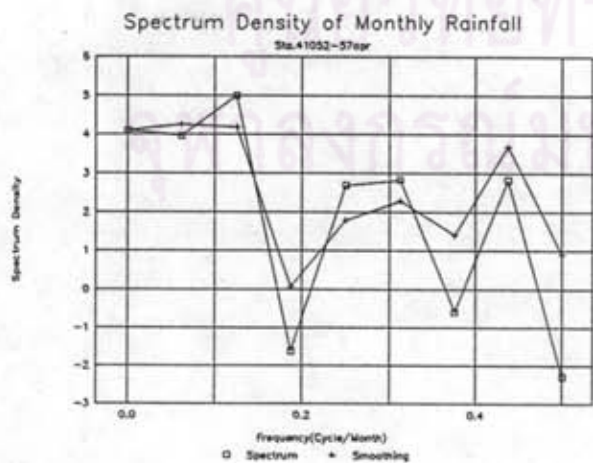
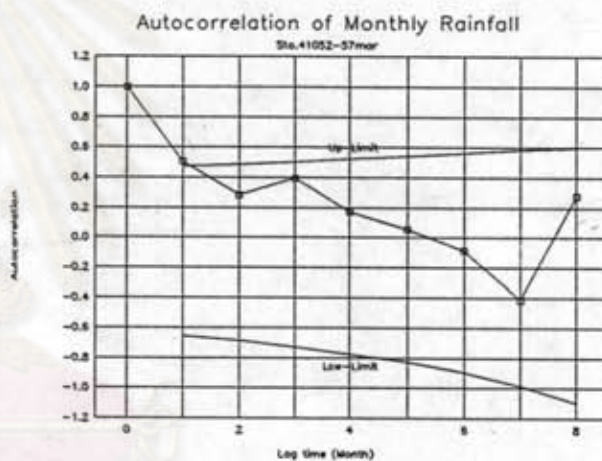
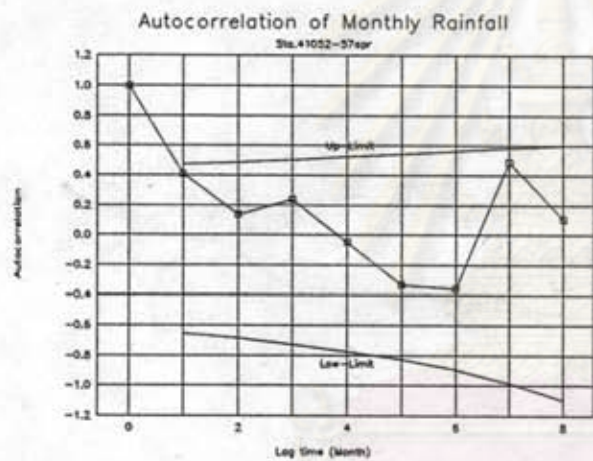
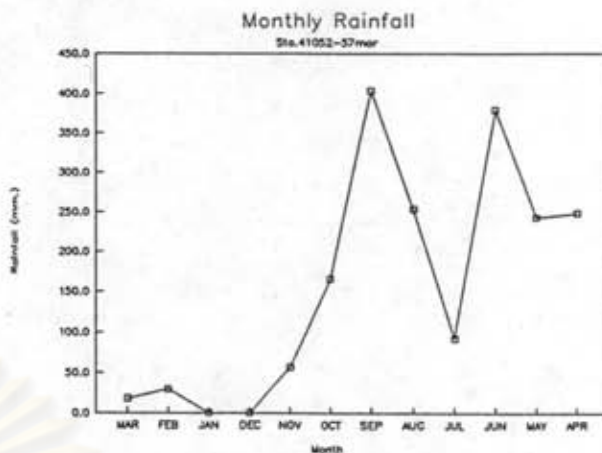
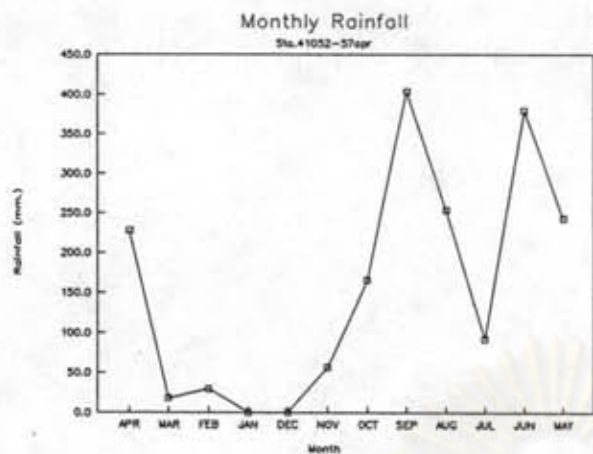


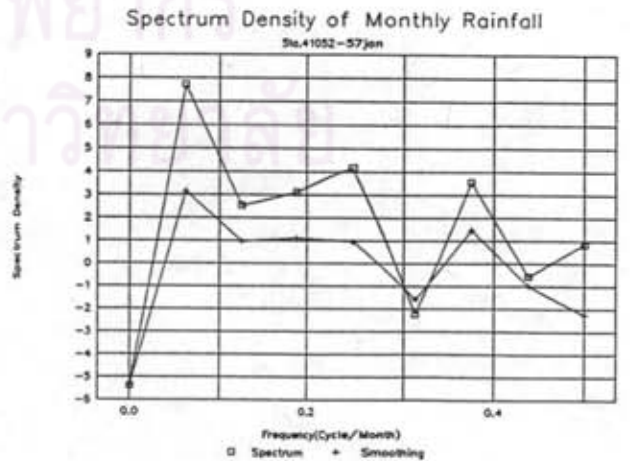
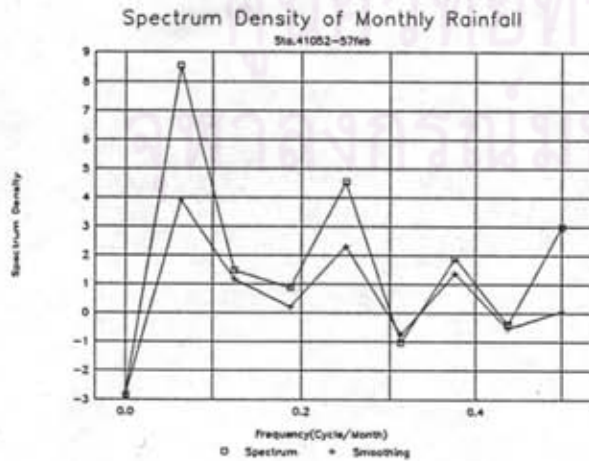
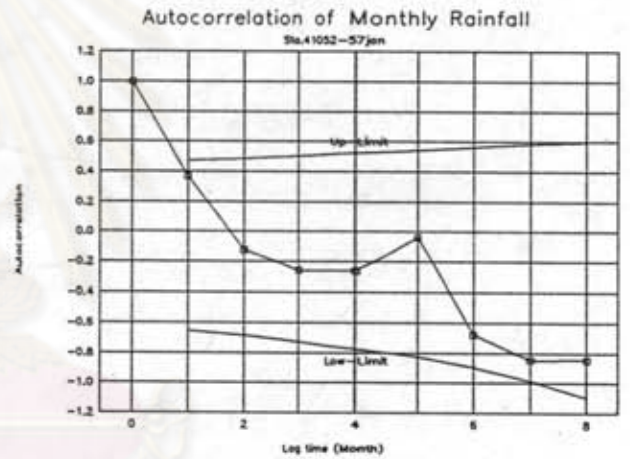
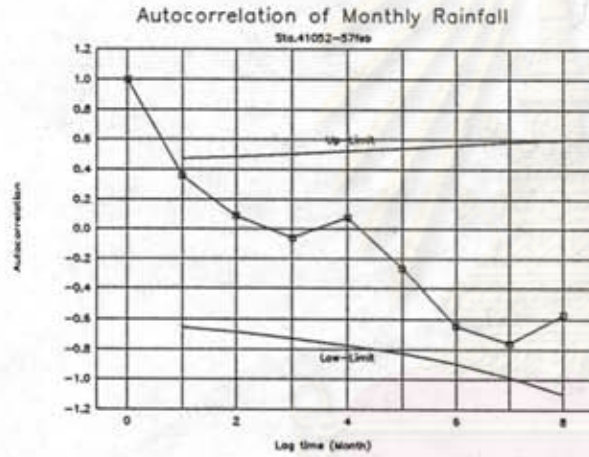
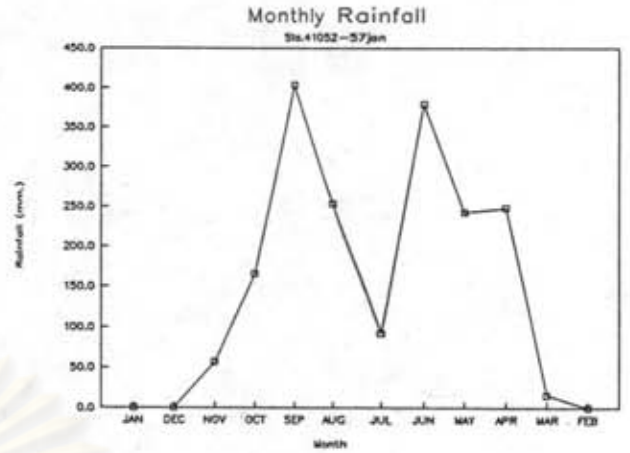
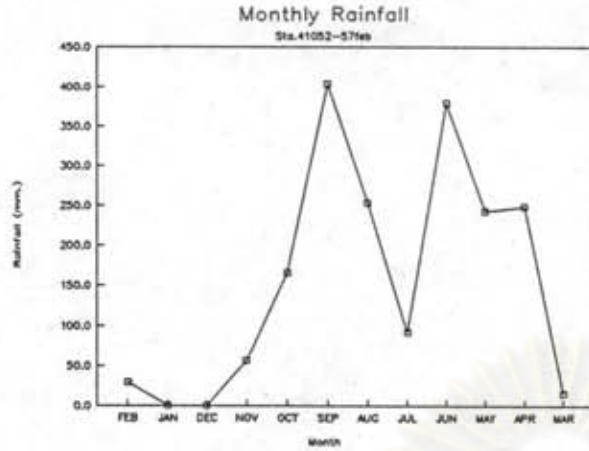


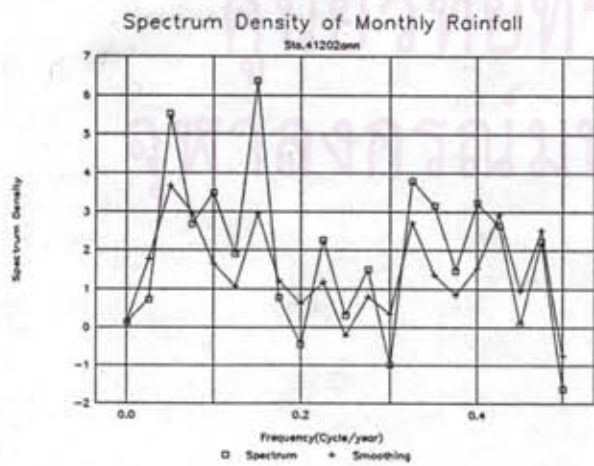
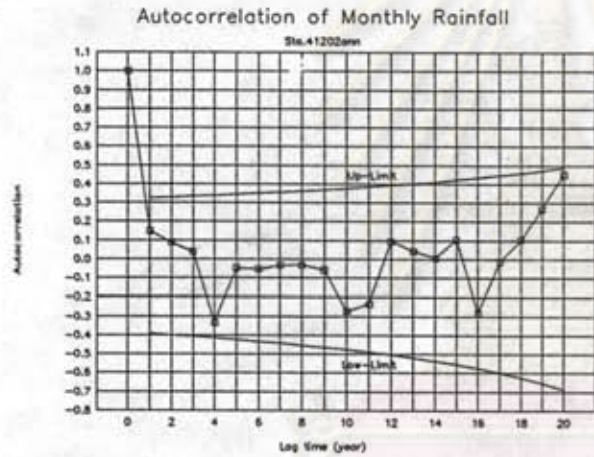
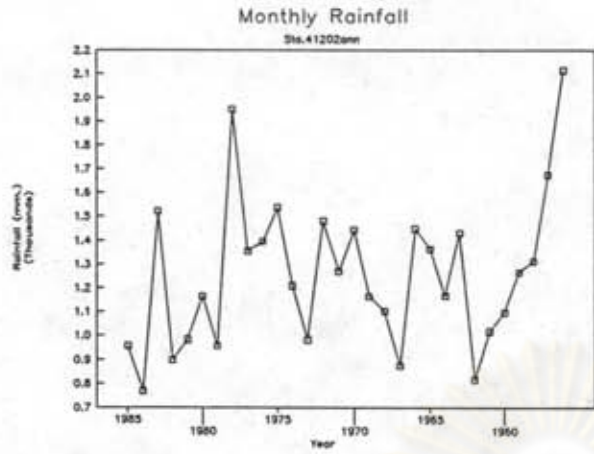




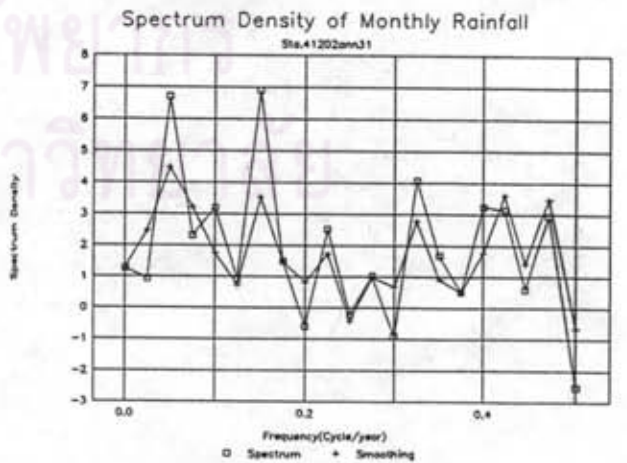
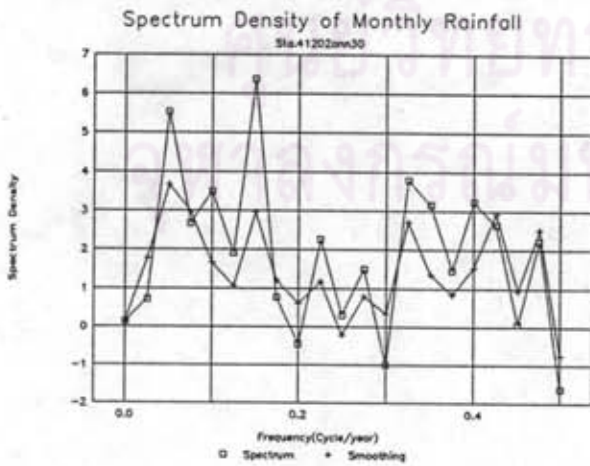
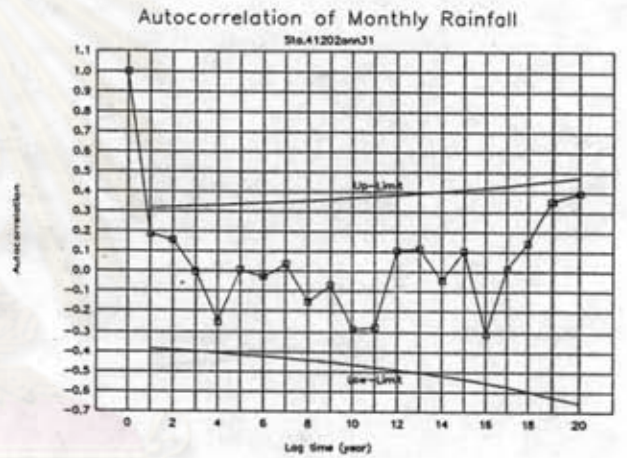
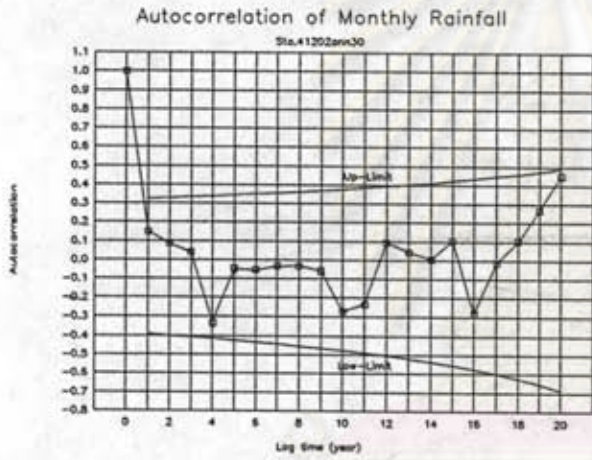
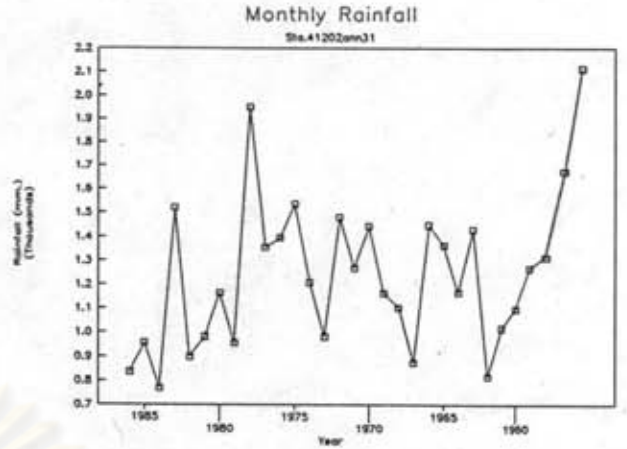
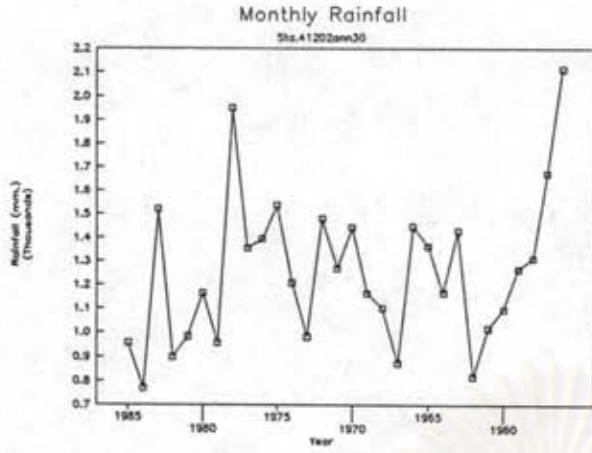


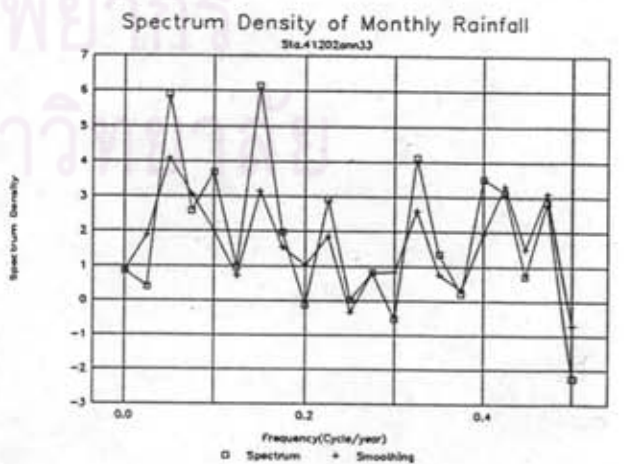
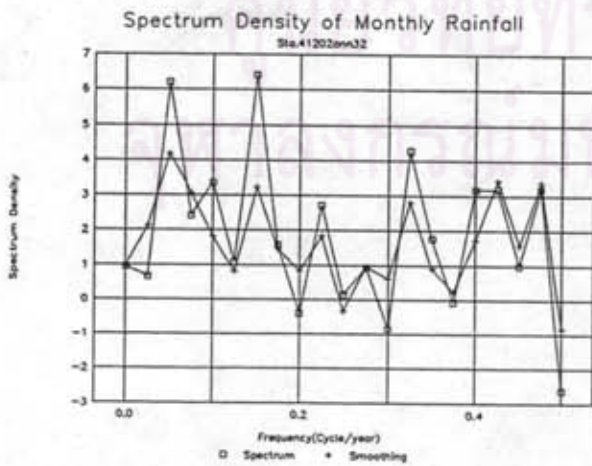
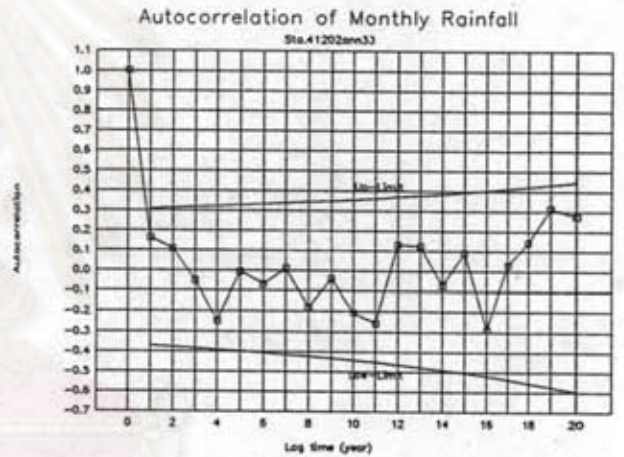
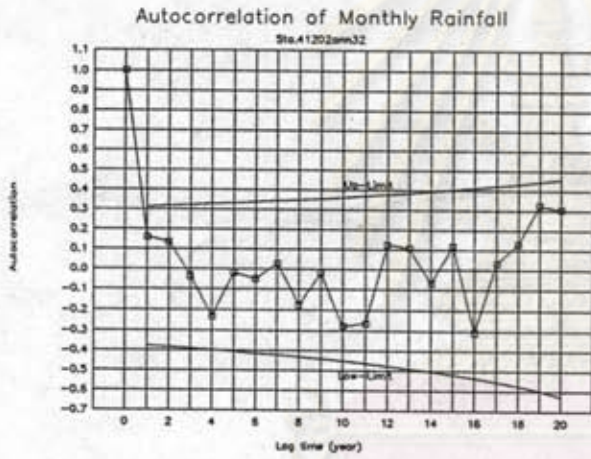
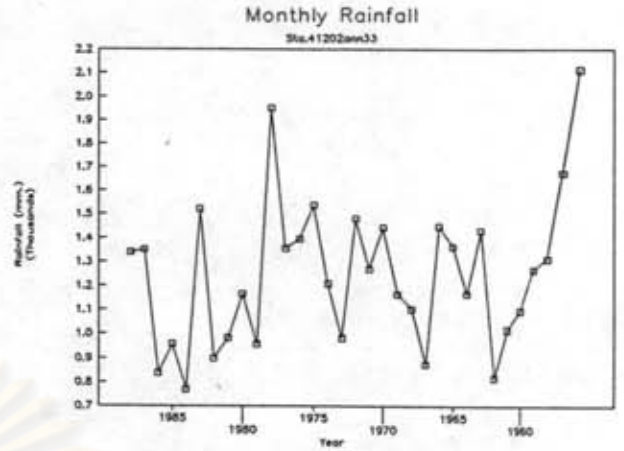
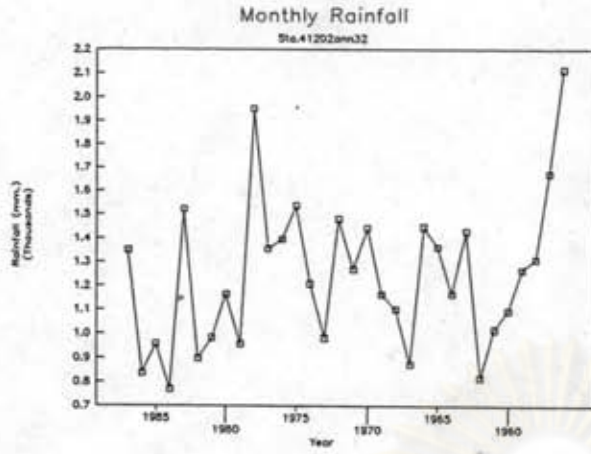


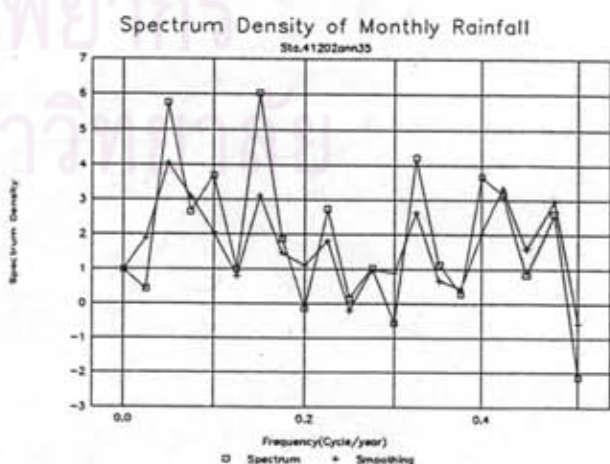
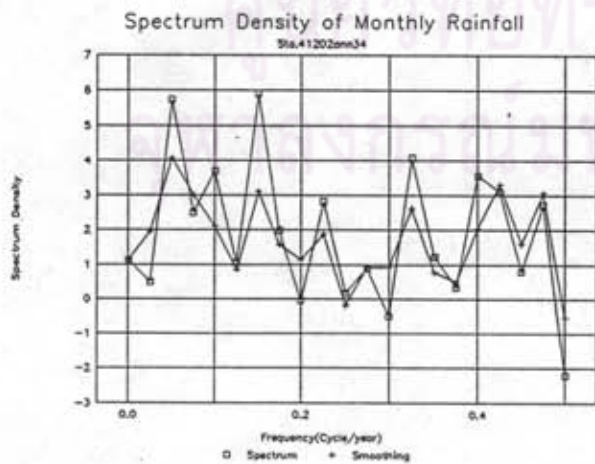
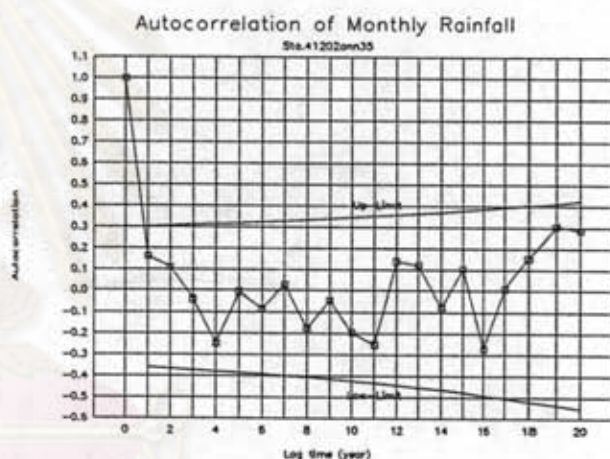
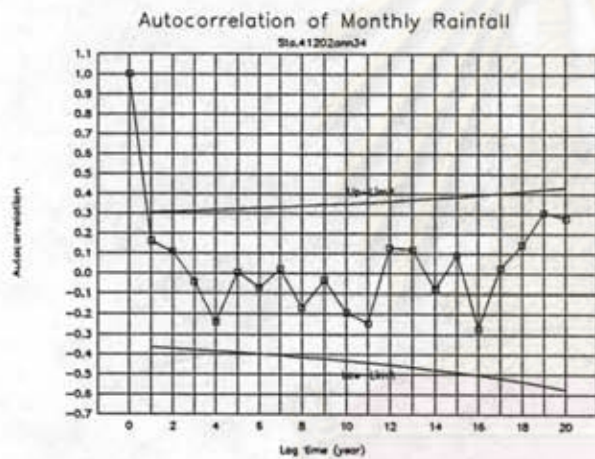
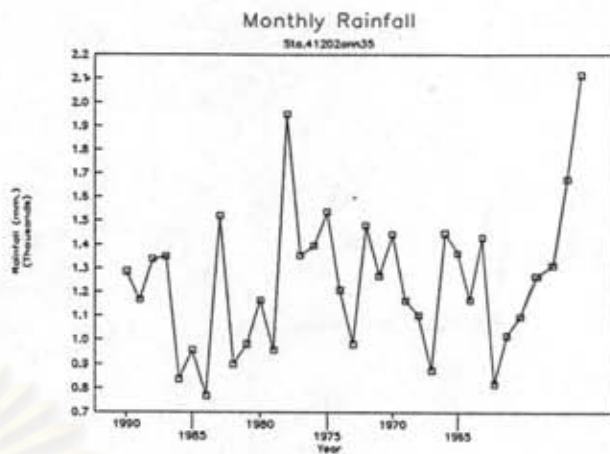
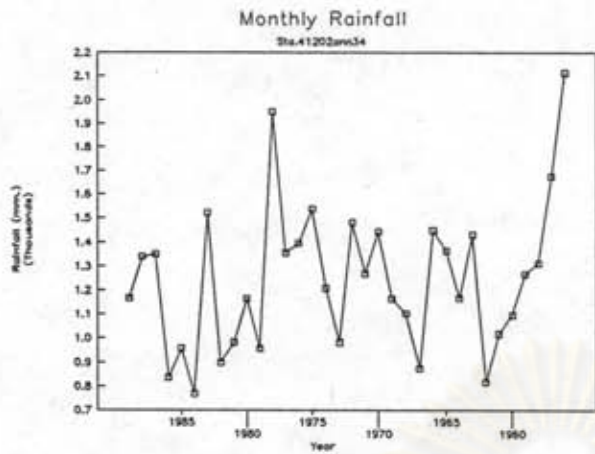


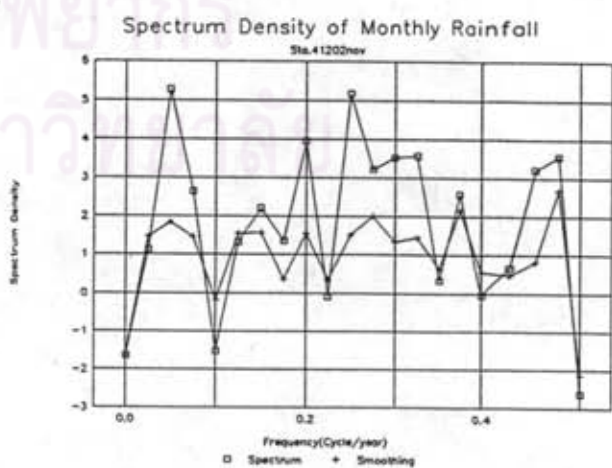
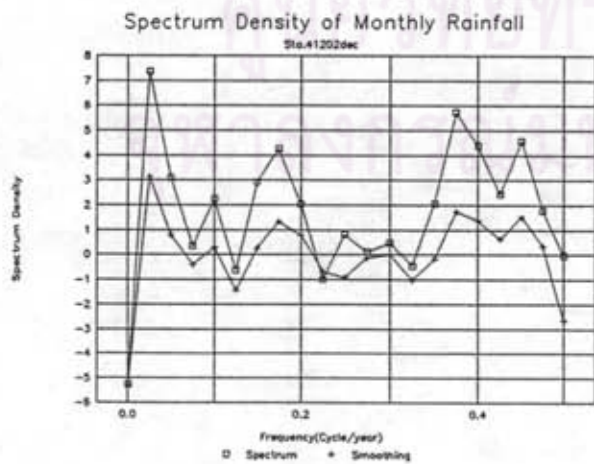
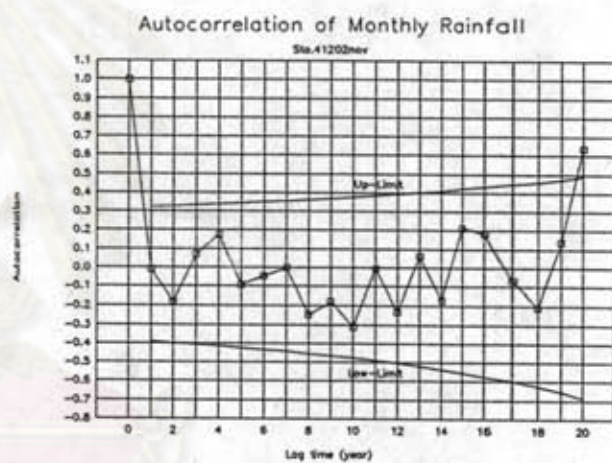
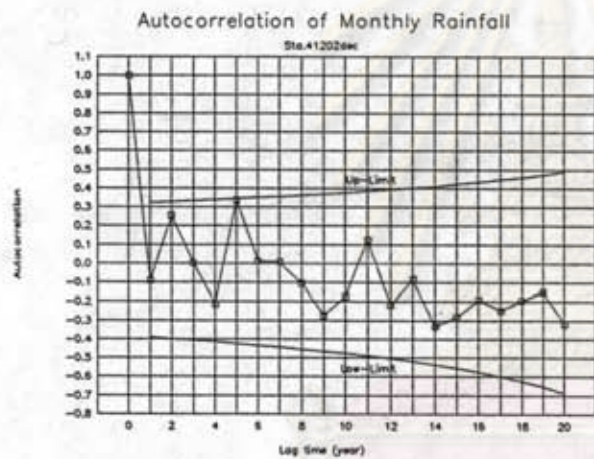
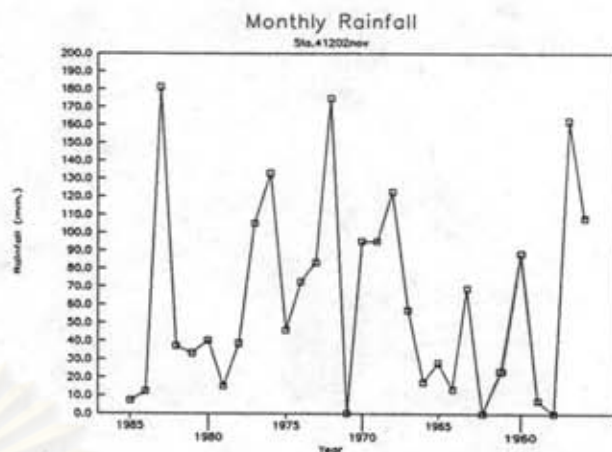
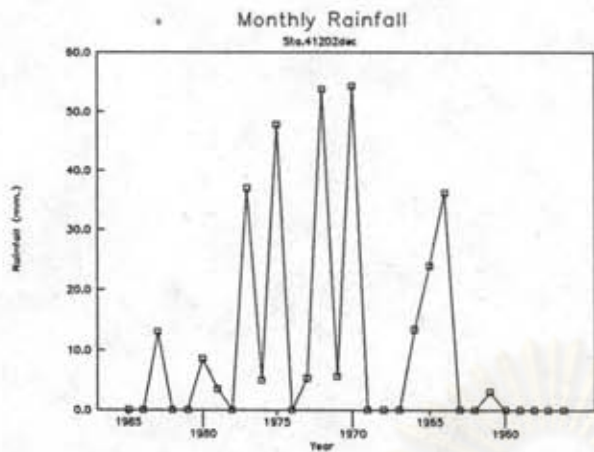


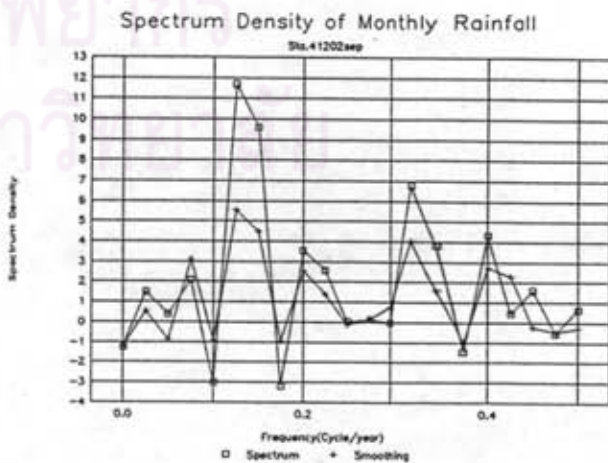
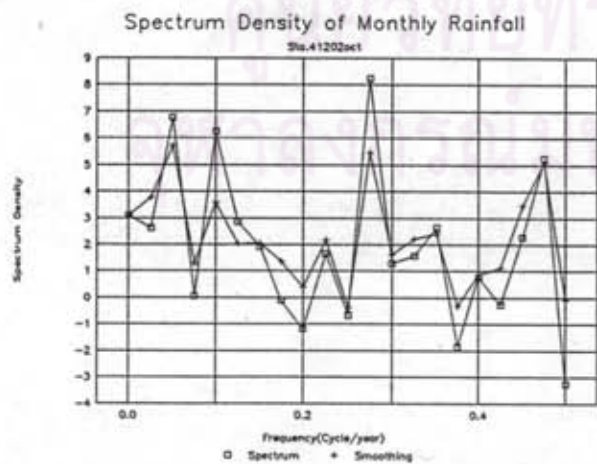
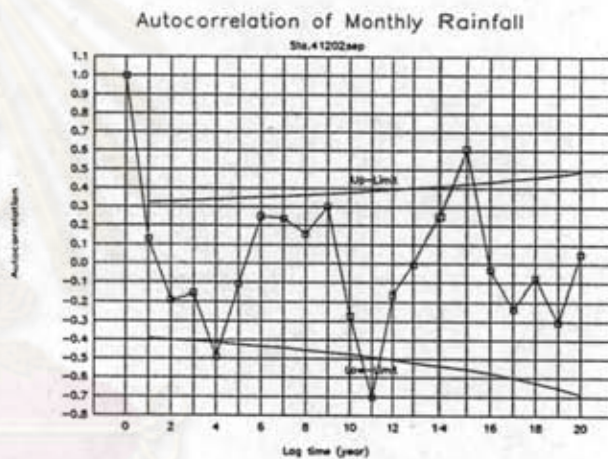
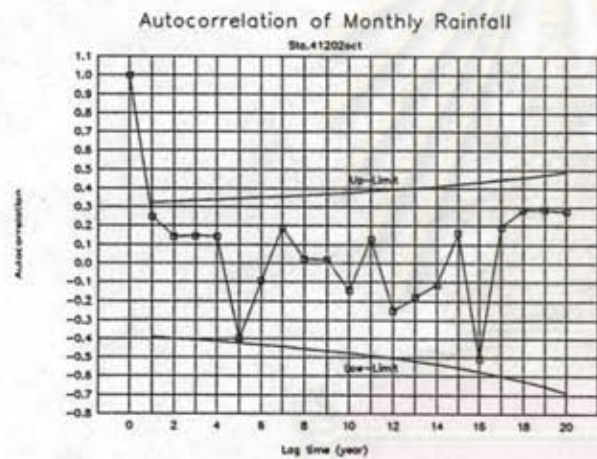
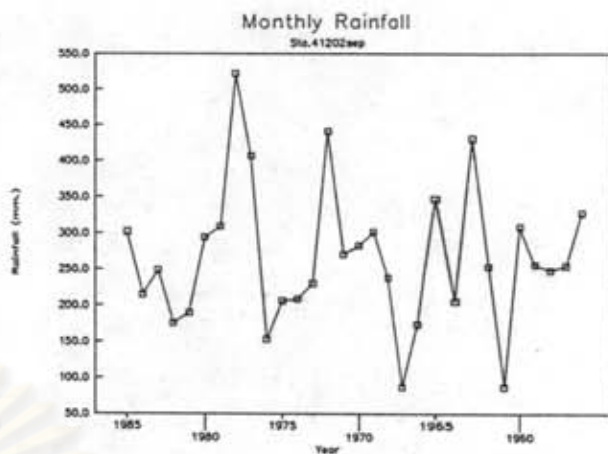
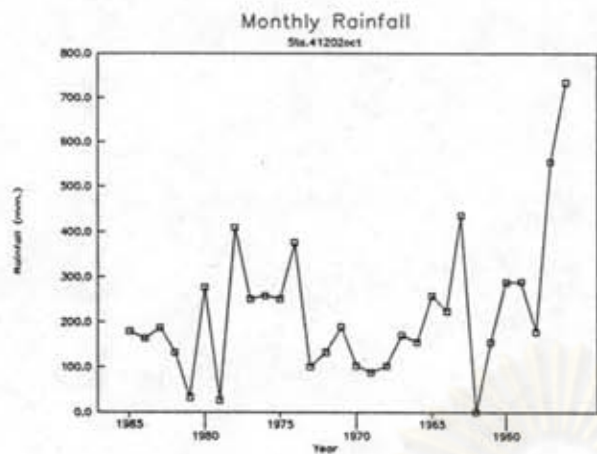
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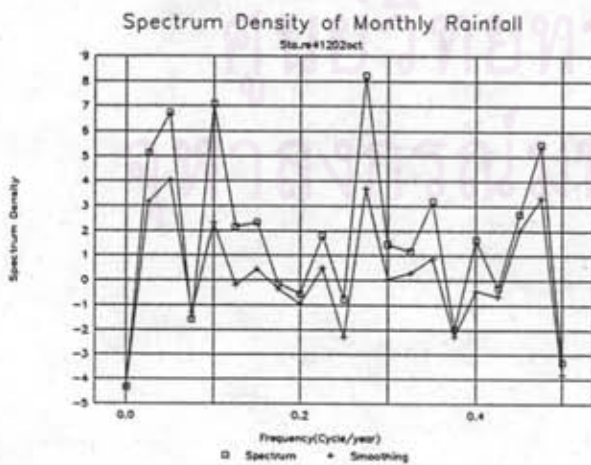
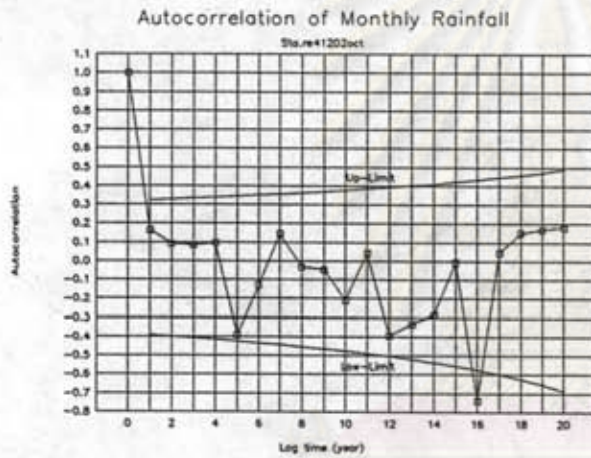
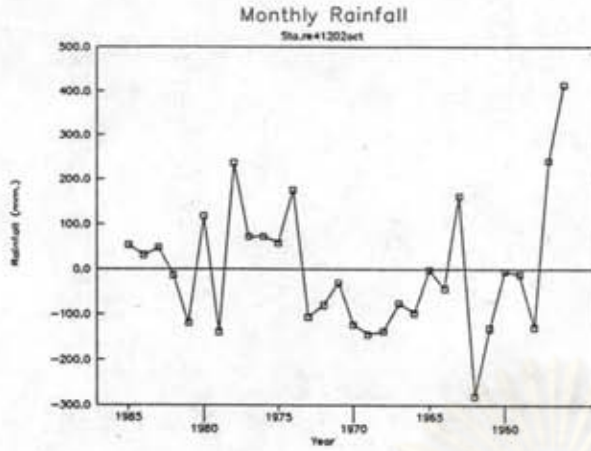


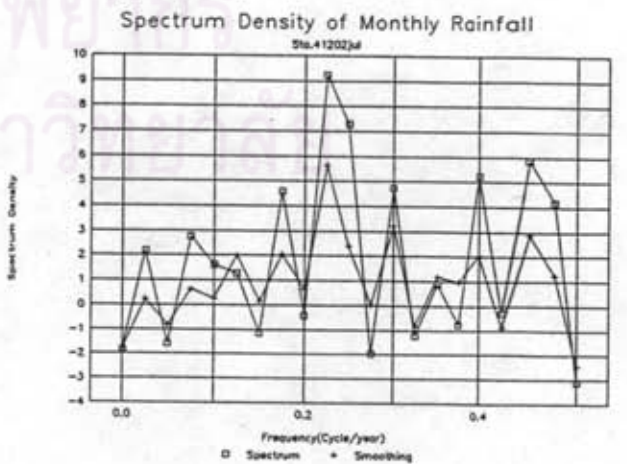
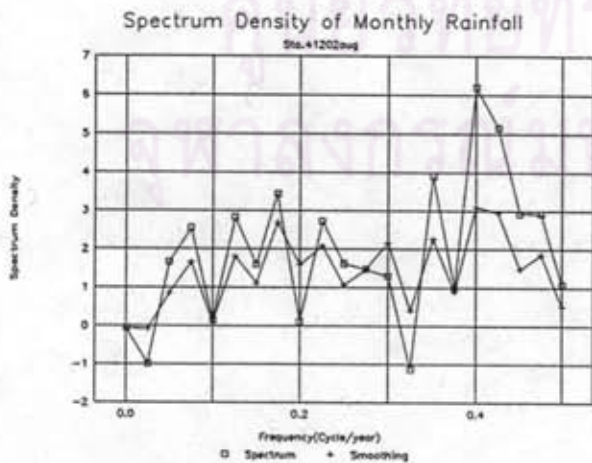
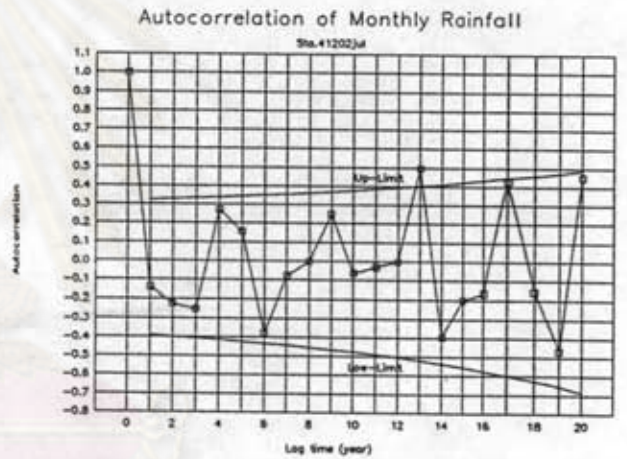
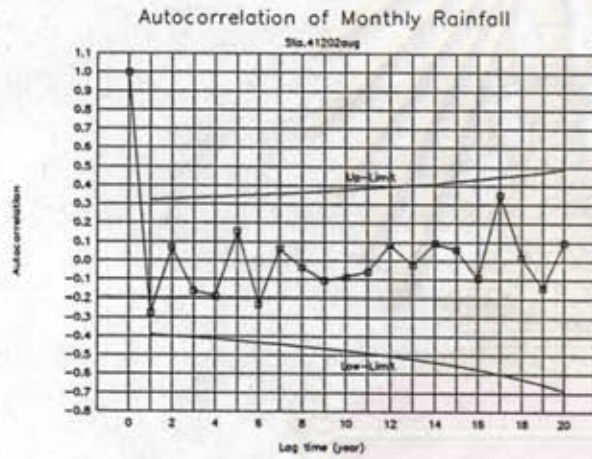
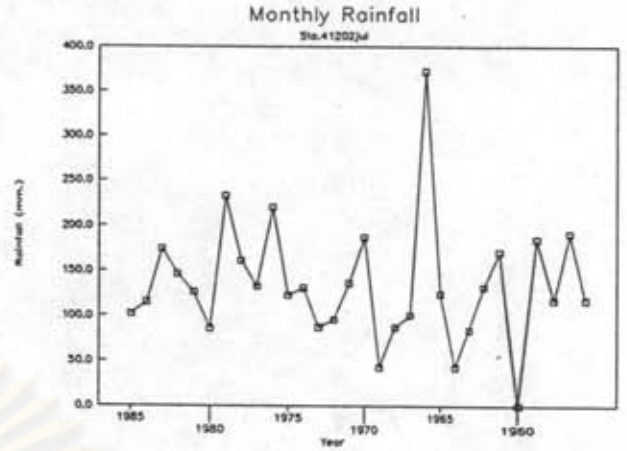
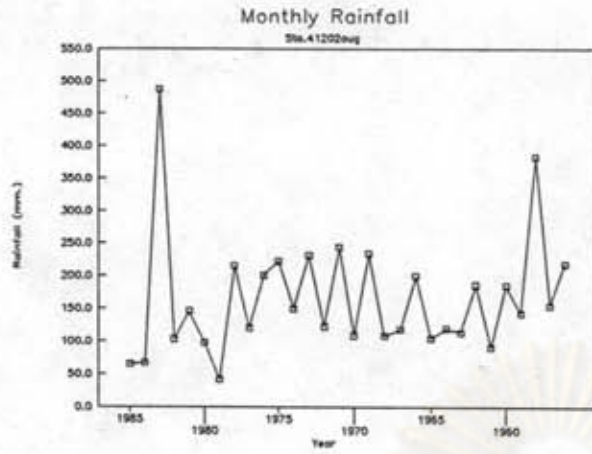


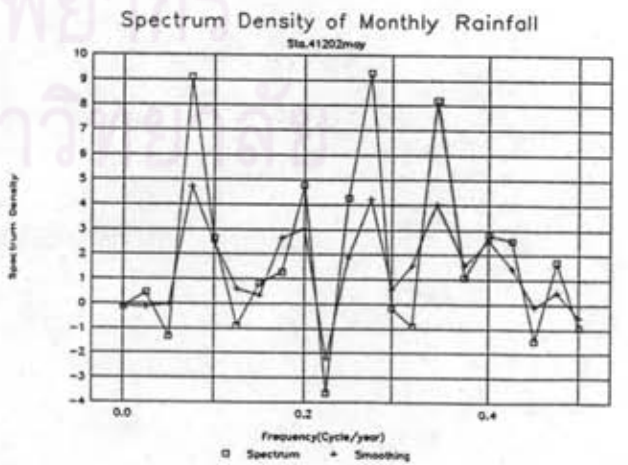
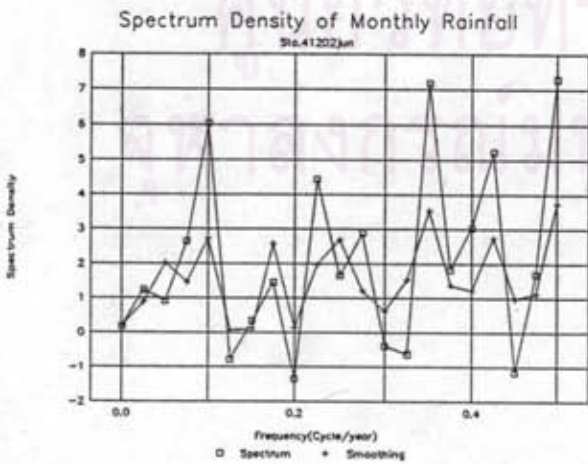
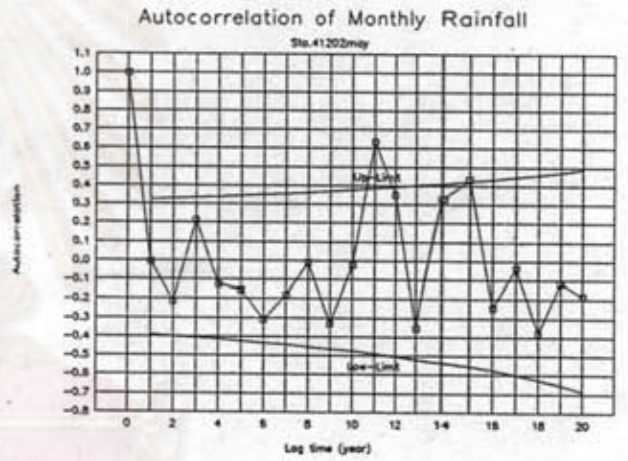
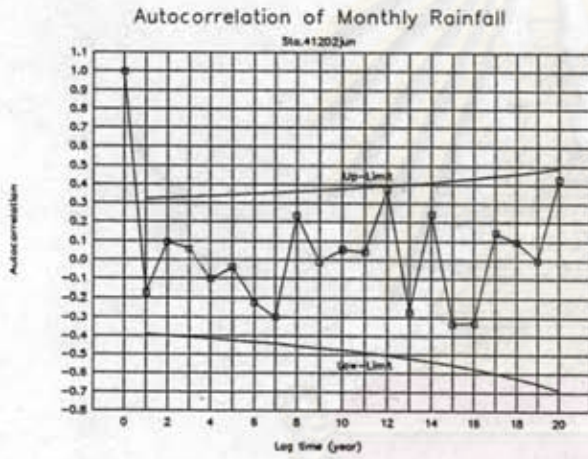
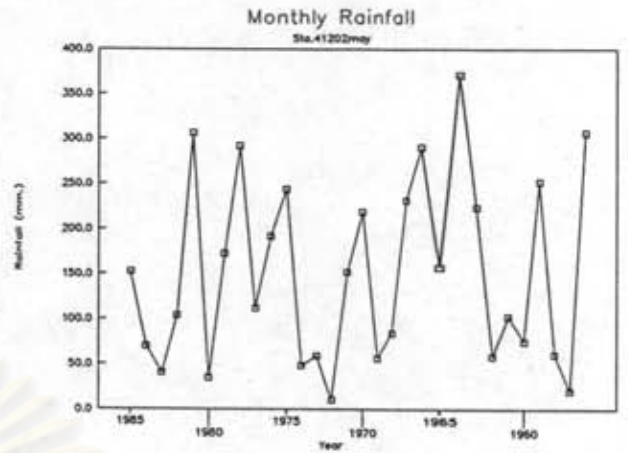
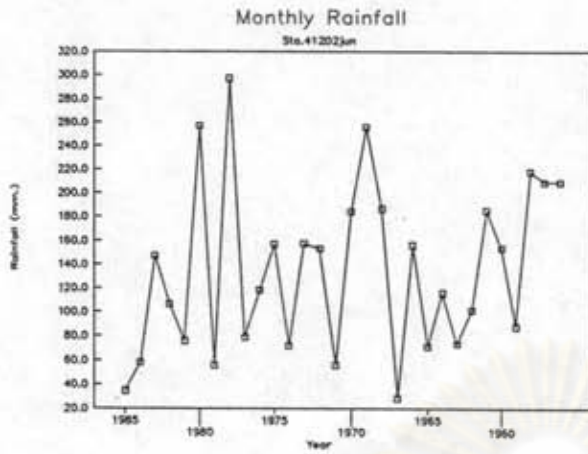


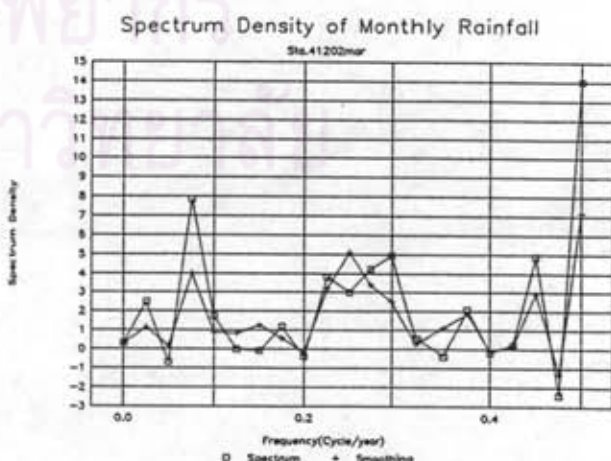
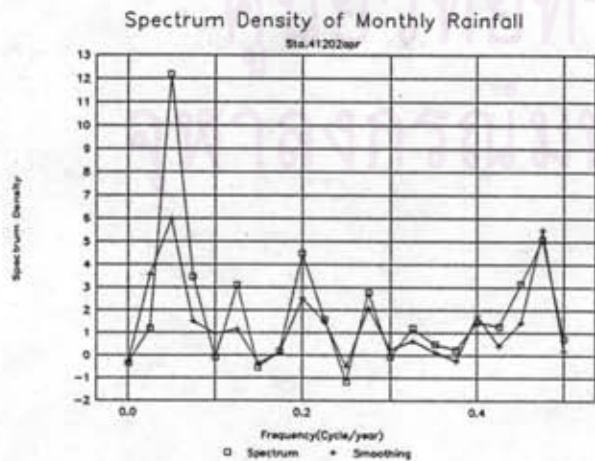
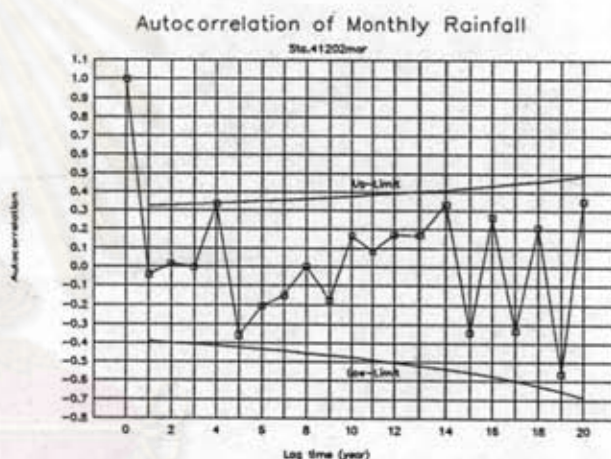
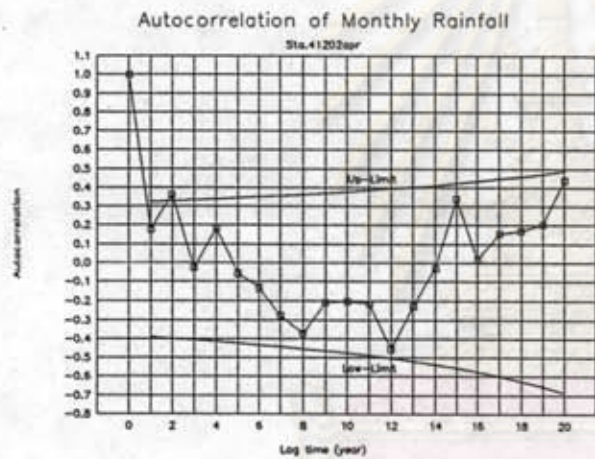
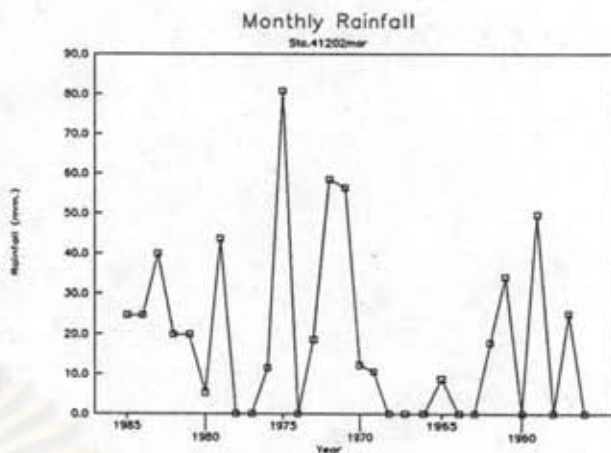
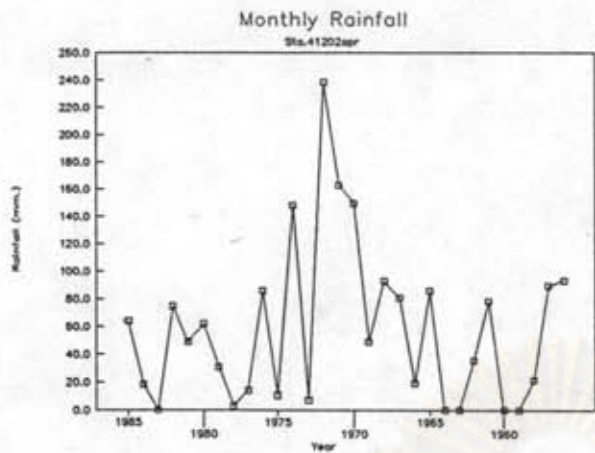


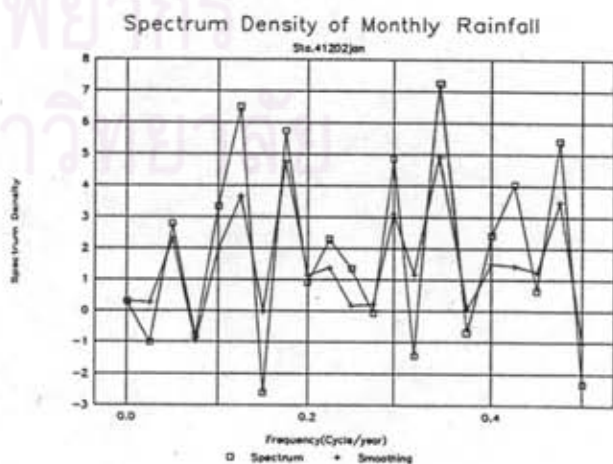
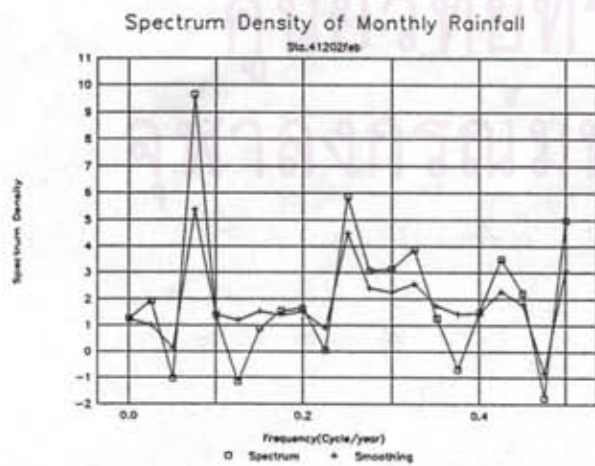
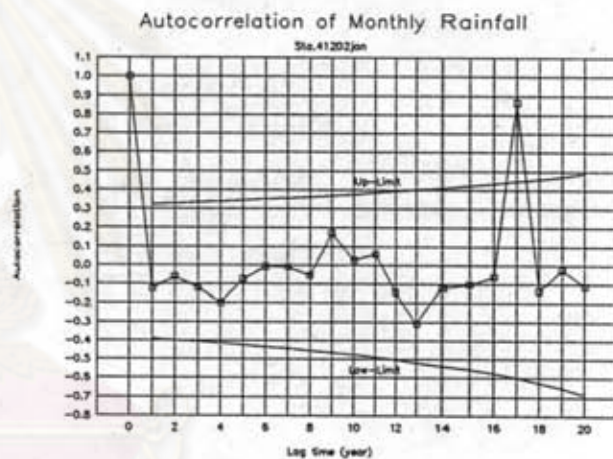
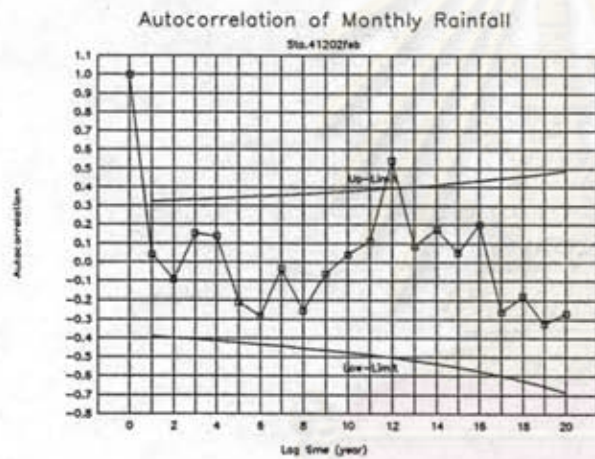
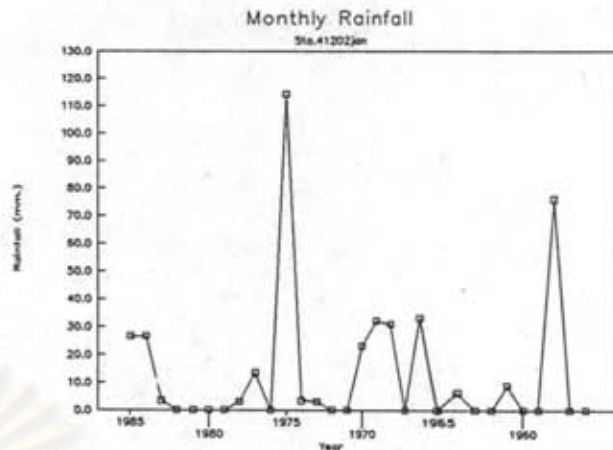
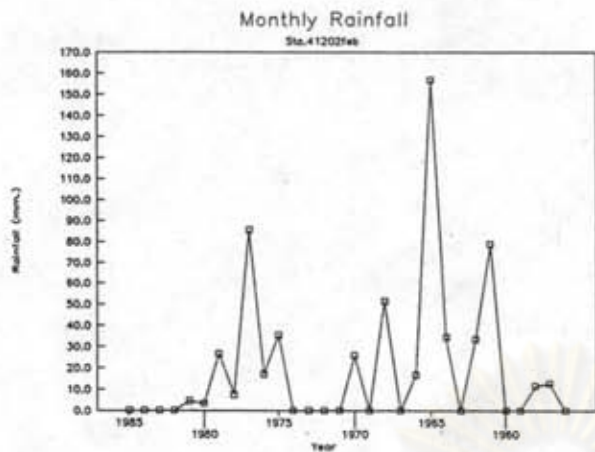


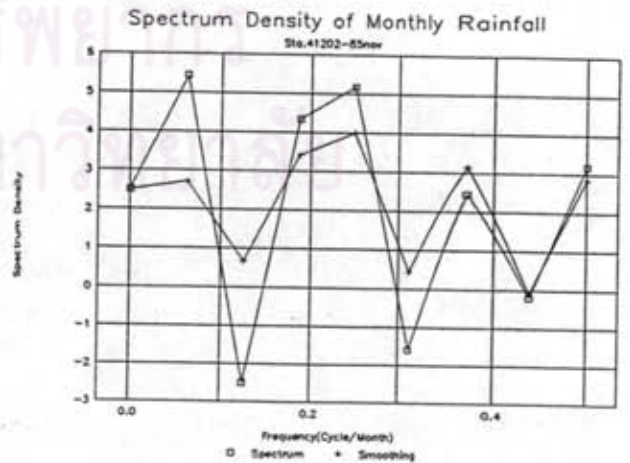
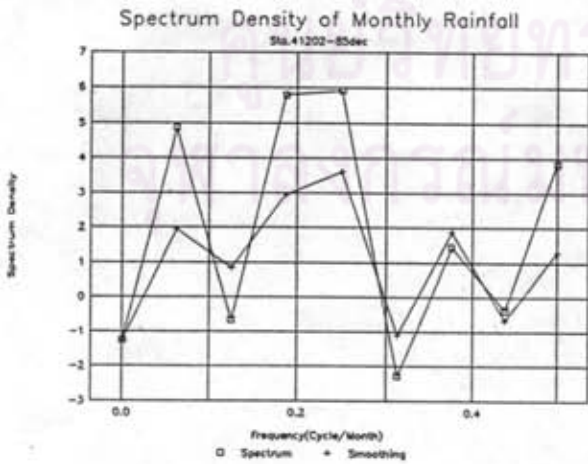
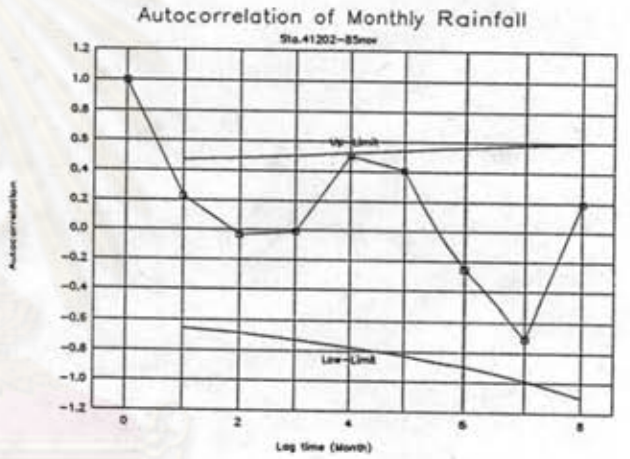
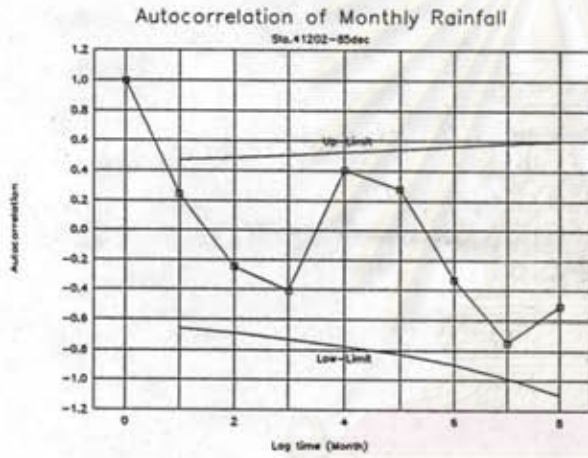
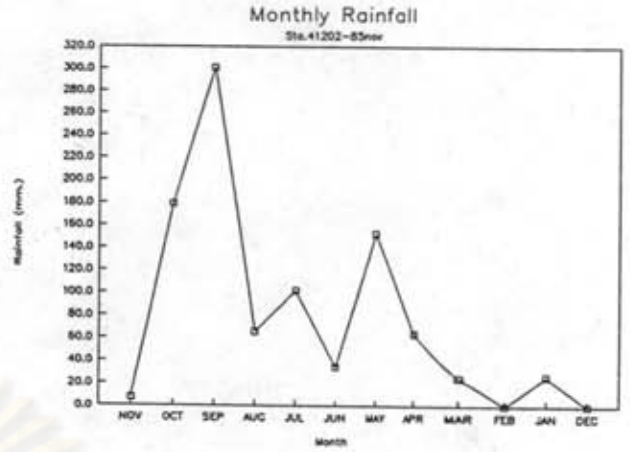
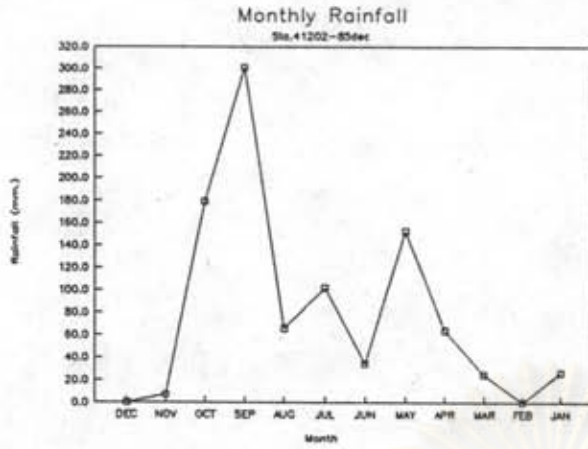


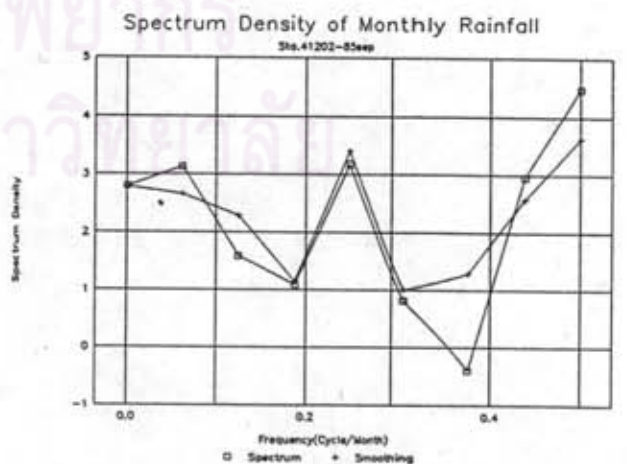
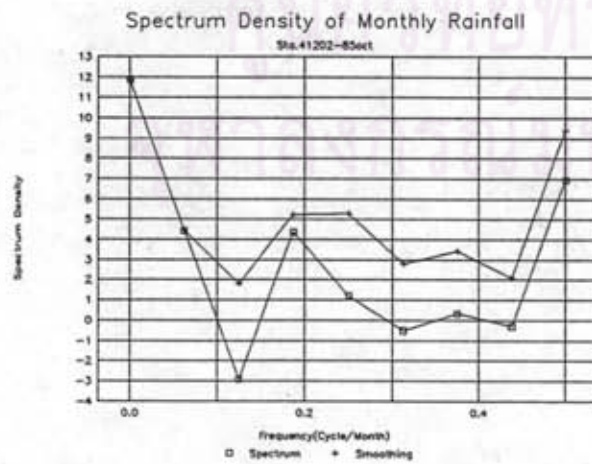
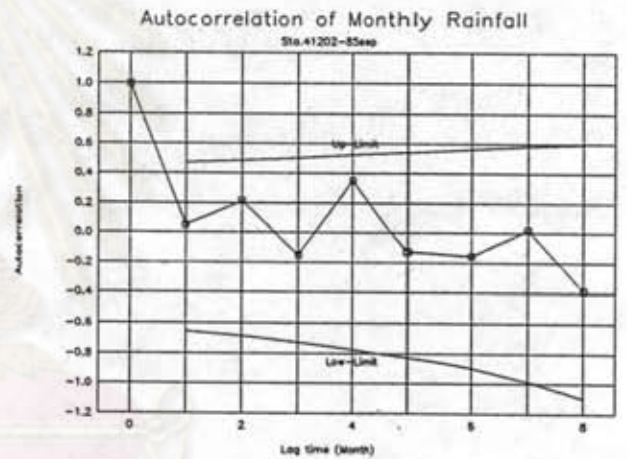
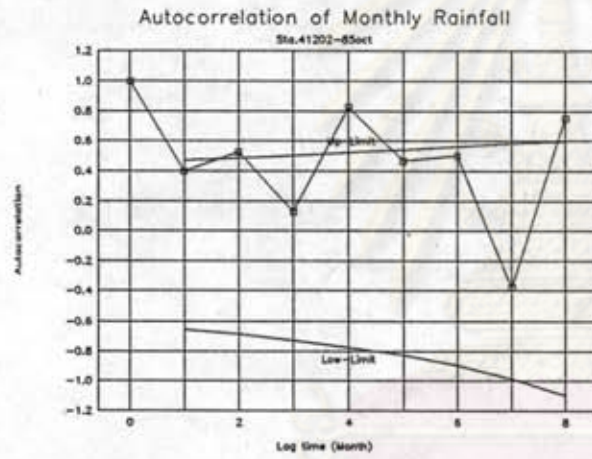
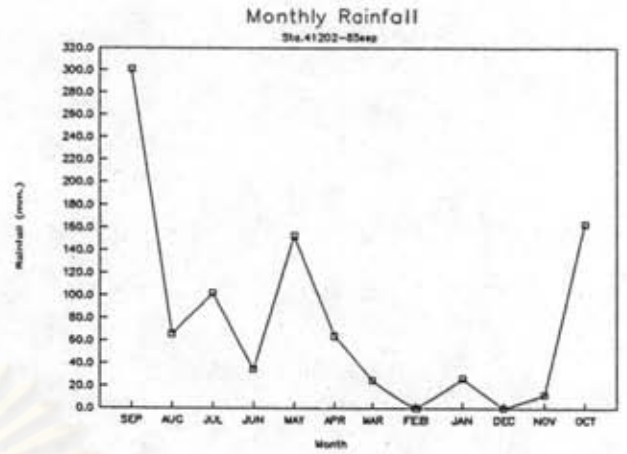
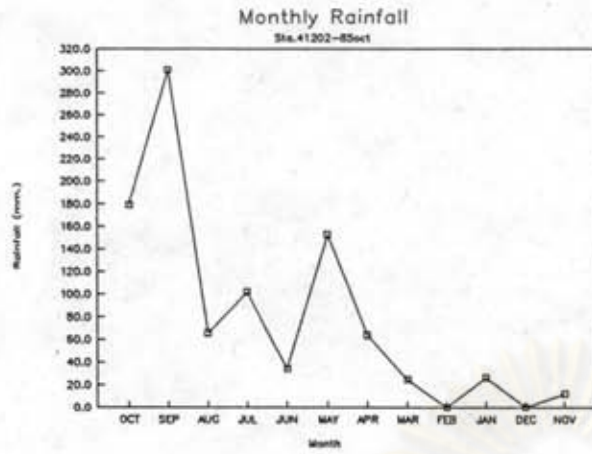


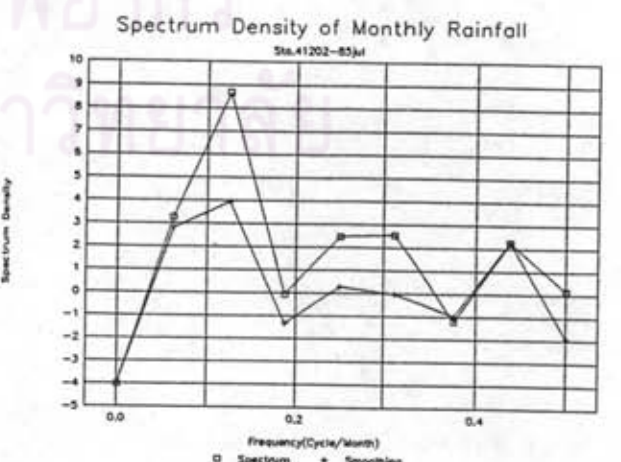
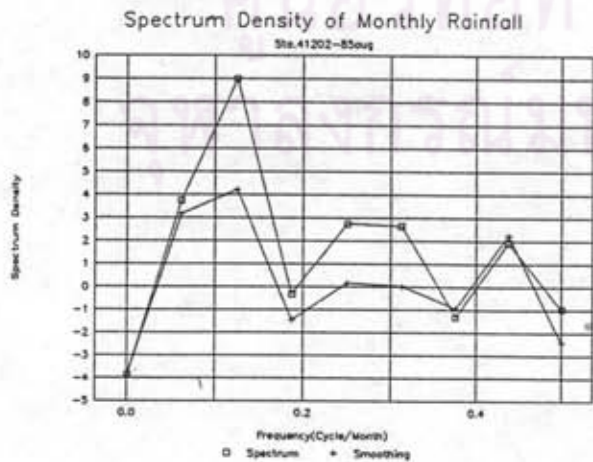
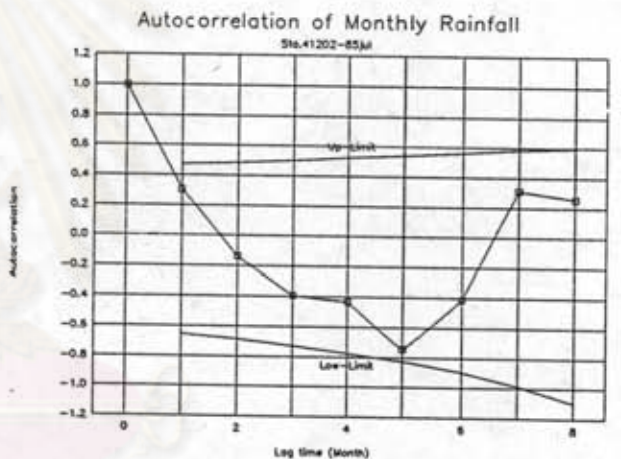
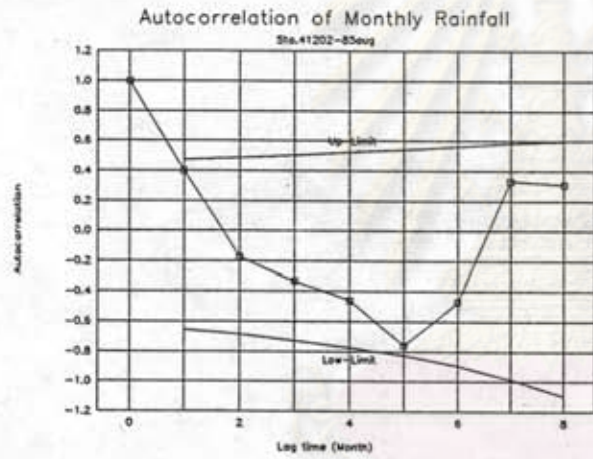
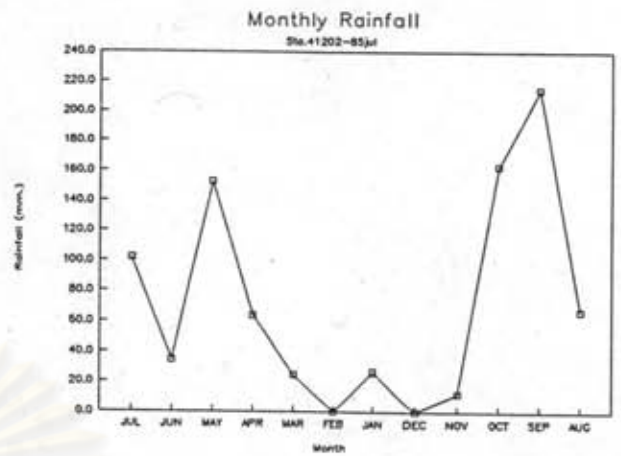
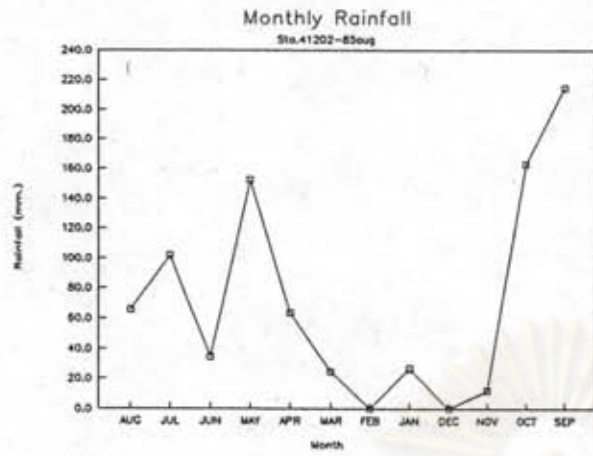


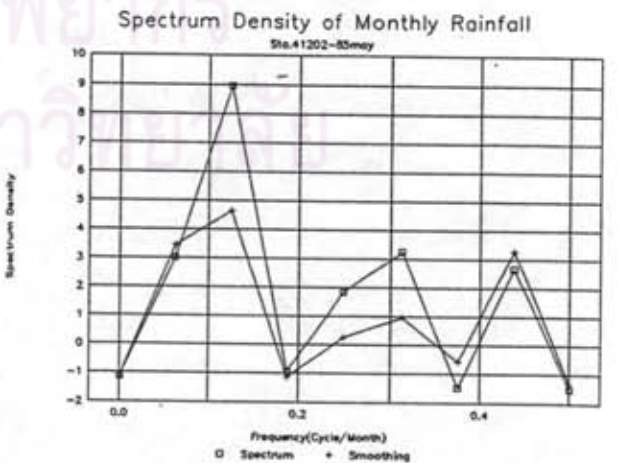
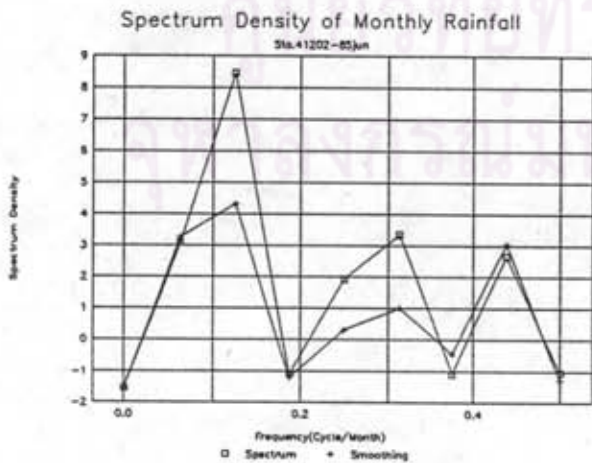
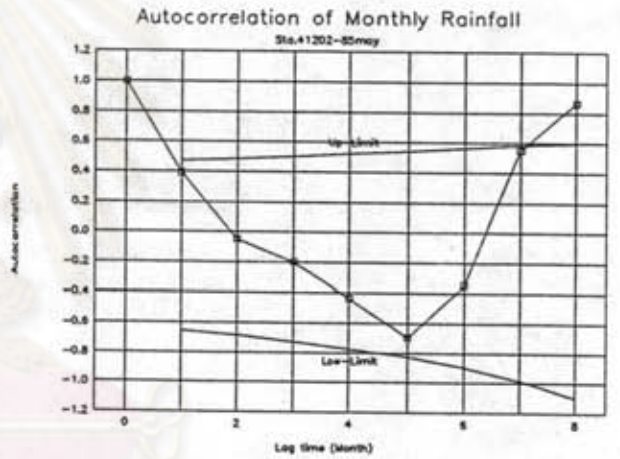
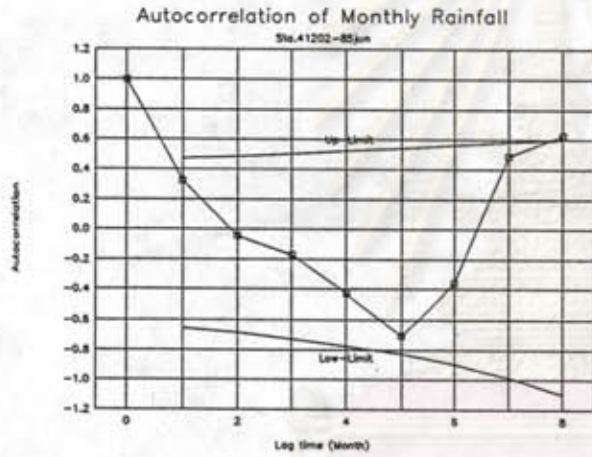
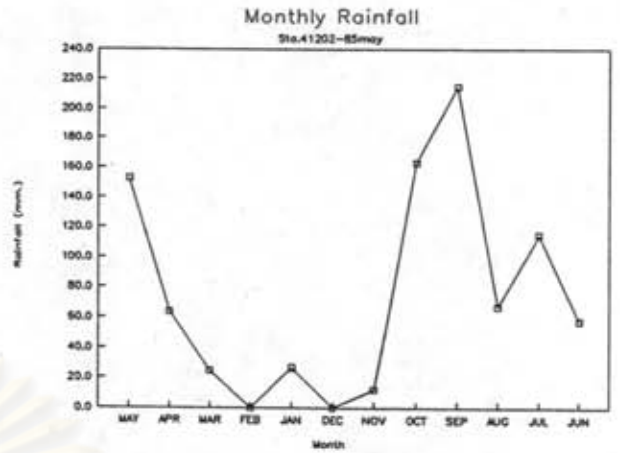
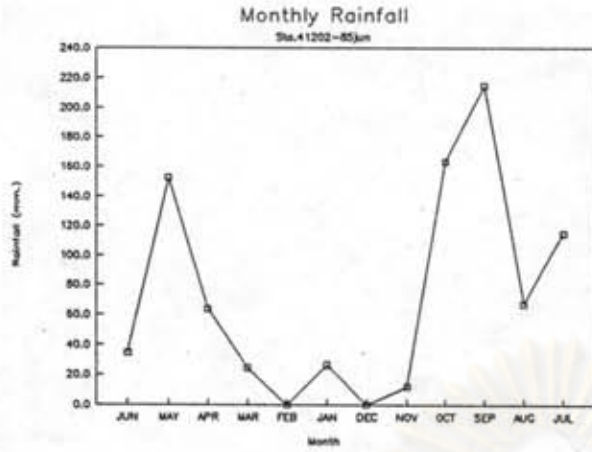


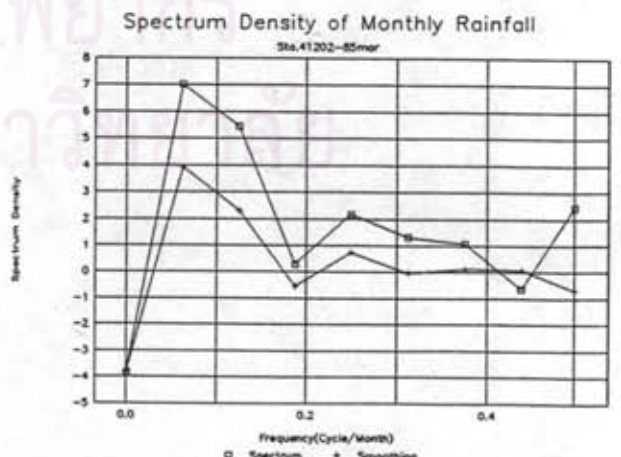
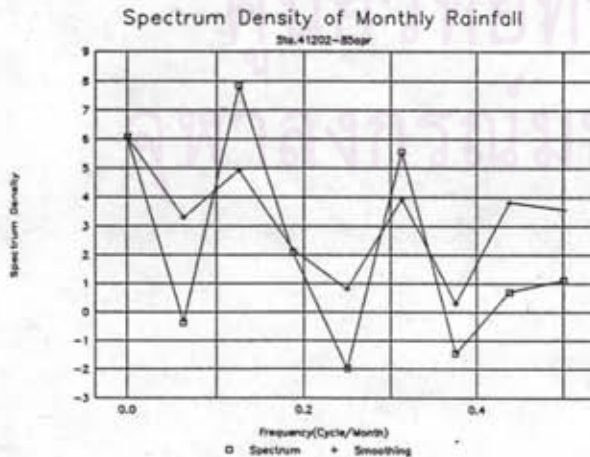
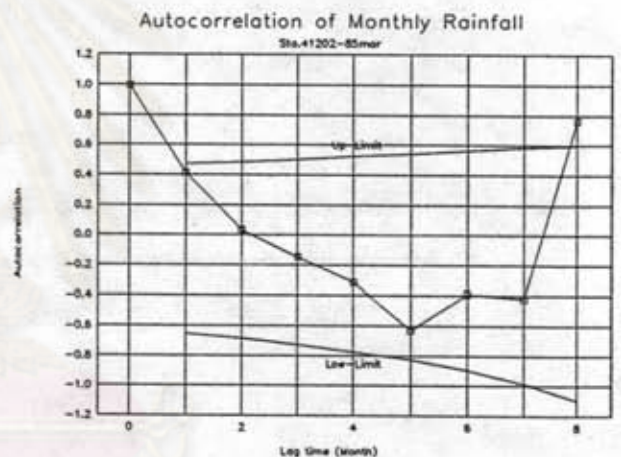
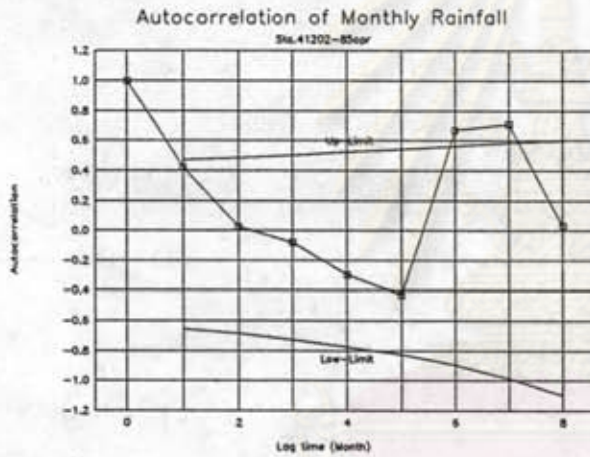
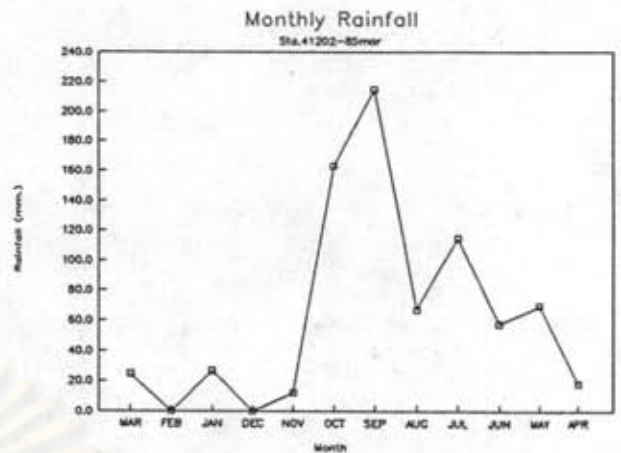
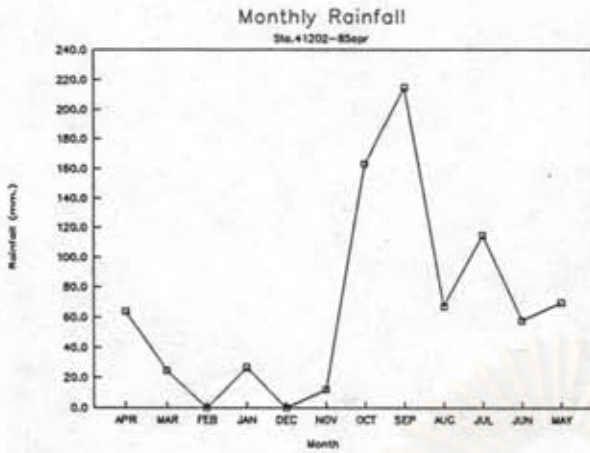


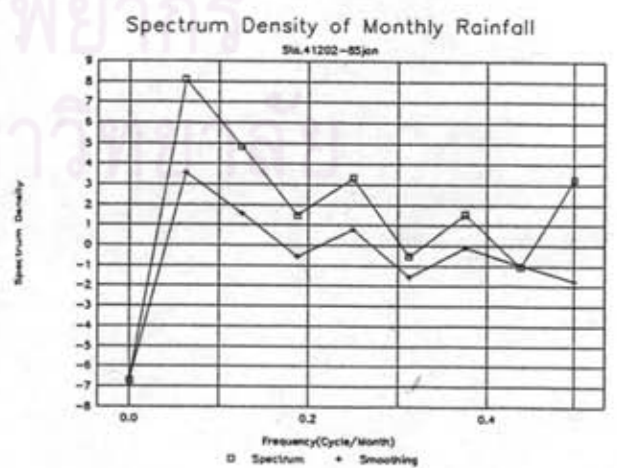
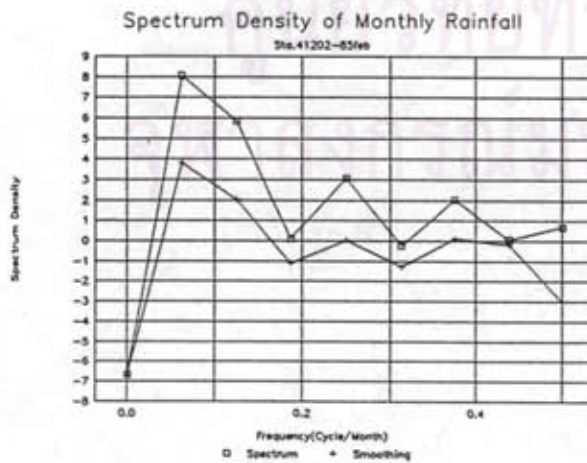
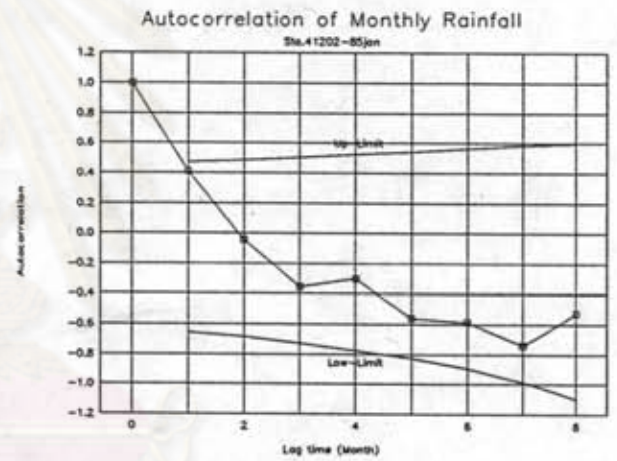
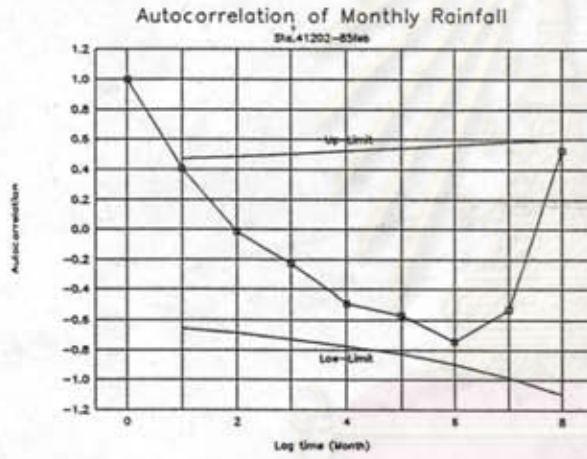
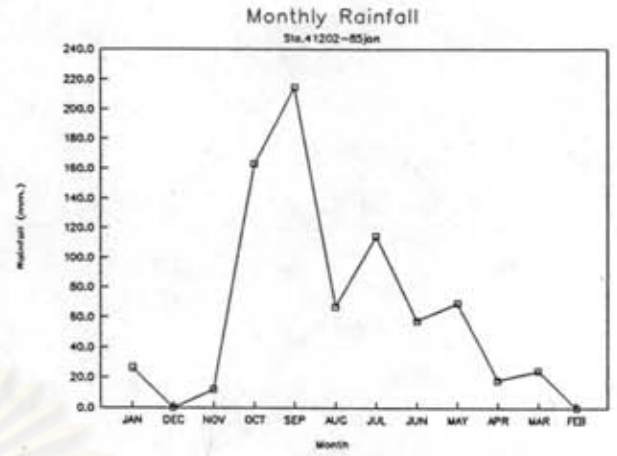
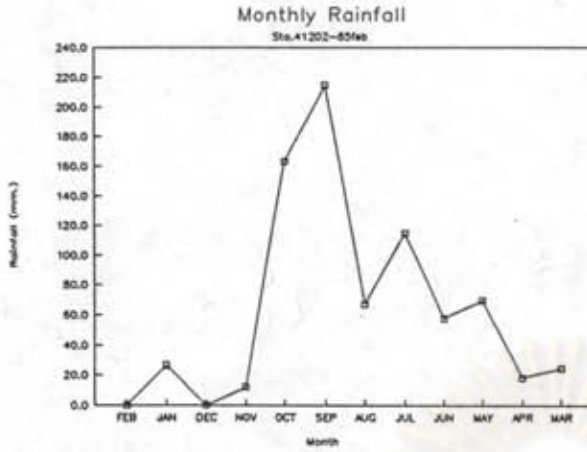


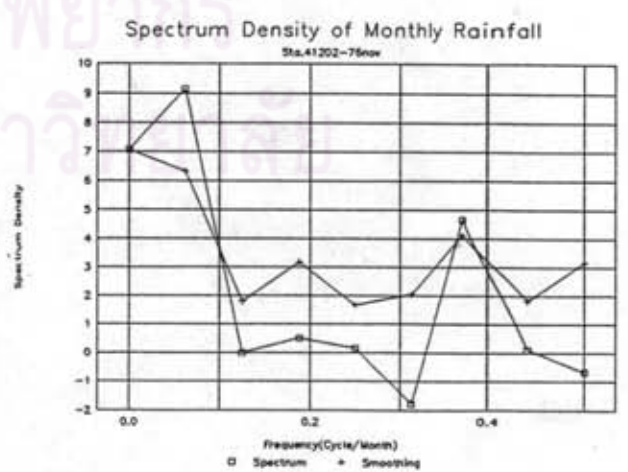
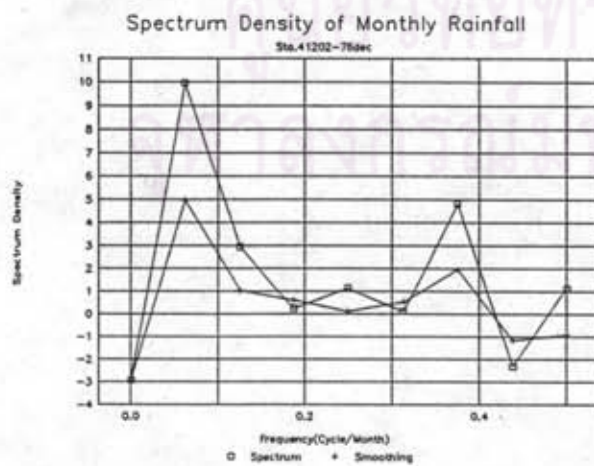
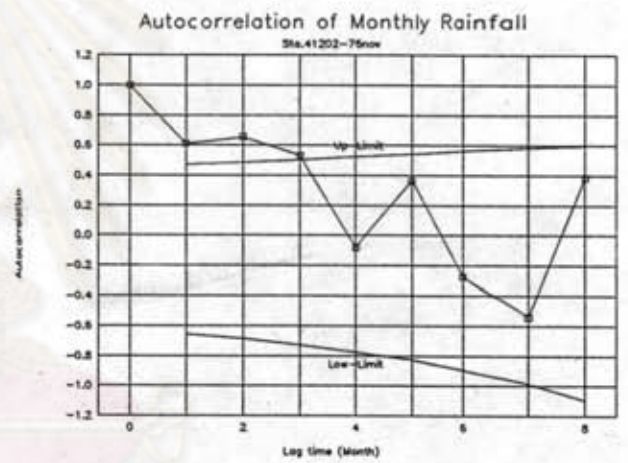
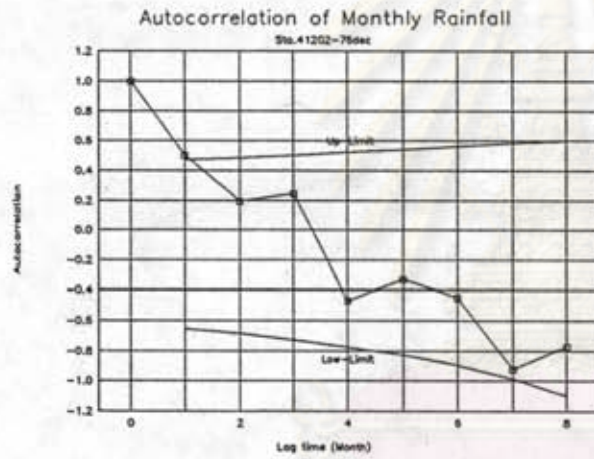
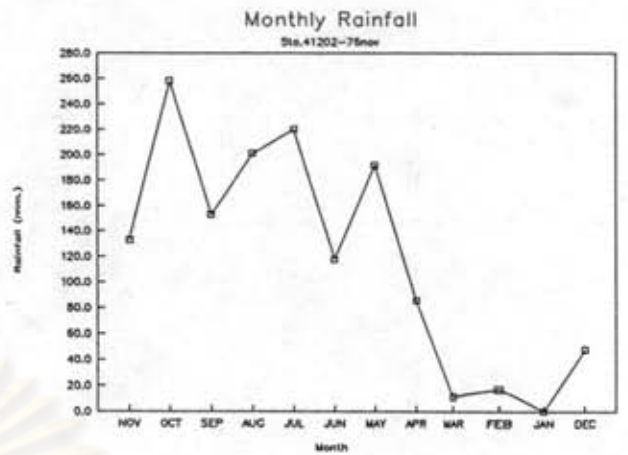
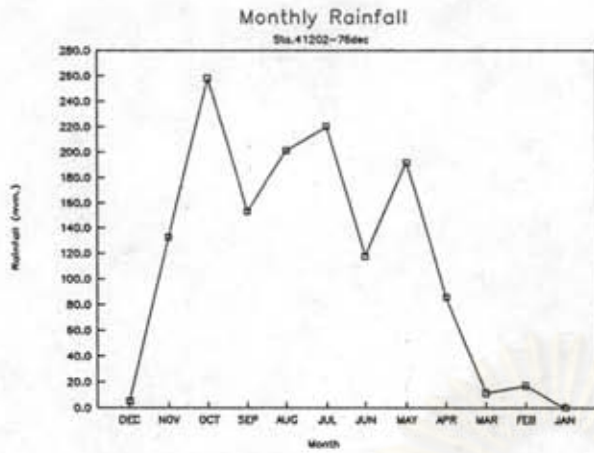


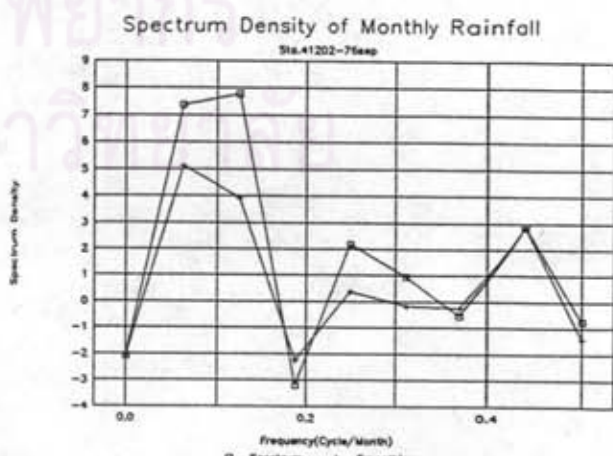
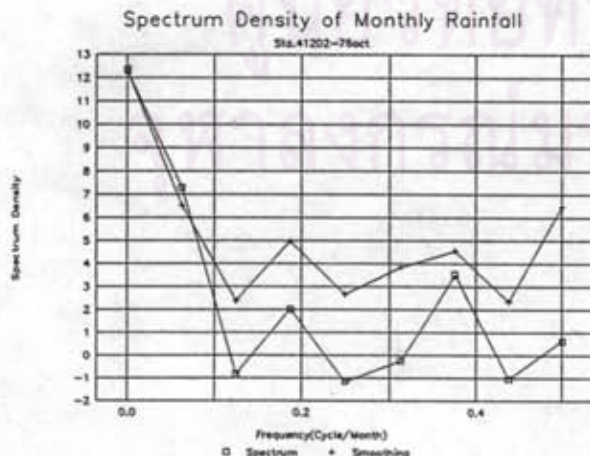
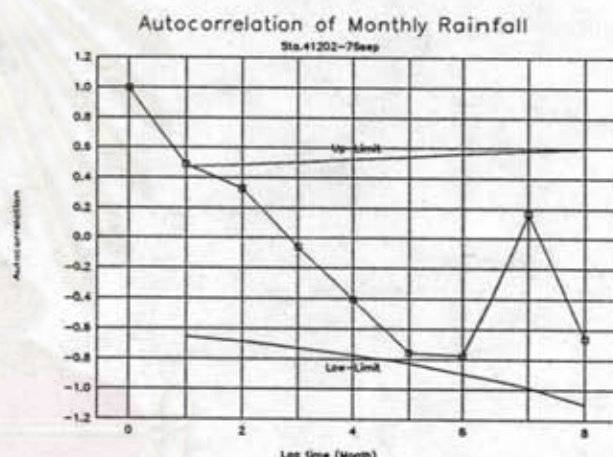
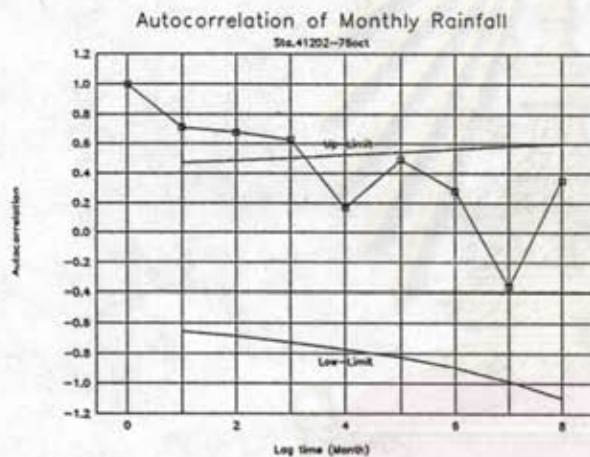
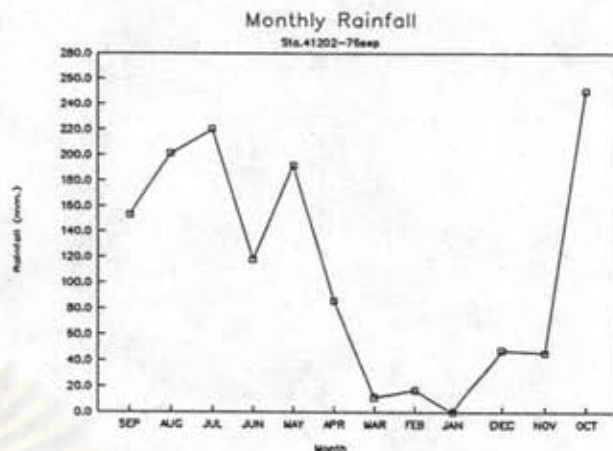
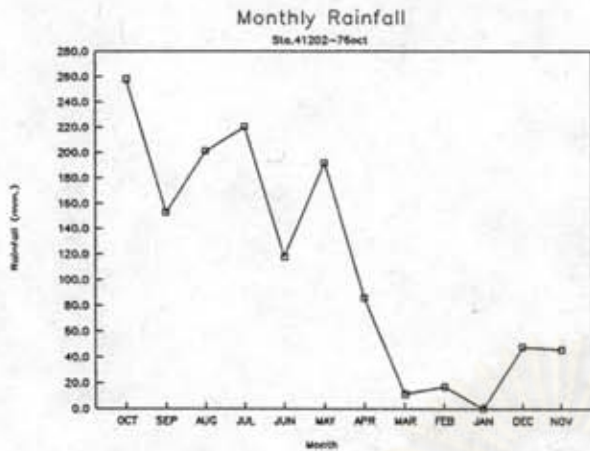


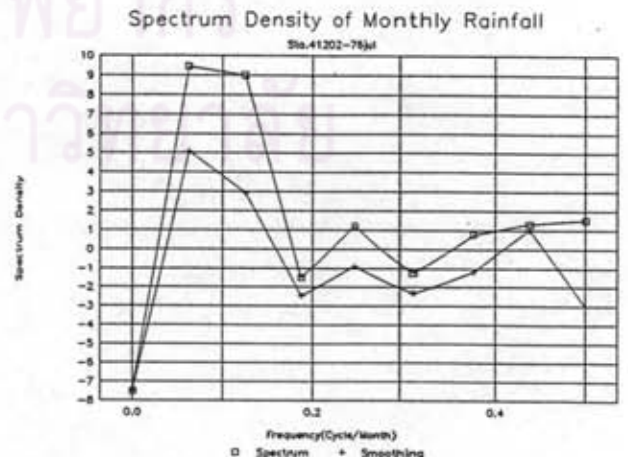
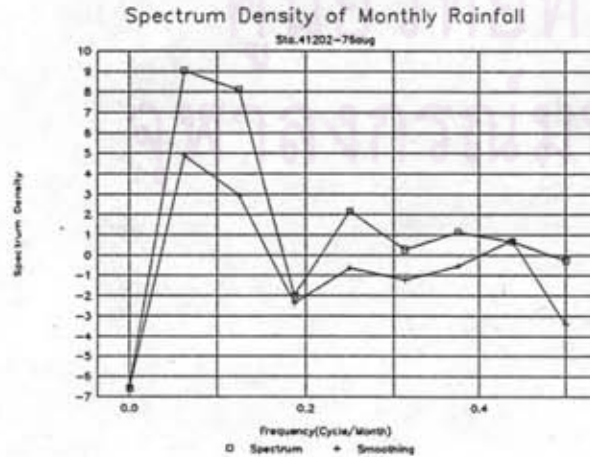
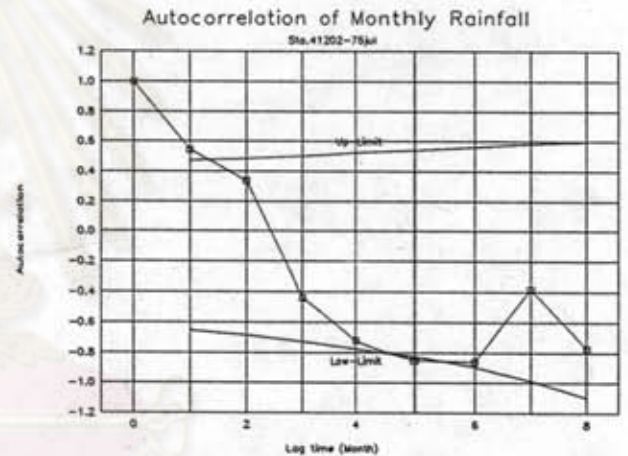
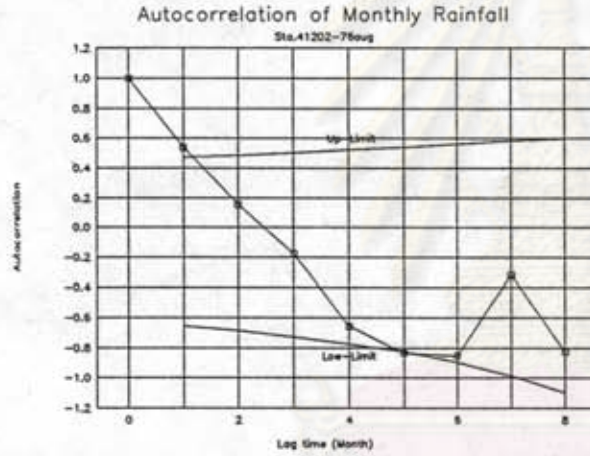
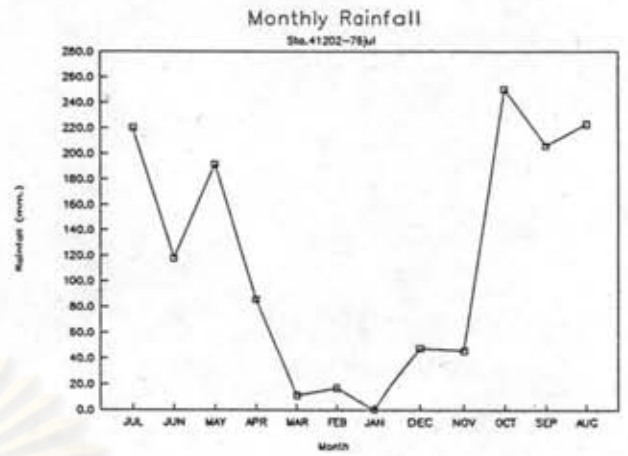
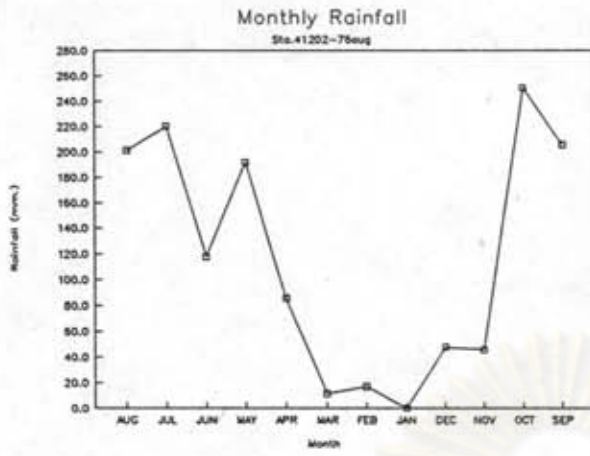


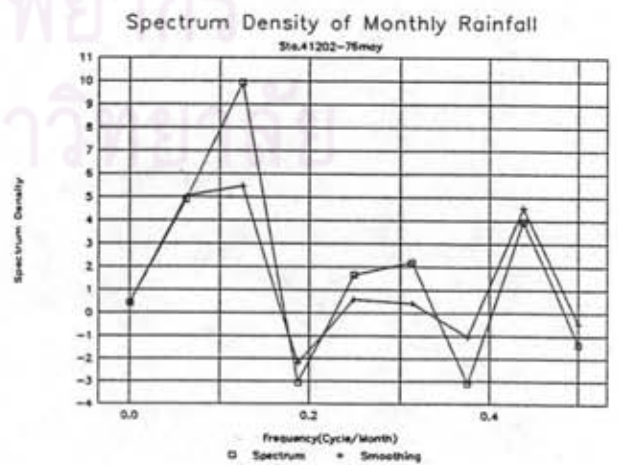
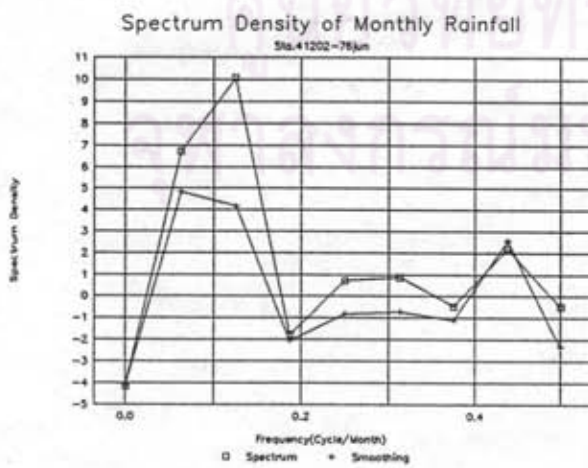
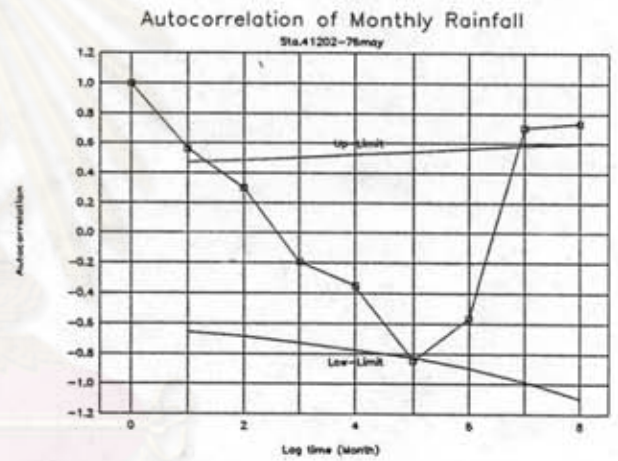
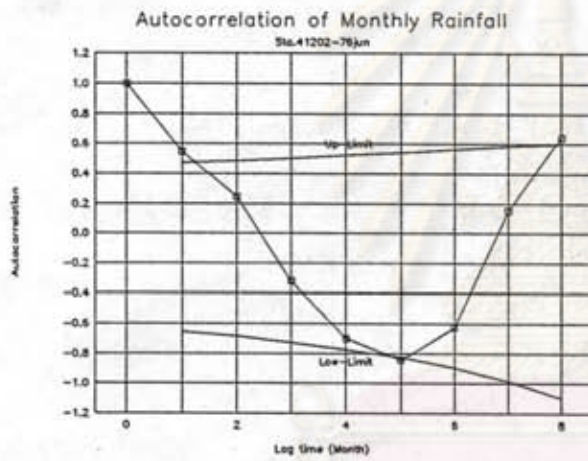
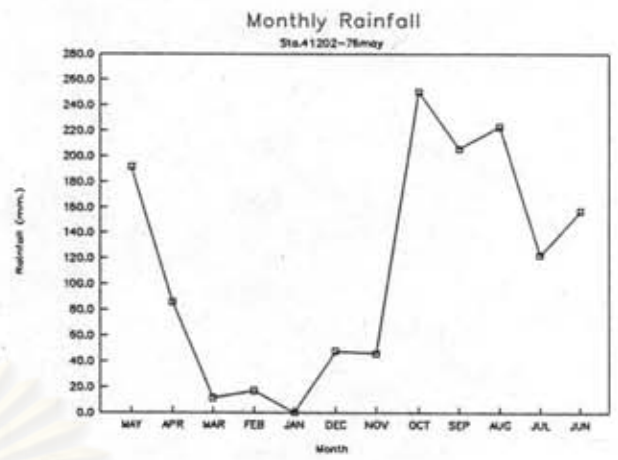
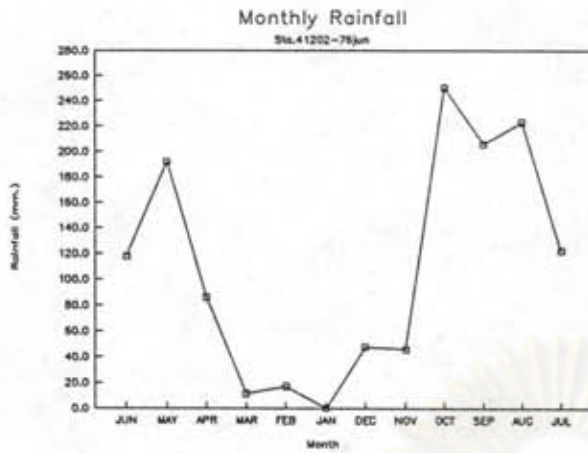


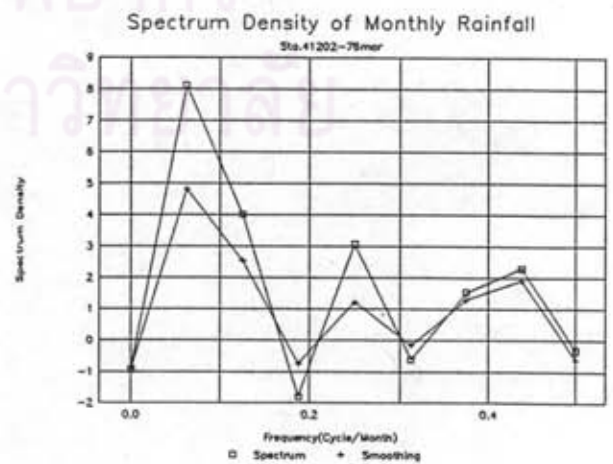
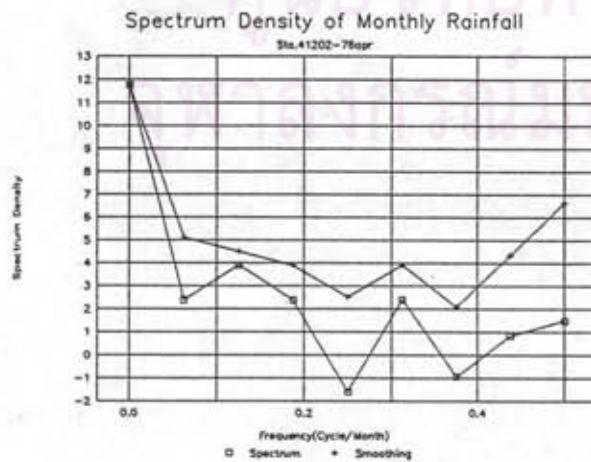
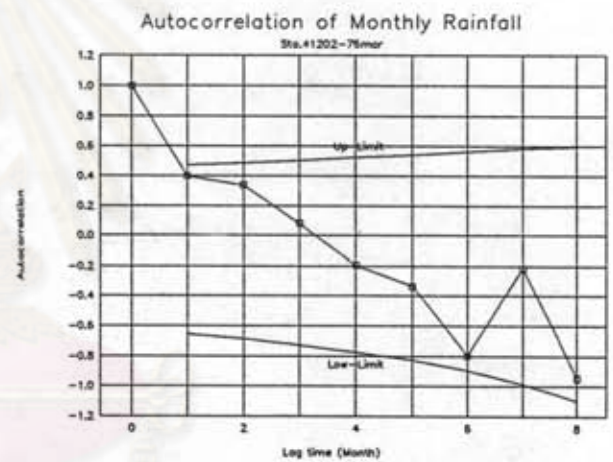
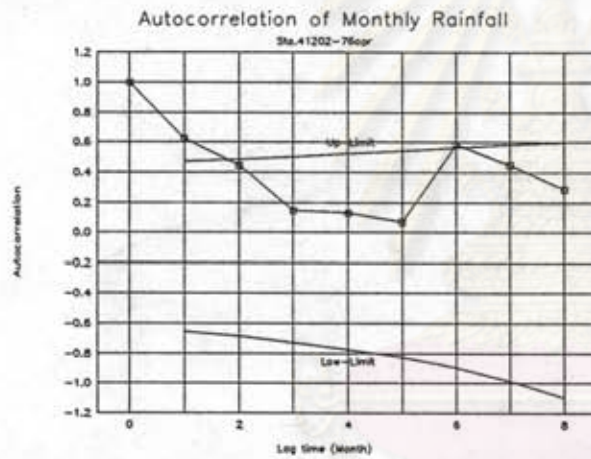
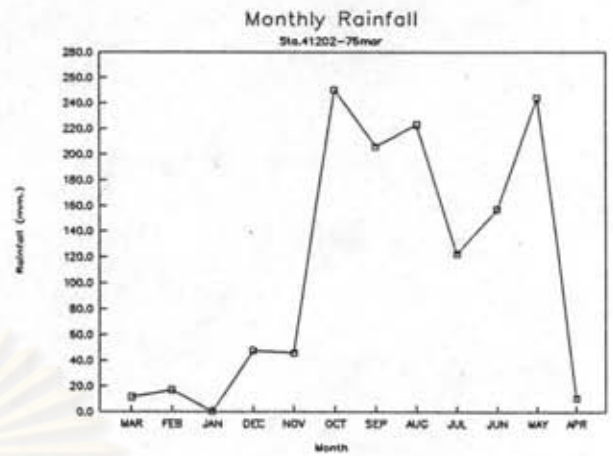
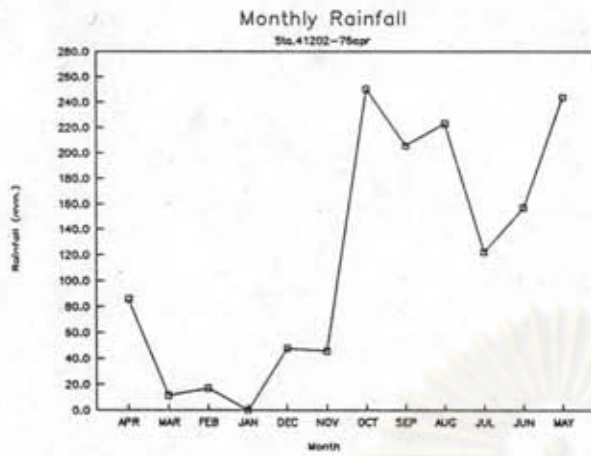


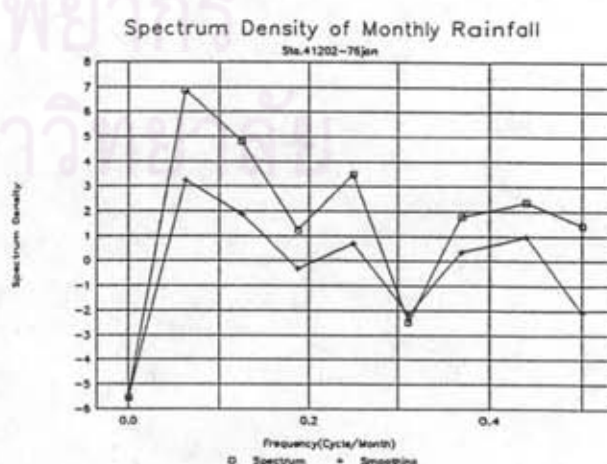
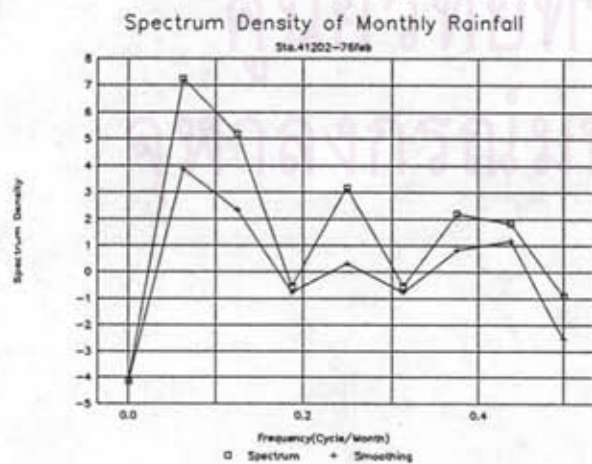
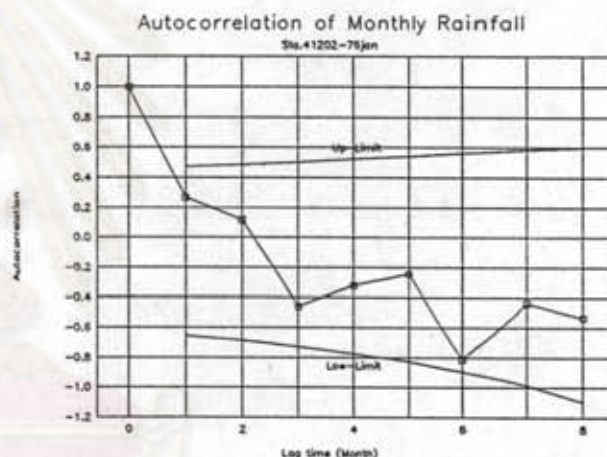
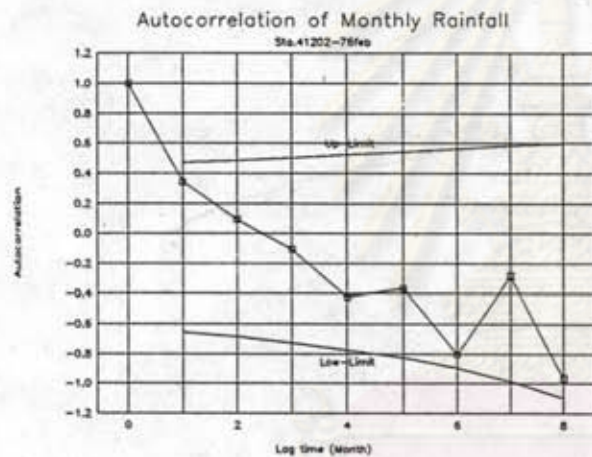
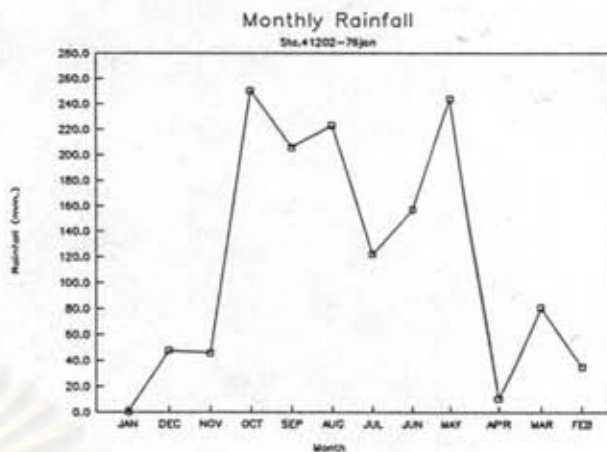
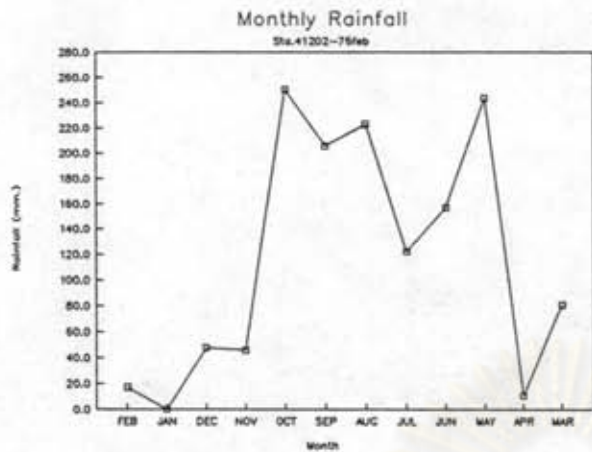


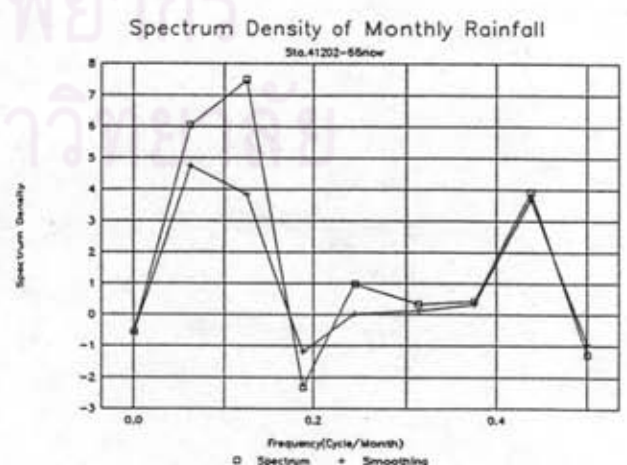
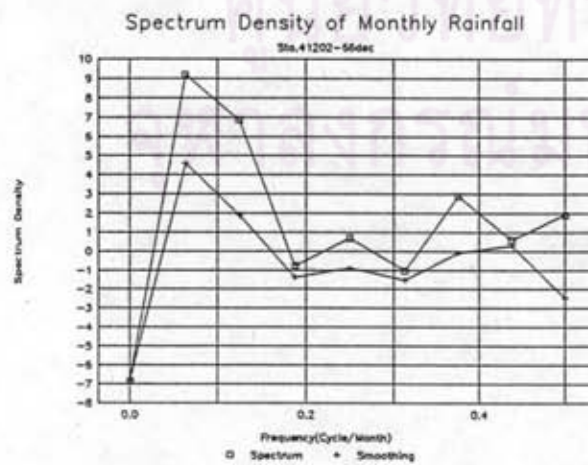
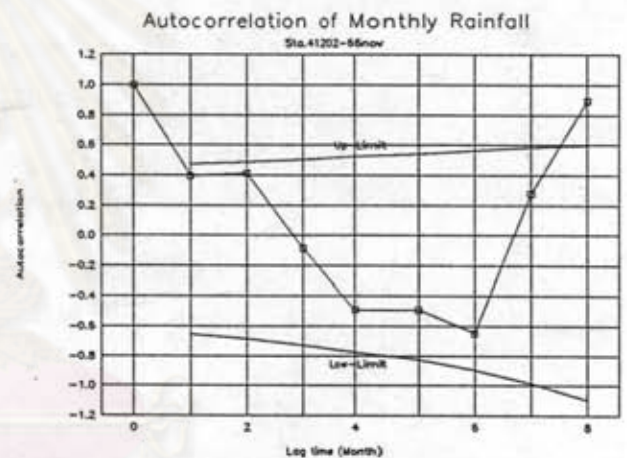
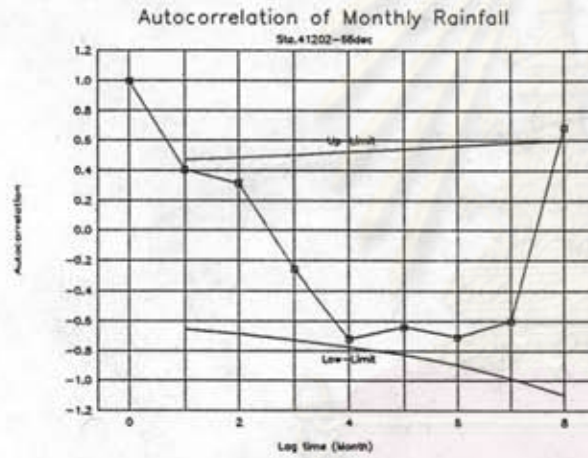
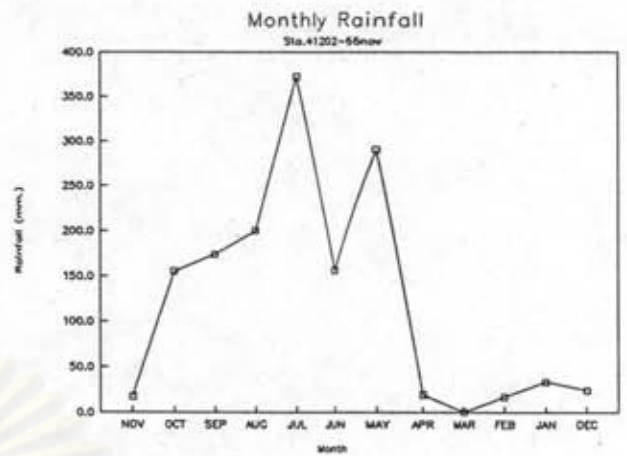
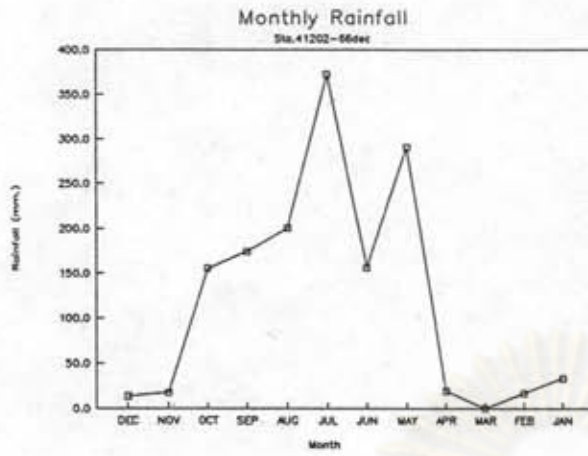


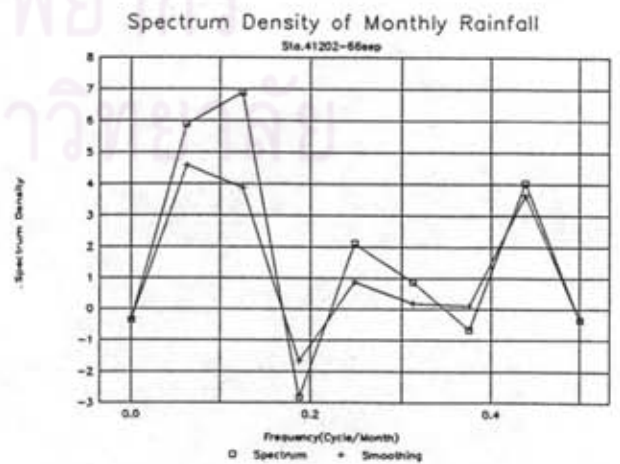
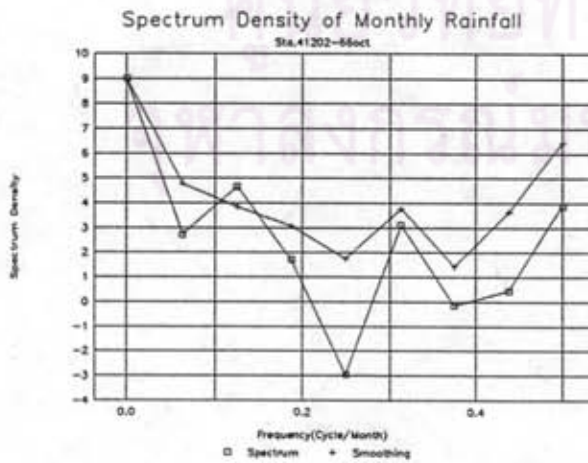
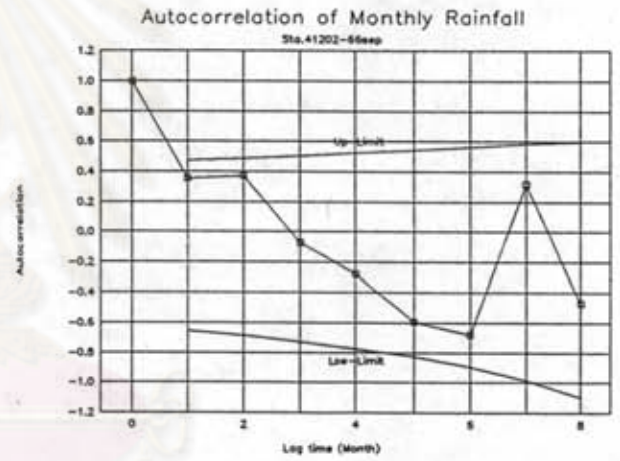
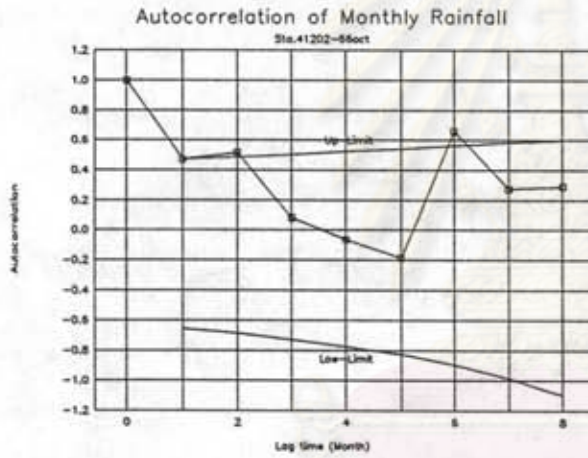
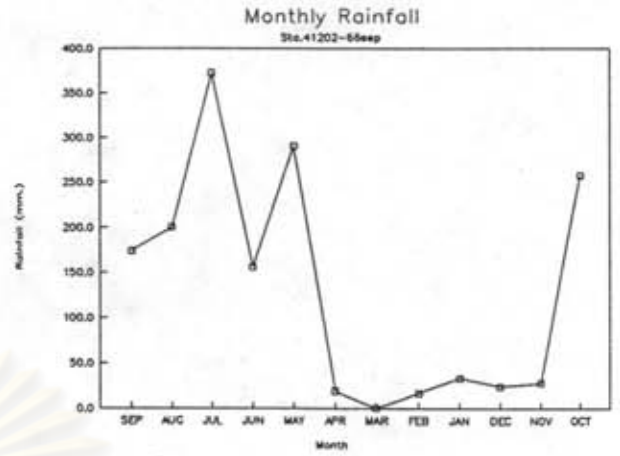
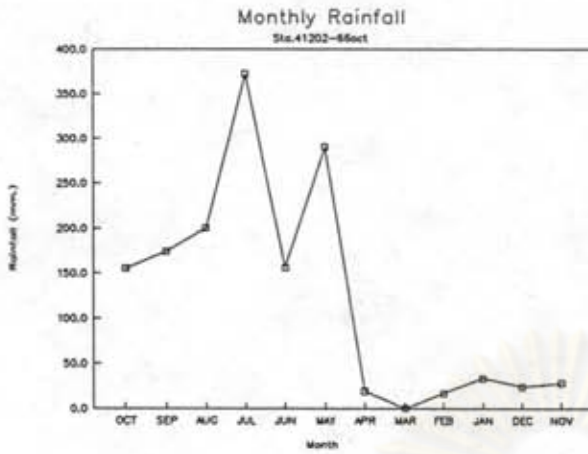


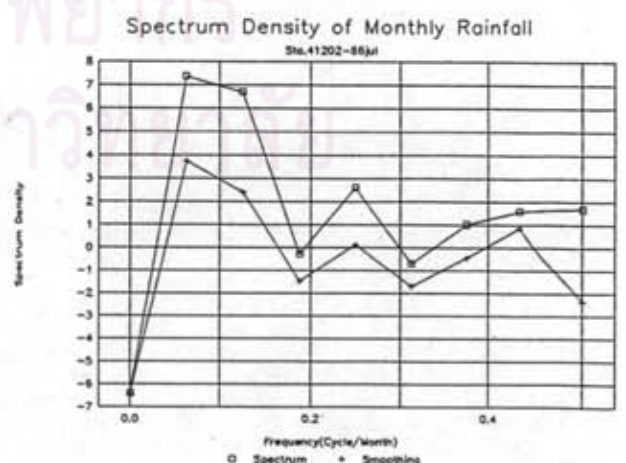
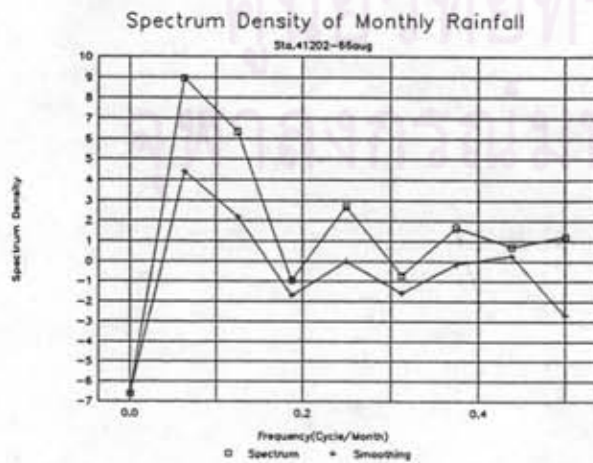
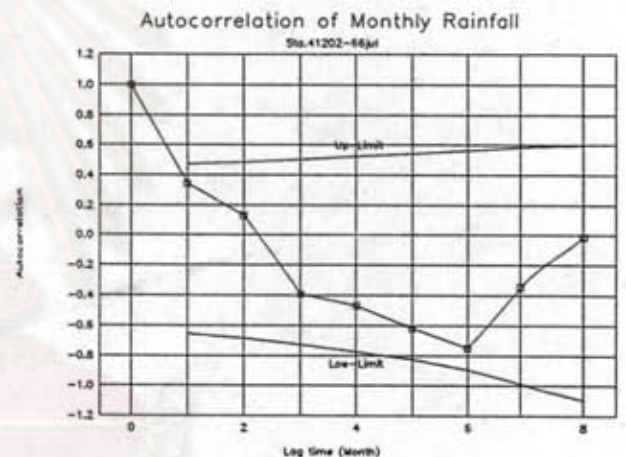
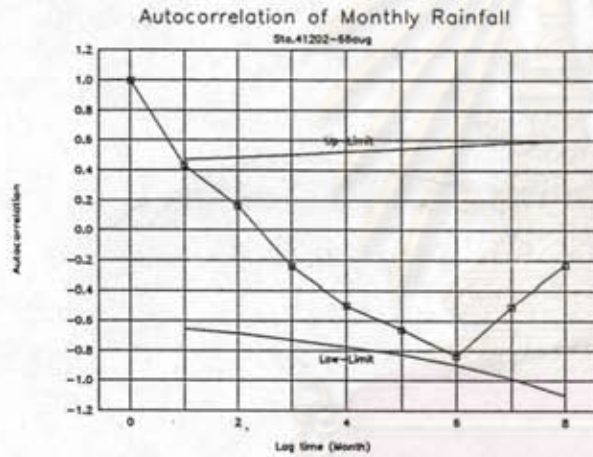
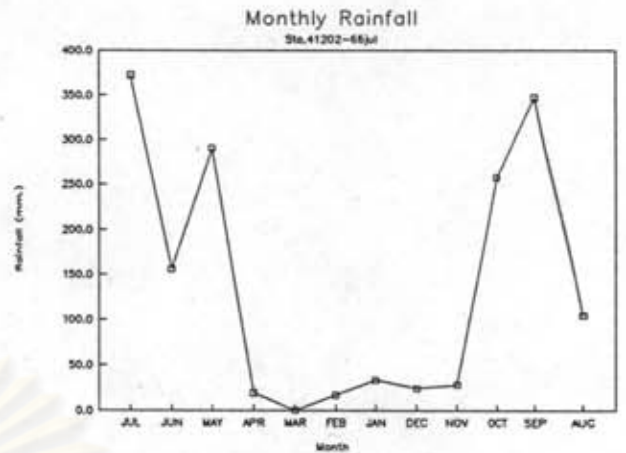
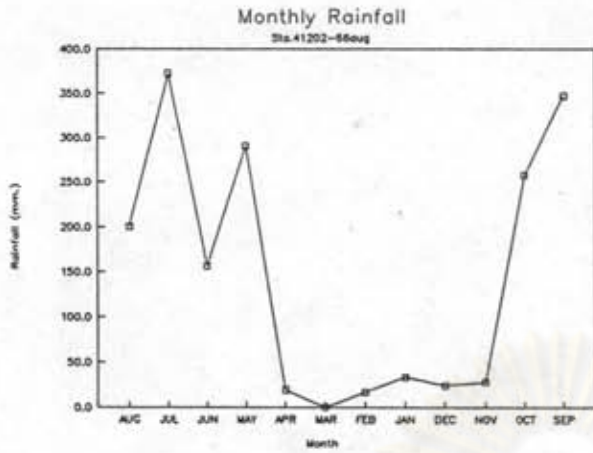


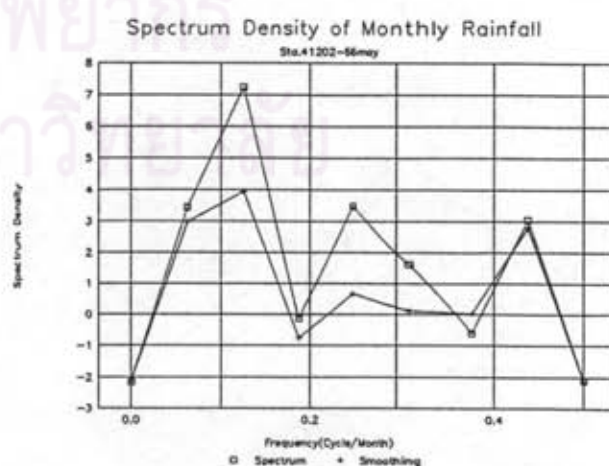
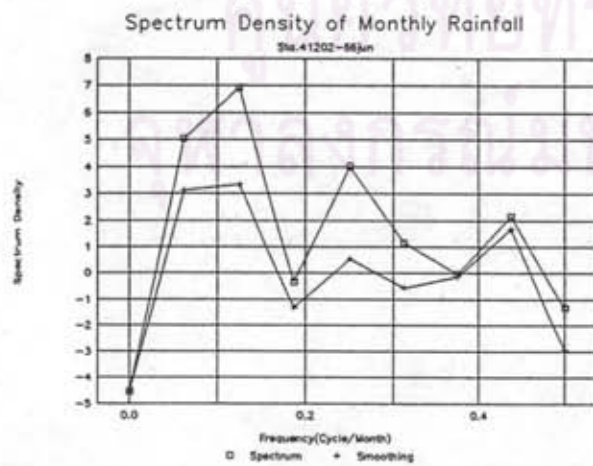
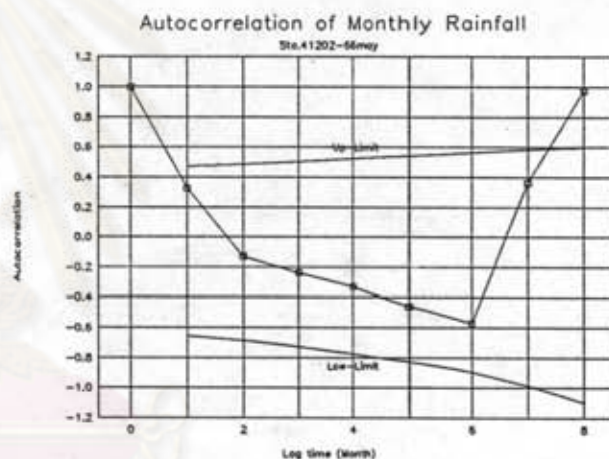
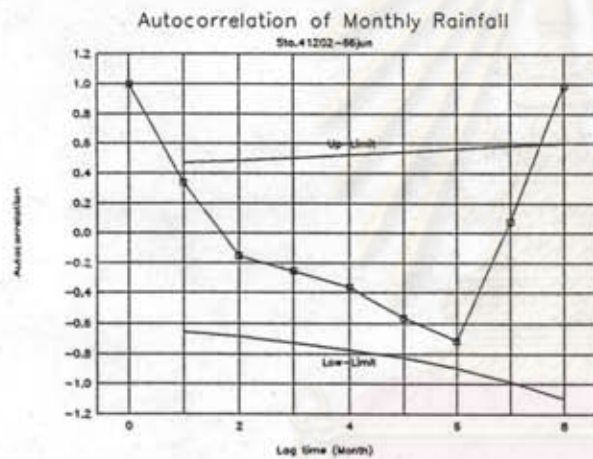
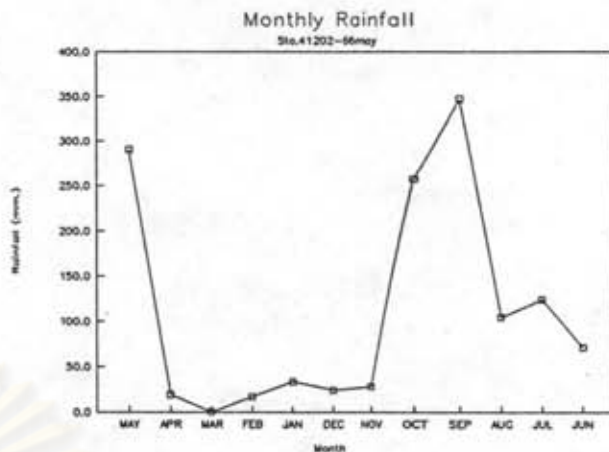
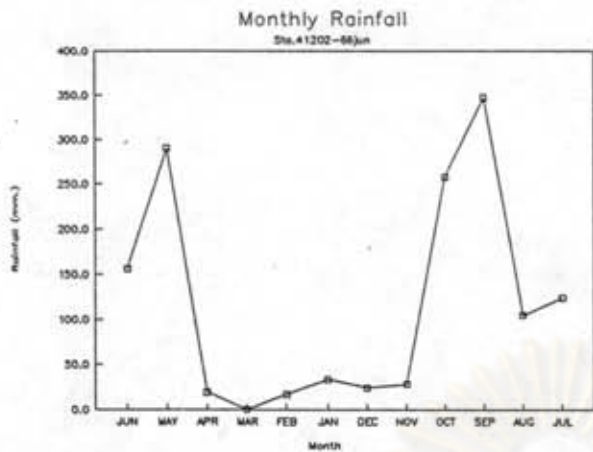


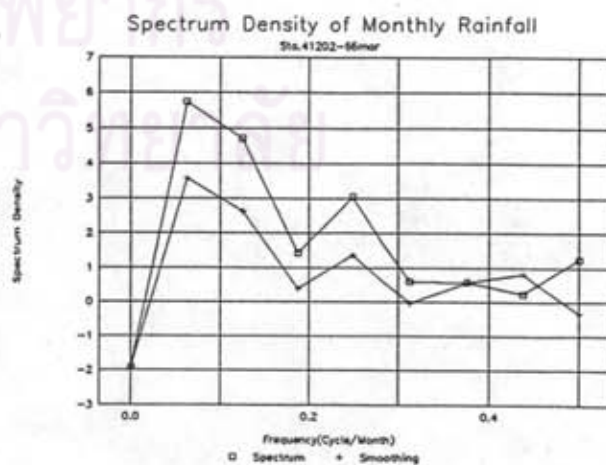
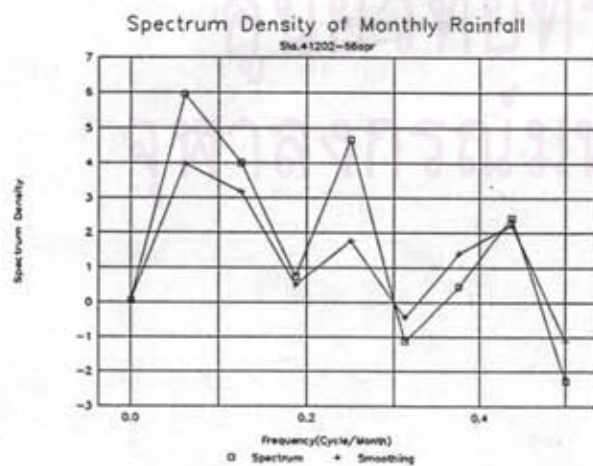
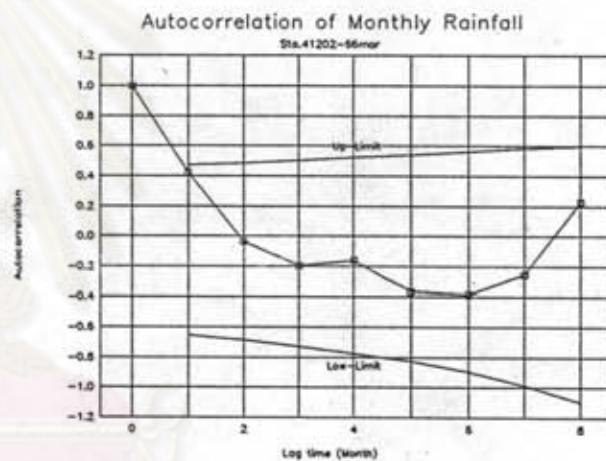
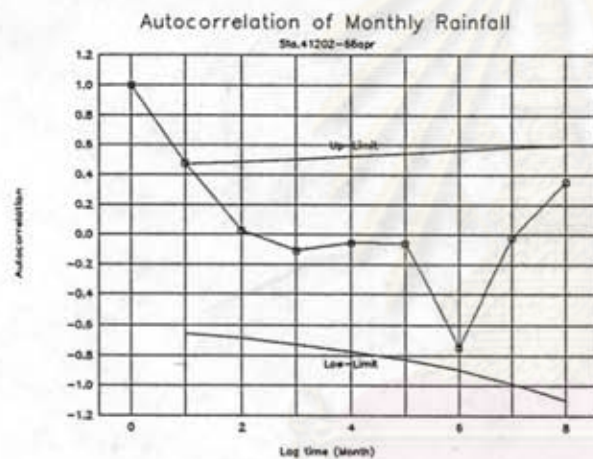
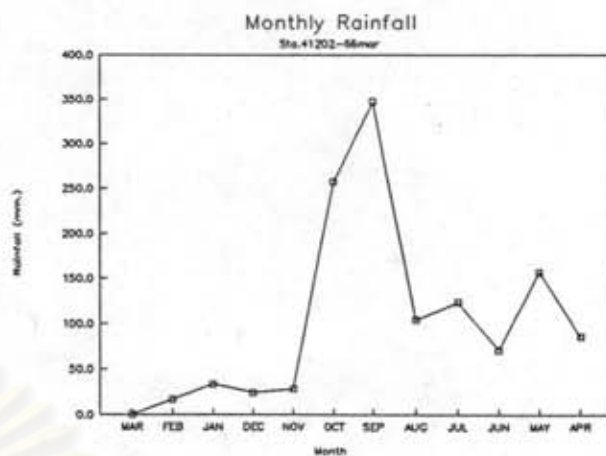
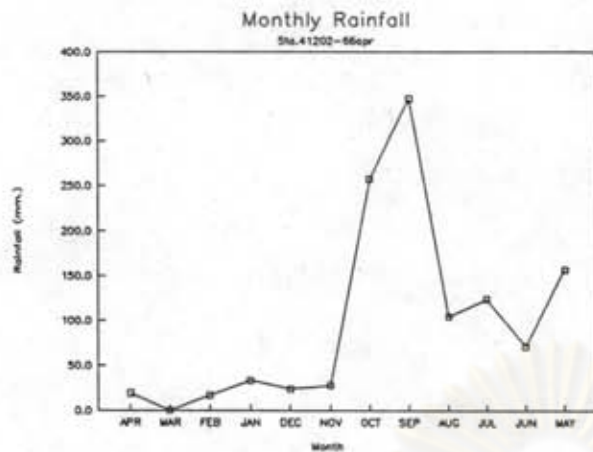


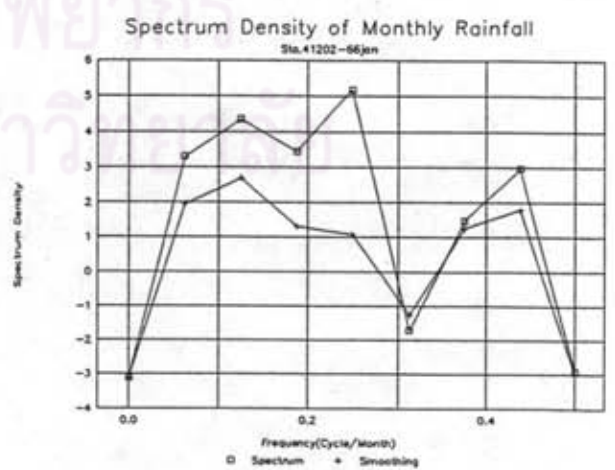
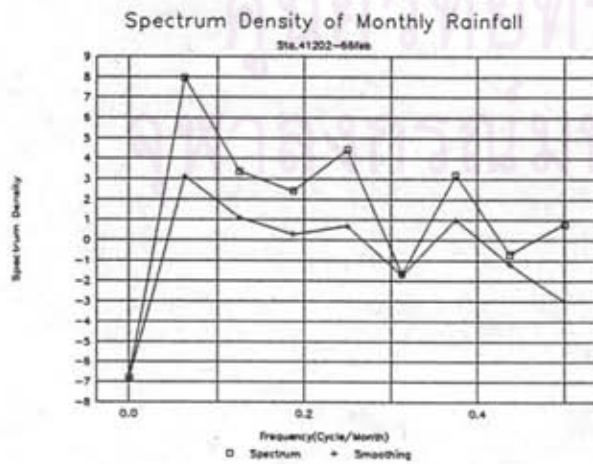
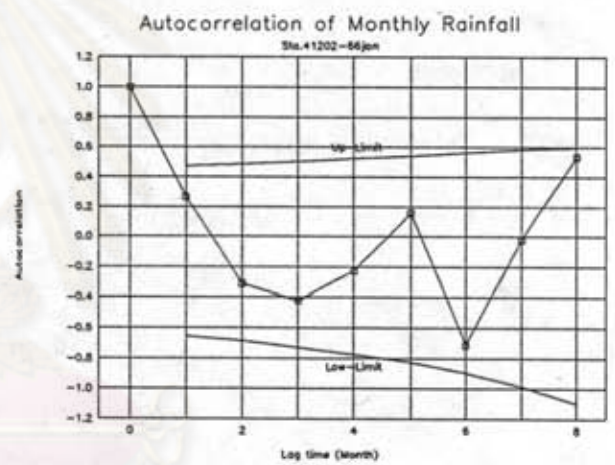
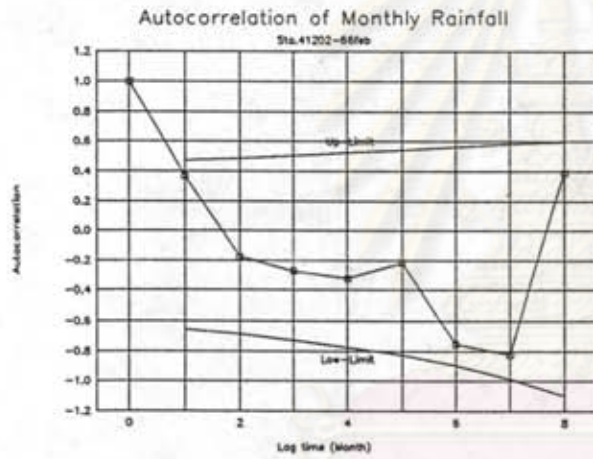
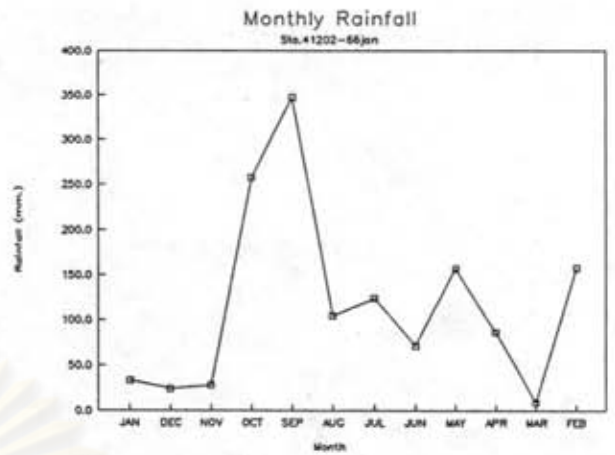
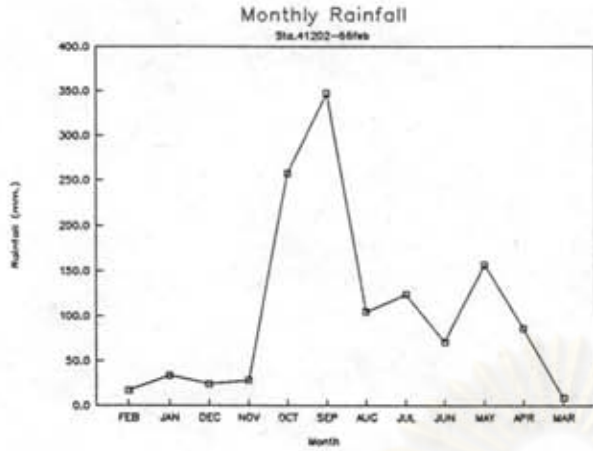


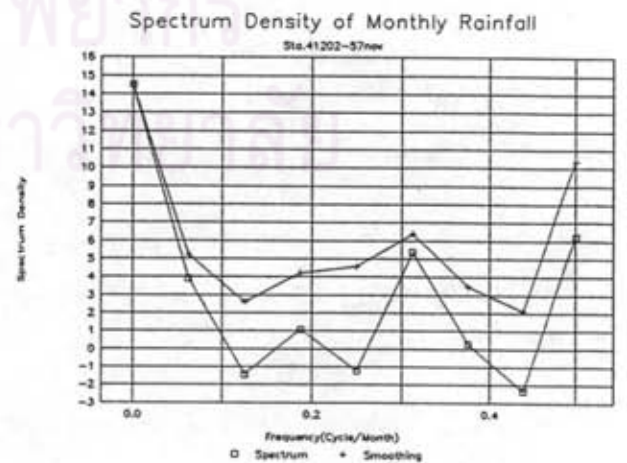
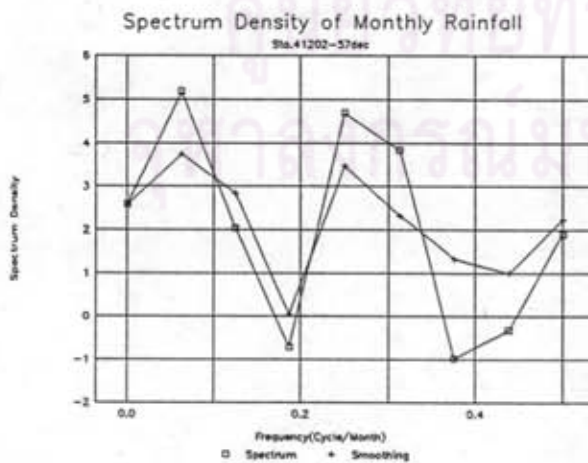
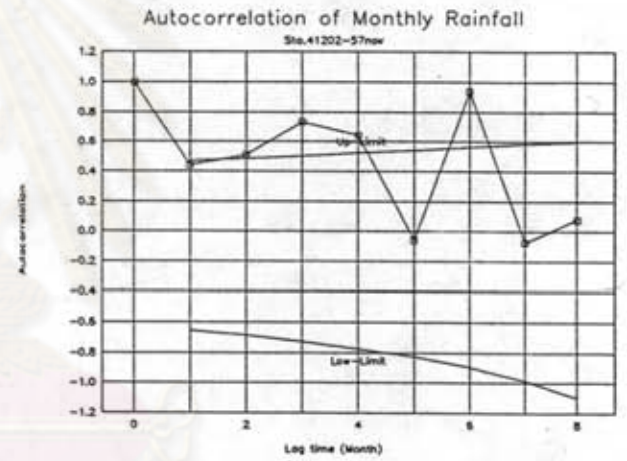
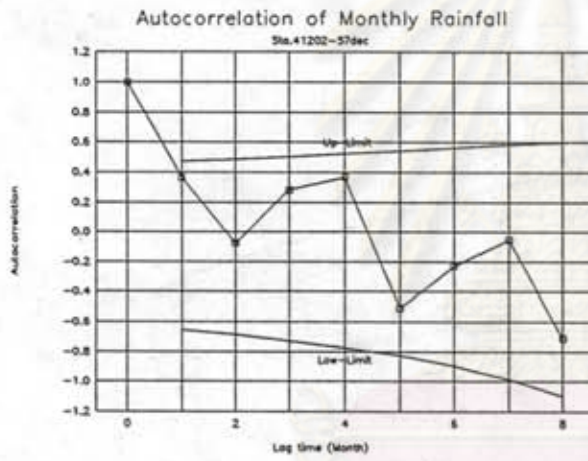
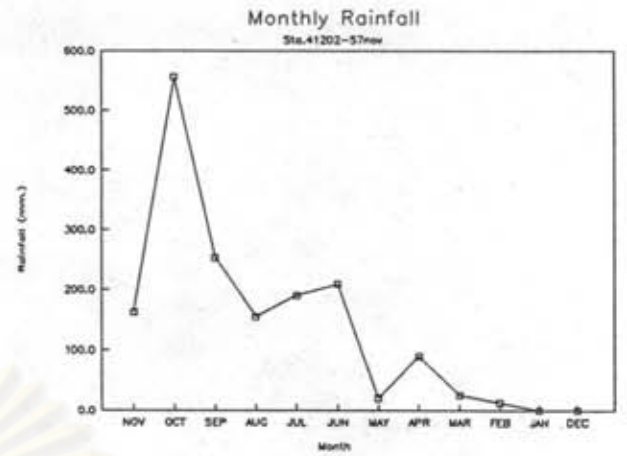
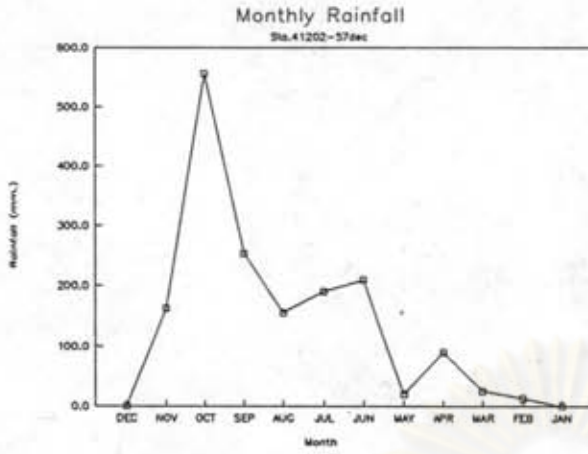


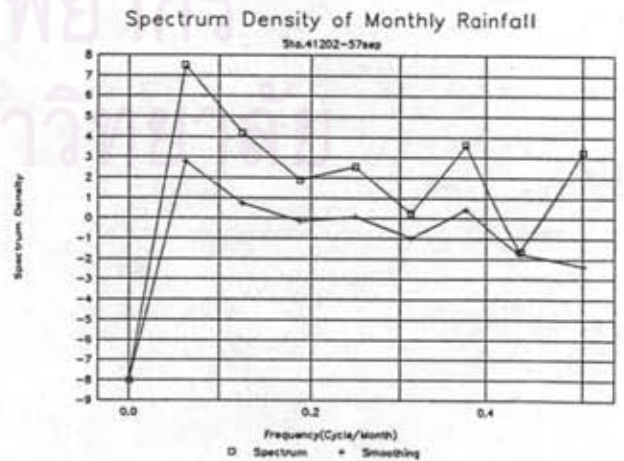
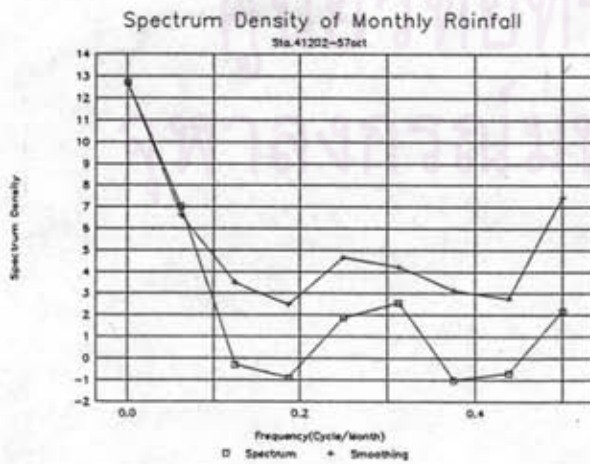
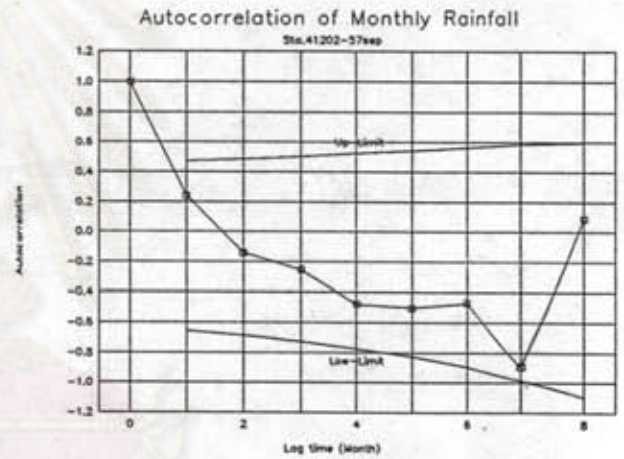
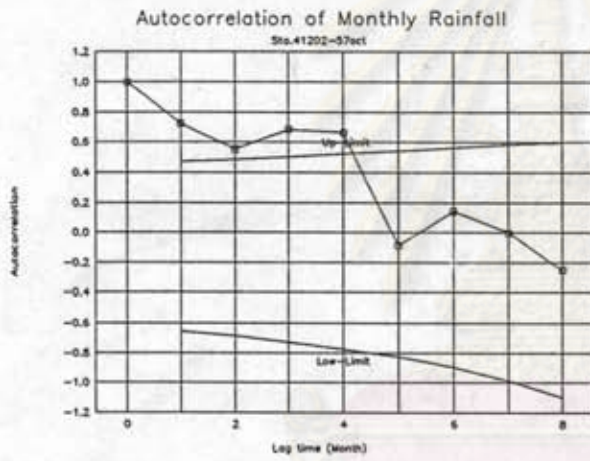
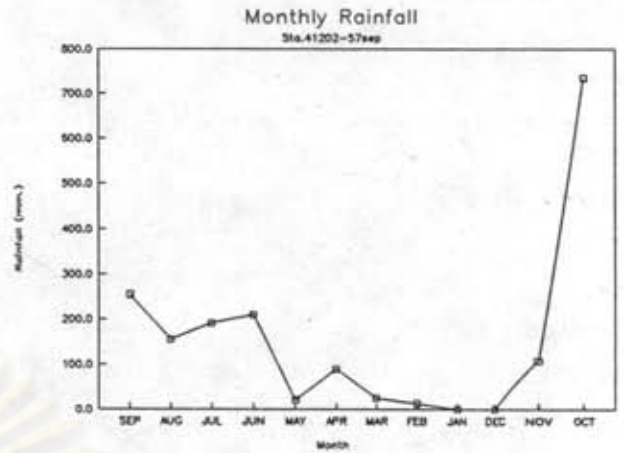
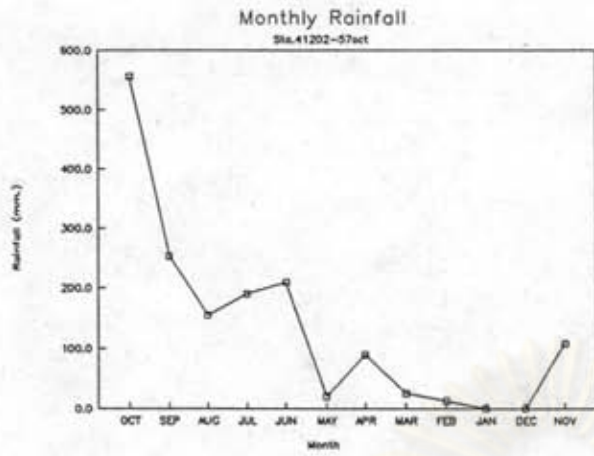


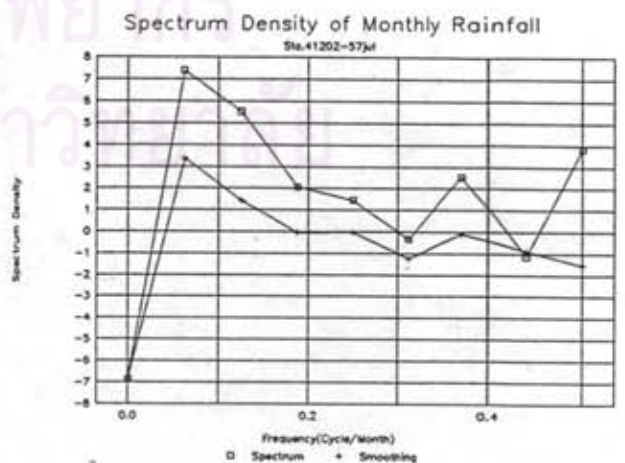
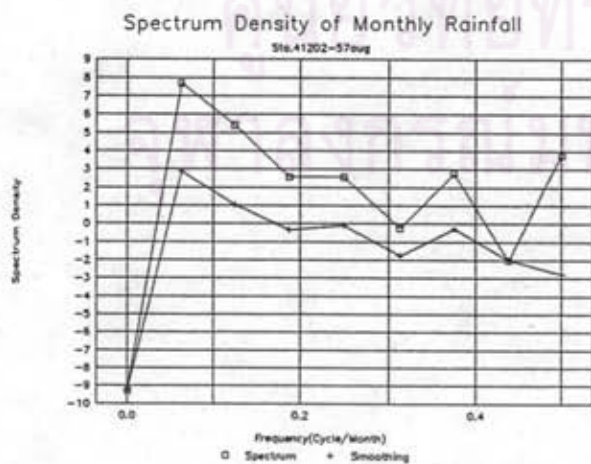
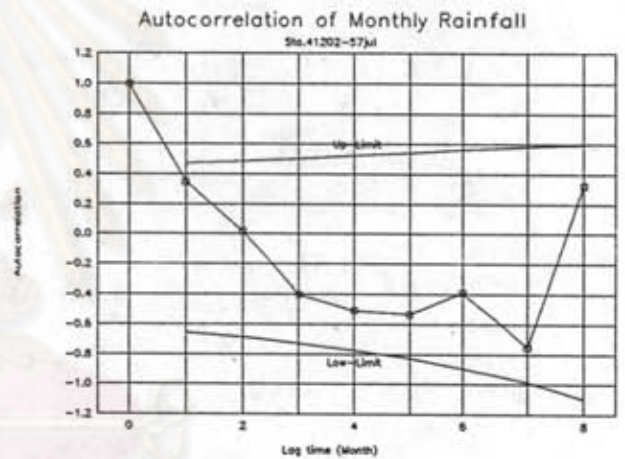
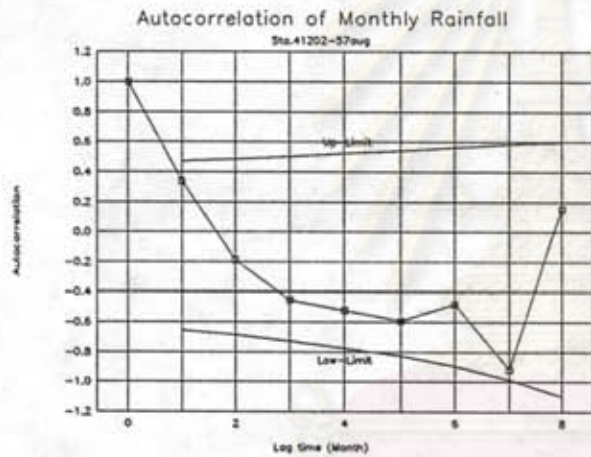
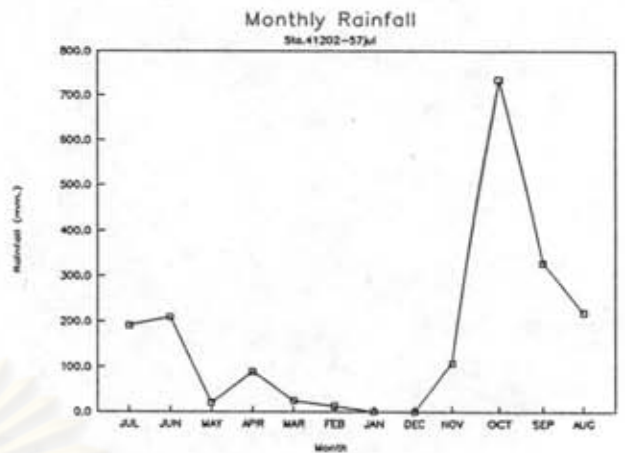
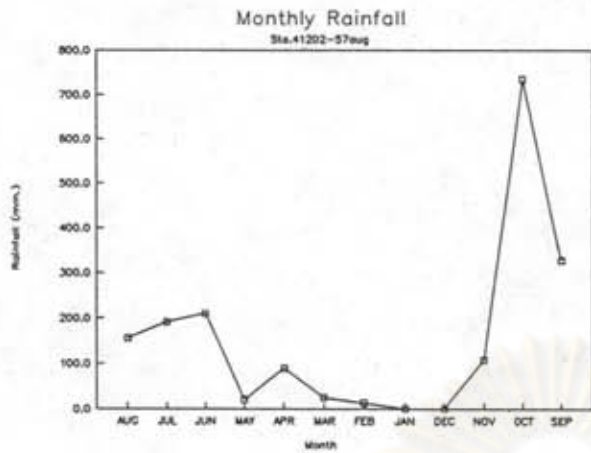


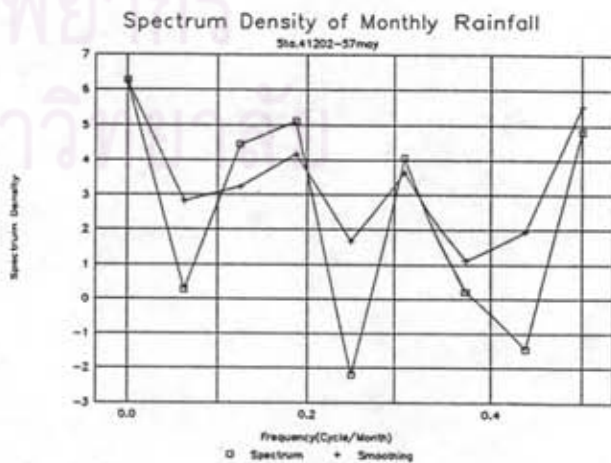
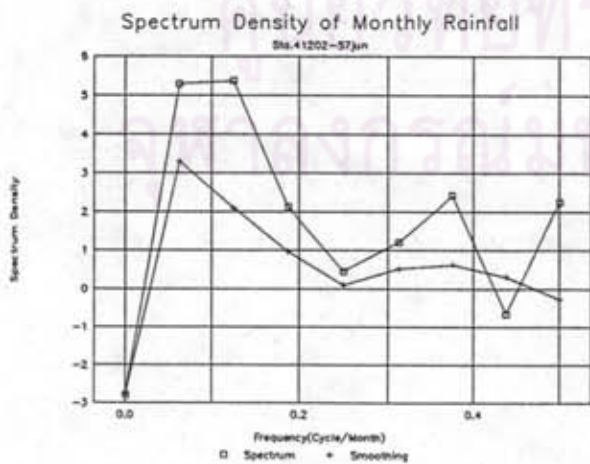
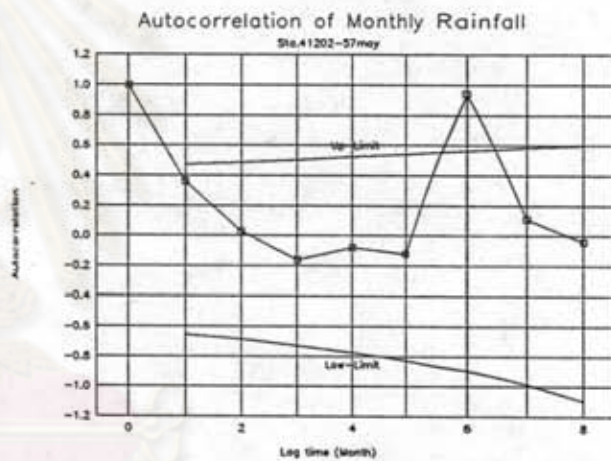
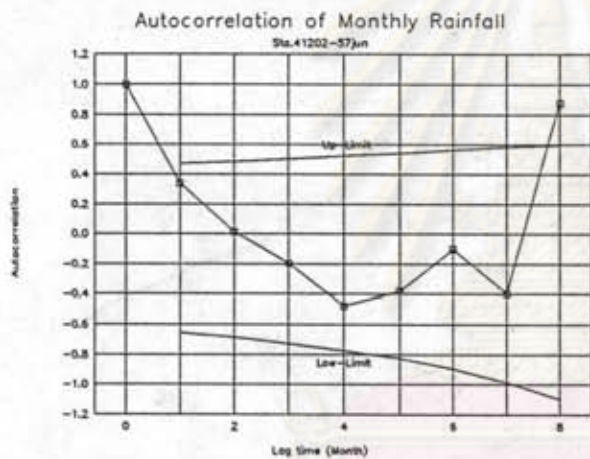
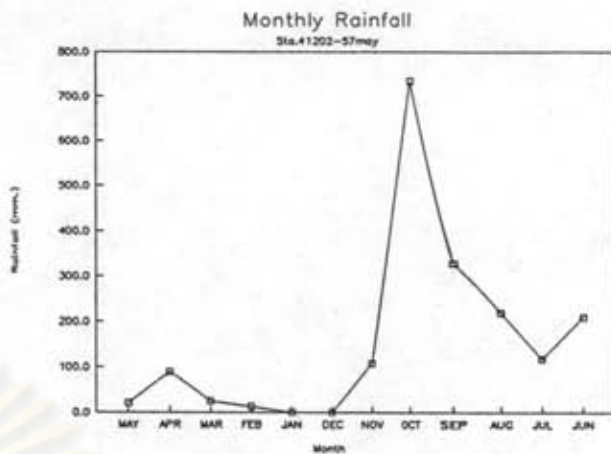
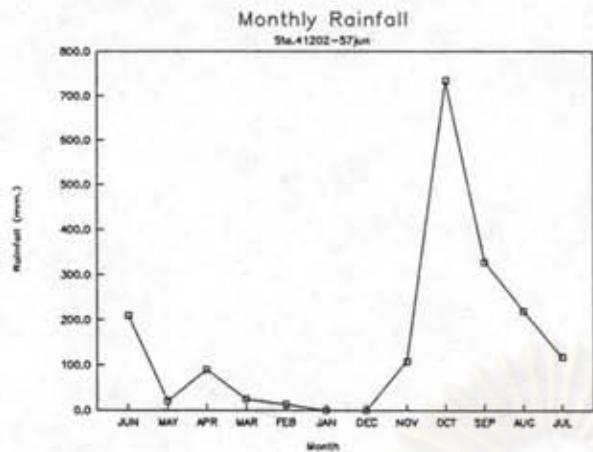


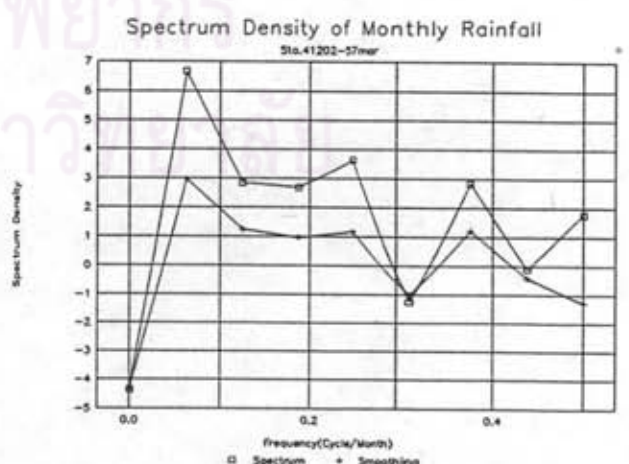
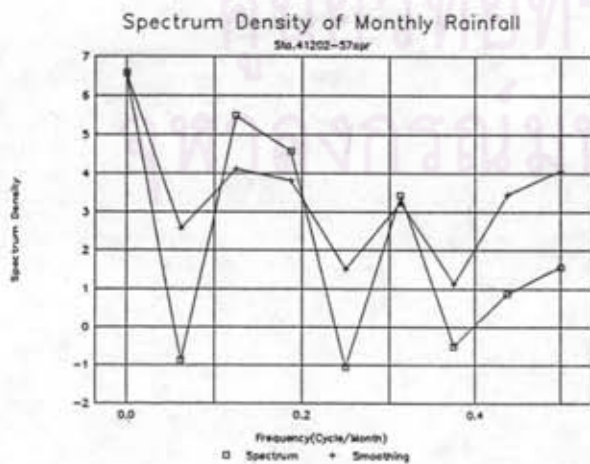
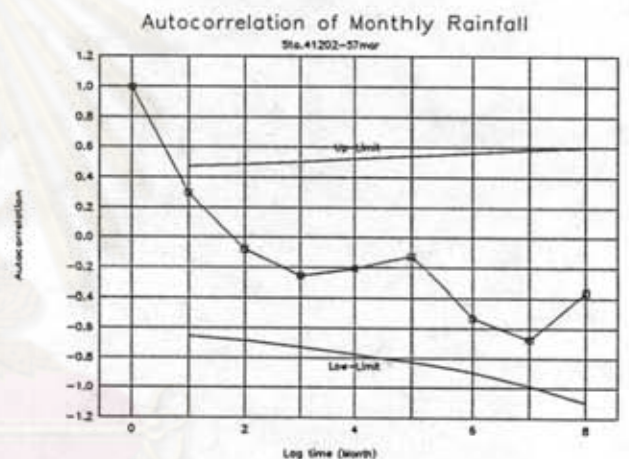
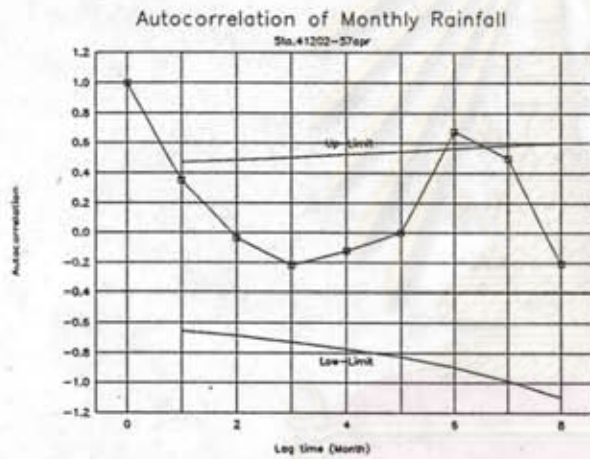
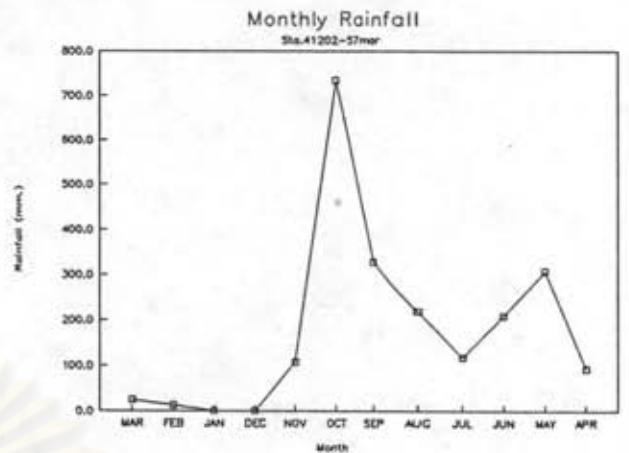
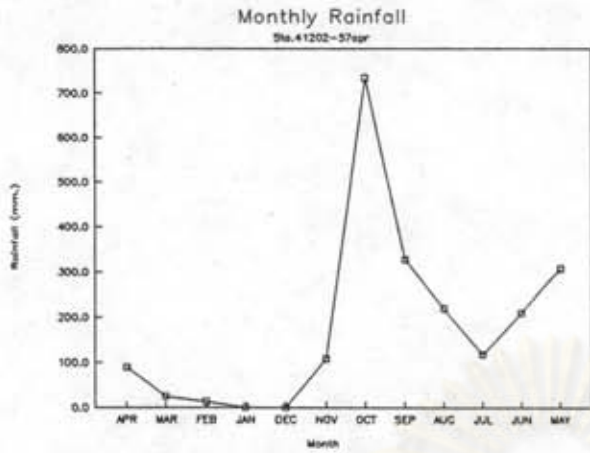


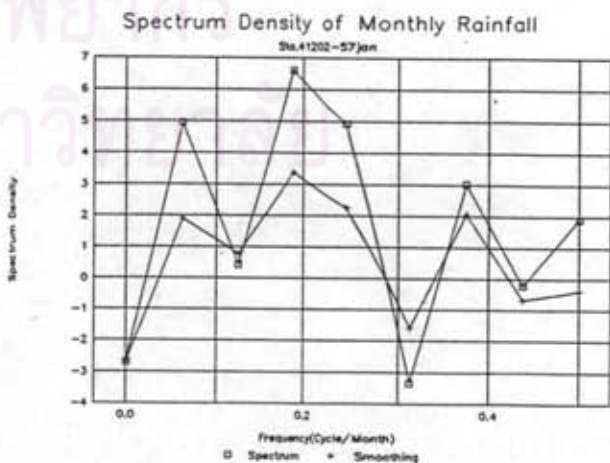
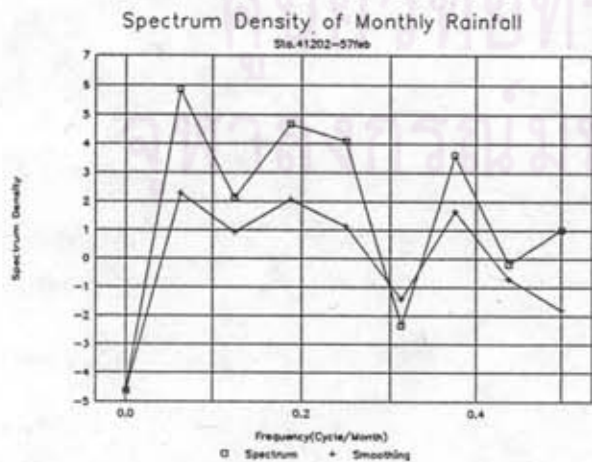
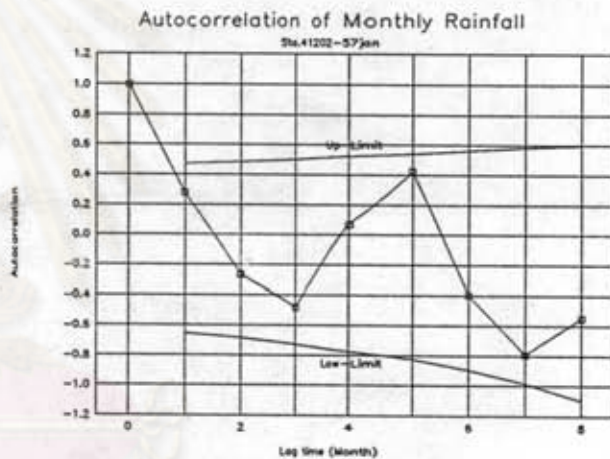
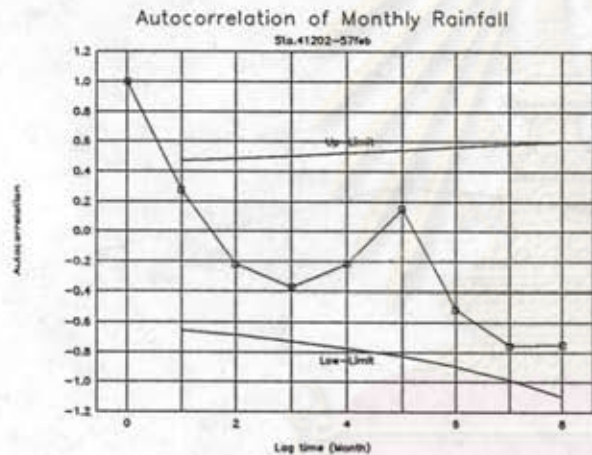
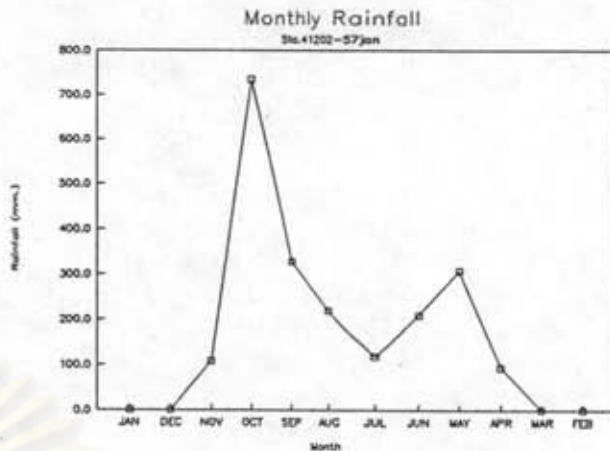
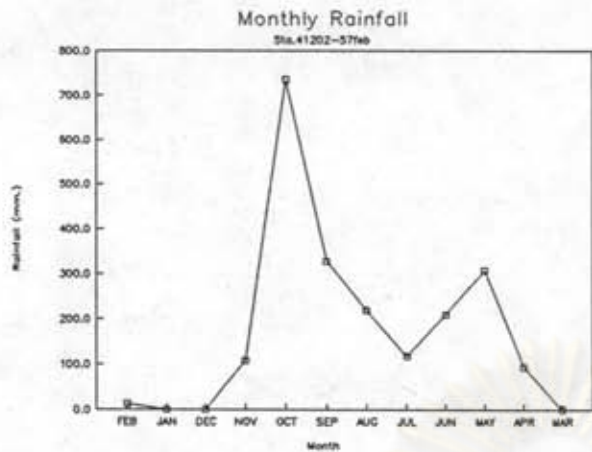












ภาคผนวก ง

โปรแกรมการวิเคราะห์การถดถอย



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย


```

REM -- PROGRAM          -- REGRESSION COEFFICIENTS
REM -----
CLS
DIM X(100), Y(100), Z(4), D$(4)
Z(1) = 1.2816: Z(2) = 1.6449: Z(3) = 2.3263: Z(4) = 3.09
B$(1) = "10%": B$(2) = "5%": B$(3) = "1%": B$(4) = "0.1%"
DEF FNVX (I) = X(I)
DEF FNVY (I) = Y(I)
DEF FNPY (X) = A + B * X
DEF FNT (N1, Z)
  STATIC TT
  K1 = 7 / 9: K2 = 1 - 2 / 9 / N1
  C = SQR((1 - K1) * (1 - K2) * (K1 * K1 / (1 - K1) + K2 * K2 / (1 - K2) - Z
  C = K1 * K2 + Z * C
  D = K2 * K2 - (1 - K2) * Z * Z
  TT = (C / D) ^ 1.5
  FNT = TT
END DEF

GOSUB readdatas
GOSUB calccoeffs
GOSUB corrs
GOSUB printcoeffs
GOSUB deviations
GOSUB forecasts
END

readdatas: REM
  INPUT "RUN DATA FILENAME :"; DA$
  LPRINT "RUN DATA FILENAME :"; DA$
  OPEN DA$ FOR INPUT AS #1
  INPUT #1, N
  FOR I = 1 TO N
    INPUT #1, Y(I)
  NEXT I
  CLOSE #1
  FOR I = 1 TO N
    X(I) = I
  NEXT I
  RETURN

calccoeffs: REM
  SX = 0: SY = 0: SXY = 0: SXX = 0: SYY = 0
  FOR I = 1 TO N
    XI = FNVX(I): YI = FNVY(I)
    SX = SX + XI: SY = SY + YI
    SXY = SXY + XI * YI
    SXX = SXX + XI * XI
    SYY = SYY + YI * YI
  
```

```

NEXT I
MX = SX / N: MY = SY / N
VX = (SXX - MX * SX) / (N - 1): VY = (SYY - MY * SY) / (N - 1)
COV = (SXY - MX * SY) / (N - 1)
B = COV / VX: A = MY - B * MX
RETURN

```

corrs: REM

```

R = COV / SQR(VX * VY): T = R * SQR((N - 2) / (1 - R * R))
SIG$ = "not significant"
FOR I = 1 TO 4
  TS = FNT(N - 2, Z(I))
  IF ABS(T) > TS THEN SIG$ = "singificant at " + B$(I)
NEXT I
LPRINT "Correlation coefficient r ="; R; " - "; SIG$
LPRINT "Explained variability "; R * R * 100; "%"
RETURN

```

printcoeffs: REM

```

LPRINT " VARIABLE      MEAN      ST DEV"
LPRINT "  -----      ----      -"
LPRINT "    X      "; MX; TAB(23); SQR(VX)
LPRINT "    Y      "; MY; TAB(23); SQR(VY)
LPRINT "Regression line is Y ="; A;
IF B < 0 THEN LPRINT "-"; ABS(B); "X" ELSE LPRINT "+"; B; "X"
RETURN

```

deviations: REM

```

LPRINT "Do you want the deviations (Y/N) ";
PRINT "Do you want the deviations (Y/N) ";
GOSUB ansyorns
SSD = 0: IF AN$ = "N" THEN 5100
LPRINT "X VALUE      Y VALUE      Y(PRED)      DEVIATN"
LPRINT "-----      -"
5100 FOR I = 1 TO N
  YP = FNPY(X(I))
  DEV = Y(I) - YP
  SSD = SSD + DEV * DEV
  IF AN$ = "Y" THEN LPRINT X(I), Y(I), YP, DEV
NEXT I
S = SQR(SSD / (N - 2))
LPRINT "Sum of squared deviations = "; SSD
LPRINT "Residual standard deviation = "; S
RETURN

```

forecasts: REM

```

6010 LPRINT "Do you want a(nother) forecast (Y/N) ";
PRINT "Do you want a(nother) forecast (Y/N) ";
GOSUB ansyorns

```

```

IF AN$ = "N" THEN RETURN
PRINT "What is your value of X "; : INPUT X
LPRINT "What is your value of X "; X
LPRINT " X ="; X; " Y ="; FNPY(X)
PRINT "Significance level (1=10%,2=5%,3=1%,4=0.1%) "; : INPUT GET$
LPRINT "Significance level (1=10%,2=5%,3=1%,4=0.1%) "; GET$
A$ = GET$: J = VAL(A$): LPRINT J; : T = FNT(N - 2, Z(J))
VY = S * S * (1 / N + (X - MX) * (X - MX) / (N - 1) / VX)
VIY = VY + S * S
SDMY = SQR(VY): SDPI = SQR(VIY)
LPRINT " Confidence interval for Y = +/-"; T * SDMY
LPRINT " Prediction interval for Y = +/-"; T * SDPI
GOTO 6010

```

```

ansyorns: REM
9910 INPUT GET$
AN$ = GET$: IF AN$ = "y" THEN AN$ = "Y"
IF AN$ = CHR$(13) OR AN$ = "n" THEN AN$ = "N"
IF AN$ = CHR$(32) THEN AN$ = "N"
IF AN$ <> "N" AND AN$ <> "Y" THEN 9910
LPRINT AN$
RETURN

```

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

ประวัติผู้เขียน



- ชื่อ นายทวีศักดิ์ บุญทวีกรัตน์
- ที่อยู่ 60/154 ม.4 ถนนสุขาภิบาล แขวงสายไหม เขตบางเขน กทม. 10220
- เกิด 25 มกราคม 2504, สุราษฎร์ธานี
- การศึกษา พ.ศ. 2524 สำเร็จการศึกษาประกาศนียบัตรวิชาชีพ สาขาวิชาช่างสำรวจ
คณะช่างโยธา วิทยาเขตเทคนิคกรุงเทพฯ
- พ.ศ. 2527 สำเร็จการศึกษาประกาศนียบัตรวิชาชีพชั้นสูง สาขาวิชาช่างสำรวจ
คณะช่างโยธา วิทยาเขตเทคนิคกรุงเทพฯ
- พ.ศ. 2530 สำเร็จการศึกษา วิศวกรรมศาสตรบัณฑิต สาขาวิศวกรรมโยธา
คณะวิศวกรรมเทคโนโลยี สถาบันเทคโนโลยีราชมงคล
- พ.ศ. 2530 เริ่มเข้าศึกษาหลักสูตรวิศวกรรมศาสตรมหาบัณฑิต สาขาวิศวกรรมแหล่งน้ำ
ภาควิชาวิศวกรรมโยธา คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
- การทำงาน พ.ศ. 2526 ตำแหน่งช่างอันดับ 2 ฝ่ายสำรวจ และจัดทำแผนที่
กองวางแผน และโครงการ องค์การโทรศัพท์แห่งประเทศไทย
ตั้งแต่ ก.บ. 2526-มี.ค. 2532
- พ.ศ. 2532 ตำแหน่งผู้จัดการโครงการ
บริษัท วีทีบี แลนด์ ดีเวลลอปเม้นท์ จำกัด
ตั้งแต่ เม.ย. 2532-พ.ย. 2532
- พ.ศ. 2532 ตำแหน่งวิศวกรโยธา
บริษัท วินิไทย จำกัด
ตั้งแต่ ธ.ค. 2532-ม.ค. 2534
- พ.ศ. 2534 ตำแหน่งผู้จัดการทั่วไป
บริษัท 24 คอนสตรัคชั่น จำกัด
ตั้งแต่ ก.พ. 2534-ม.ค. 2535
- พ.ศ. 2535 ตำแหน่งผู้จัดการก่อสร้าง
บริษัท สุภาลัย จำกัด
ตั้งแต่ มี.ค. 2535-ปัจจุบัน