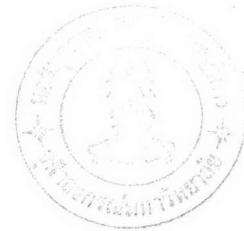


CHAPTER 1

INTRODUCTION



1.1 Location and Access

The investigated area is located at Amphoe Wang Nam Yen, Changwat Prachin Buri, eastern Thailand. It is bounded by latitude 13° 31' to 13° 40' N and longitude 102° 02' to 102° 10' E, covering an area of approximately 250 square kilometres. The area is in the topographic map scale 1:50,000 series L 7017, sheet 5436 III (Ban Khao Chakan), and the topographic map scale 1:250,000 sheet ND 48-9 (Battambang).

Roads and rail accessible to the survey area is shown in Fig 1.1. The accessibility to the field area by roads is readily served by means of good network of primary and secondary roads. The first route is from Bangkok heading east to Sa Kaeo (Highway no. 304 or 33) and then travelling about 25 kilometres southward to the study area (Highway no. 317). Another route is by travelling southeasterly from Bangkok to Chanthaburi (Highway no. 344 and 3) and then heading north approximately 120 kilometres to the study area (Highway no. 317). The study area is also accessible by rail. The eastern routed train starts from Bangkok to Sa Kaeo and then travelling southward by road about 25 kilometres (Highway no. 317). Sample location map of investigated area is given in Fig.1.4.

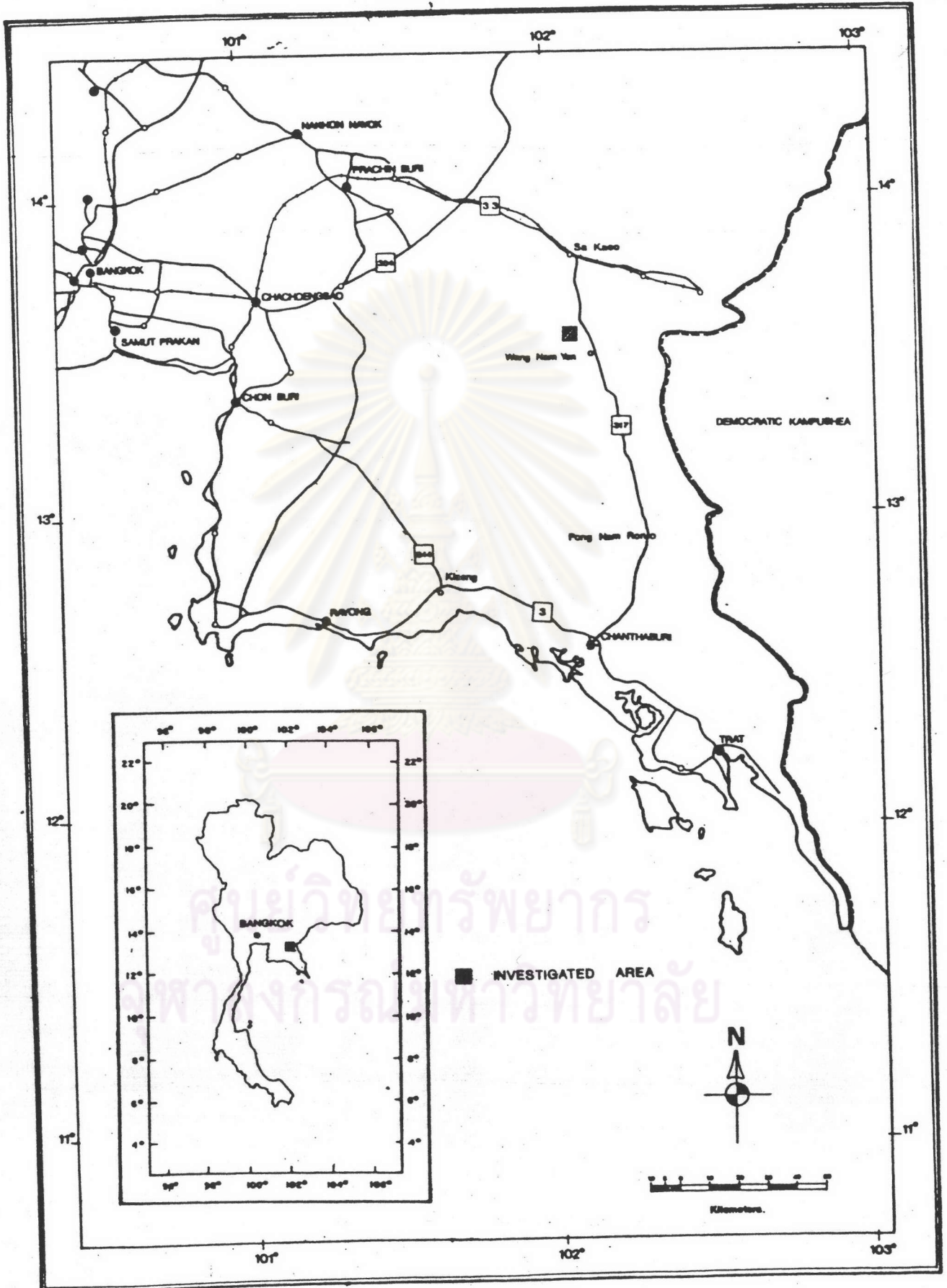


Fig. 1.1 Location map of the area under geochemical investigation.

1.2 Physiography

1.2.1 Topography and Drainage

The study area is situated approximately at 100 metres above mean sea level (a.s.l). The elevation ranges from 50 metres a.s.l along Klong Phra Sathung on the west to 240 metres a.s.l. at Khao Tham Ma Kok on the central part. The central portion of the study area is characterized by mountainous zone of a northwest trending ultramafic rocks. The area surrounding mountainous zone is nearly flat with reference to relative difference in general of less than 10 metres. This region is overlaid by colluvial and lateritic soil which covered by cultivations.

Almost all of area in this region is drained by Klong Pha Sathung which flows northward. Drainage is well developed and generally characterized by dendritic pattern in mountainous areas. The surrounding lowland is generally poorly drained because the area was disturbed by cultivations

1.2.2 Climate

The climate of the area studied is the tropical rain forest type which being controlled by the seasonal monsoons of Southeastern Asia. Three seasons occur within a year : The wet period or rainy season is in between May and September, the cold dry season is in between October and January, and summer season between February and April. Temperature varies from 24°c to 42°c during the summer period and between 12°c and 28°c during the cold dry season. The annual rainfall is about 1500 mm.

1.2.3 Vegetations

Only the mountainous area are covered by dense evergreen rain forest. The large portions of land surrounding the mountains are presently cleared to be used as cultivation land for maize, tapioca, and soybean. In the inhabited lowlands or flat plains of alluviums, large areas have been used for rice cultivation and small plots are devoted to vegetable and tobacco.

1.3 Previous Works

From 1974 to 1976, Geological Survey Division, Department of Mineral Resources, undertook the regional geological mapping in the eastern part of Thailand. The preliminary reports (unpublished) on geology and geological map at a scale 1:250,000 were conducted by Sivabovorn et al., (1976). In the vicinity of Amphoe Wang Nam Yen, Changwat Prachin Buri, the exposed ultramafic zone was located in the trending of NW-SE direction and associated with chromite mineralization (Sivabovorn, 1976).

From 1979 to 1980, Sander Geophysics Limited cooperated with Department of Mineral Resources to conduct a combined air borne magnetometer and gamma ray spectrometer survey. The survey was conducted over an area of 35,000 square kilometres in the Southeastern Thailand. The purpose of the survey was to delineate additional iron deposits and to help in the prospecting for base metals along with other minerals (Sander et al., 1980). Many magnetic anomalies are evident throughout the zone of ultramafic rocks and appear to represent a complex array of lenticular sources ranging in length from less than 1 km up to about 10 km and generally less than 1 km in width. These

dykes appear to be steeply dipping to near vertical in orientation.

1.4 Purpose and Investigated Methodology

In the past few years some small deposits of chromite mineralization were found associated with ultramafic rocks in the vicinity of Amphoe Wang Nam Yen, Changwat Prachin Buri (Suwanasing, 1973). However, no further detailed geological investigation has been subsequently done. Geochemical prospecting is considered to be one of the most important role in locating anomalous zone, especially in the unexplored geologic terrains. The main purpose of this investigation is to use geochemical prospecting and various techniques in data processing to define and locate the high potential mineralization areas. Detailed work in these high potential zone may finally lead to the discovery of new mineralization.

Field mapping in the study area, approximately 250 square kilometres were accomplished during late of 1981 and summer period of 1982. Polished sections and thin sections of some important rock types have been prepared for petrographic studies. Rock sampling and semi-detailed stream sediment and soil collection were currently carried out in the vicinity of ultramafic terrain. 327 active stream sediment samples and 654 B-horizon soil samples were collected for chemical analysis. Stream sediment were picked up from accessible stream and creeks at sampling spacing of 150-200 metres. B-horizon soils were also collected from depth of 20-30 cm of stream banks at about 15-20 metres away from stream sediment sampling location. Atomic absorption spectrophotometer has been used for determination of the content of Cr, Ni, Co and Cu. Various techniques of data processing were employed to define high potential mineralization areas. The threshold values were

selected between anomalous and background by probability graphical method (Lepeltier, 1969; Sinclair, 1974). The geochemical maps are constructed using the range that was limited by cumulative percentile levels. Trend surface analysis based on microcomputer involved polynomial functions were computed to separate geochemical data into the regional component and local component (Davis, 1973) and therefore, residual maps were produced. The moving average method described by Geoffroy (1968) was employed to define background trends of trace element distribution. Geochemical surfaces in various cell sizes were constructed, and finally residual or areal maps were obtained.

1.5 Regional Geologic Setting

Regional geologic setting of the area will be discussed according to the geological map scale 1:250,000 sheet ND 48-9 (Fig. 1.2), compiled by Pholprasit et al., (1983). Generally, the area is underlain by Permo-Triassic sedimentary rocks on the southern half and by Quaternary sediments on the northern half. The sedimentary rocks trend along NW-SE direction. They are composed of Permian limestone and bedded chert and intervening of conglomerate and sandstone of Triassic and massive sandstone of Jurassic. The igneous rocks crop out scatterly through the area in small portions. They consist of olivine basalt, hornblende biotite granite, andesite, tuff and serpentinite. The simplified stratigraphy of the area is shown in Fig 1.3 and the brief description of the rocks are as follows :

1.5.1 Sedimentary rocks

Sedimentary rocks are more commonly found in the southern portion of the area. The rocks of Ratburi Group are the oldest rock

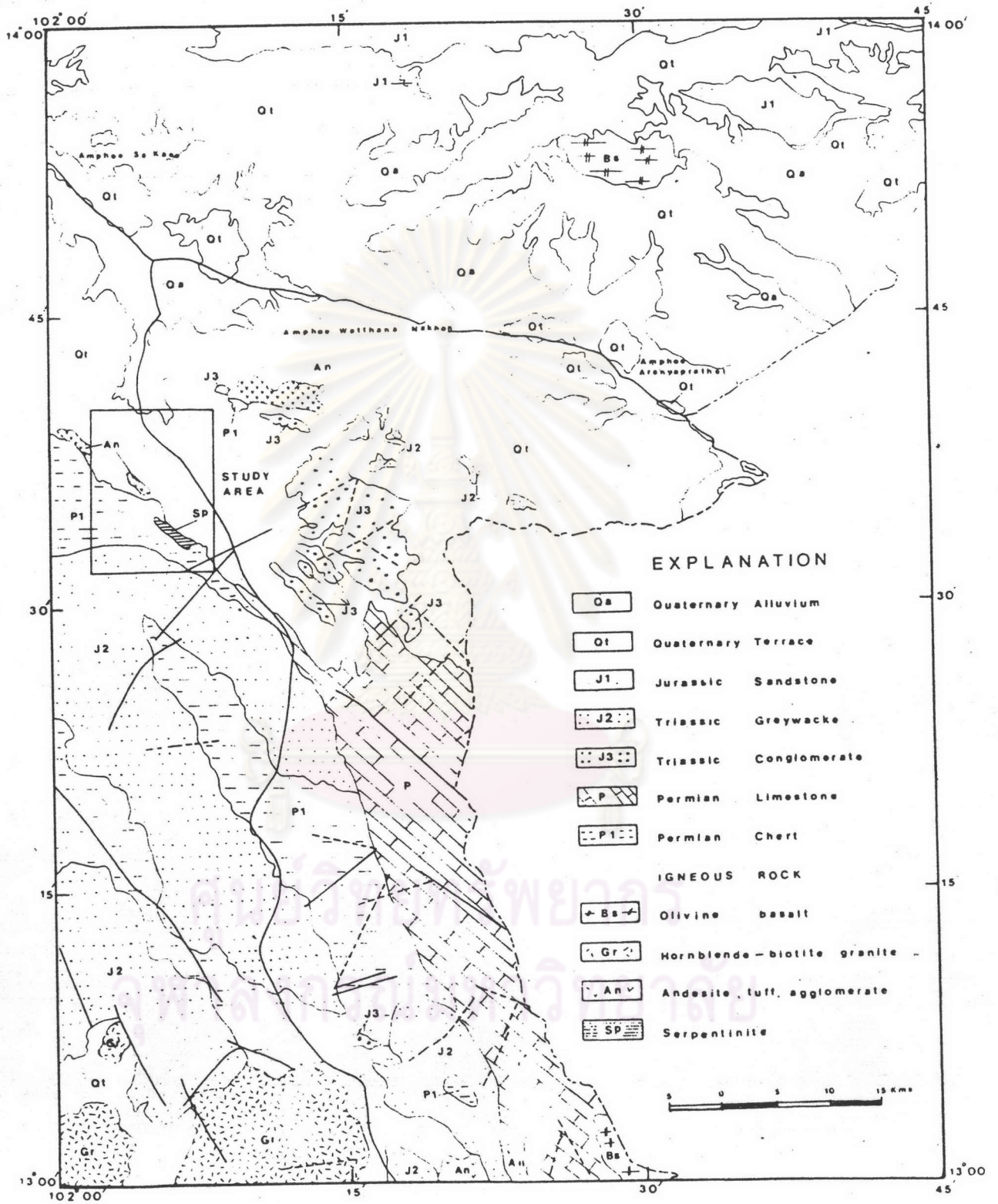


Fig. 1.2 Generalized Geological map of Prachin Buri Province, eastern region, Thailand (After Paijitprapapon et.al., 1983).

encountered. The rock are composed of fossiliferous limestone, chert, and tuffaceous sandstone. The Ratburi Group in the area is highly disturbed and deformed (Paijitprapaporn, 1983). Age of the rocks indicated by fossils of fusulinids, brachiopods and corals found in the area is Permian. Above the Ratburi Group is Pong Nam Ron Formation. This formation has been designated to be Triassic age (Paijitprapaporn, 1983) and consists of two units, namely conglomerate-sandstone and siltstone-shale. These units align almost parallel to the rocks of Permian age which generally extend in the NNW-SSE direction. Pebbles and cobbles of chert, limestone, and siltstone are commonly found in the conglomerate. The Khorat Group (Jurassic) is found only at the northern part of the area. It is characterized by the escarpment of E-W trending. The thickness of this unit (Phra Wihan Formation) is approximately 250 metres. The unit consists of pinkish brown to reddish purple massive medium-grained sandstone. The Quaternary unit is composed of unconsolidated sediments which can be divided into two types alluvial deposit and terrace deposit. Alluvium is composed of gravel, sand, silt, clay, mud of flood plain. Terrace deposit consists of gravel, sand, silt, and laterite.

1.5.2 Igneous Rocks

Several varieties of igneous rock are found in the area. Hornblende biotite granite is found in the southwest. Serpentinite and andesite are found in the west, and olivine basalt is found in the northeastern. Ultramafic rocks found in the area are almost entirely serpentinized rocks. The rocks are found in the central west and trend in the NW-SE direction. These rocks are the oldest units among igneous rock found in the area (Salyapongse, 1983). The younger

volcanic igneous varieties are andesite, welded tuff, tuff, agglomerate, and andesitic basalt. These various rock types are suggested to be of Triassic age (Paijitrapapon, 1983). The Triassic plutonic rock, hornblende biotite granite is found in the southwest of the area. Olivine basalt is the youngest igneous rock in the area. The rock is characterized by greyish black colored and massive (Paijitrapapon, 1983).

Fig. 1.3 Simplified stratigraphy of the investigated area.

Symbol	Lithology	Group	Age
Sedimentary Rocks			
Qa	Alluvium, gravel, sand, silt, mud of flood plain		QUATERNARY
Qt	Terrace and colluvium		
UNCONFORMITY			
J1	Sandstone, white brown, medium-grained, well cemented intercalated conglomeratic SS.	KHORAT	JURASSIC
J2	Greywacke, greenish grey, fine to medium-grained.		TRIASSIC
J3	Conglomerate, boulder of granite, andesite, chert, lst.		TRIASSIC
UNCONFORMITY			
P	Limestone, fossiliferous, grey to dark grey	RATBURI	PERMIAN
P1	Chert, grey black minor limestone lense.		PERMIAN

continued

Symbol	Lithology	Age
	Igneous Rocks	
Bs	Olivine basalt, greyish black, black vesicular, amygdoloidal	QUATERNARY
Gr	Hornblende biotite granite medium to coarse-grained porphyritic	L-JURASSIC Ū-TRIASSIC
An	Andesite, welded tuff agglomerate, andisitic basalt	TRIASSIC
Sp	Serpentinite, olive green pearly luster, sheared structure.	PRE-TRIASSIC

1.6 Mineralizations

Some known mineralizations were found in the study area. Chromite mineralization is present in ultramafic serpentinized rocks. Some small bodies of chromite occur as pockets and disseminations. However, there are no detailed informations and report of investigation of these features concerned. The other important mineralization in this area is magnesite. The cryptocrystalline magnesite were found in many localities as pockets and lenses in serpentinized rocks. Also few localities of fibrous asbestos were found in the ultramafic rocks.

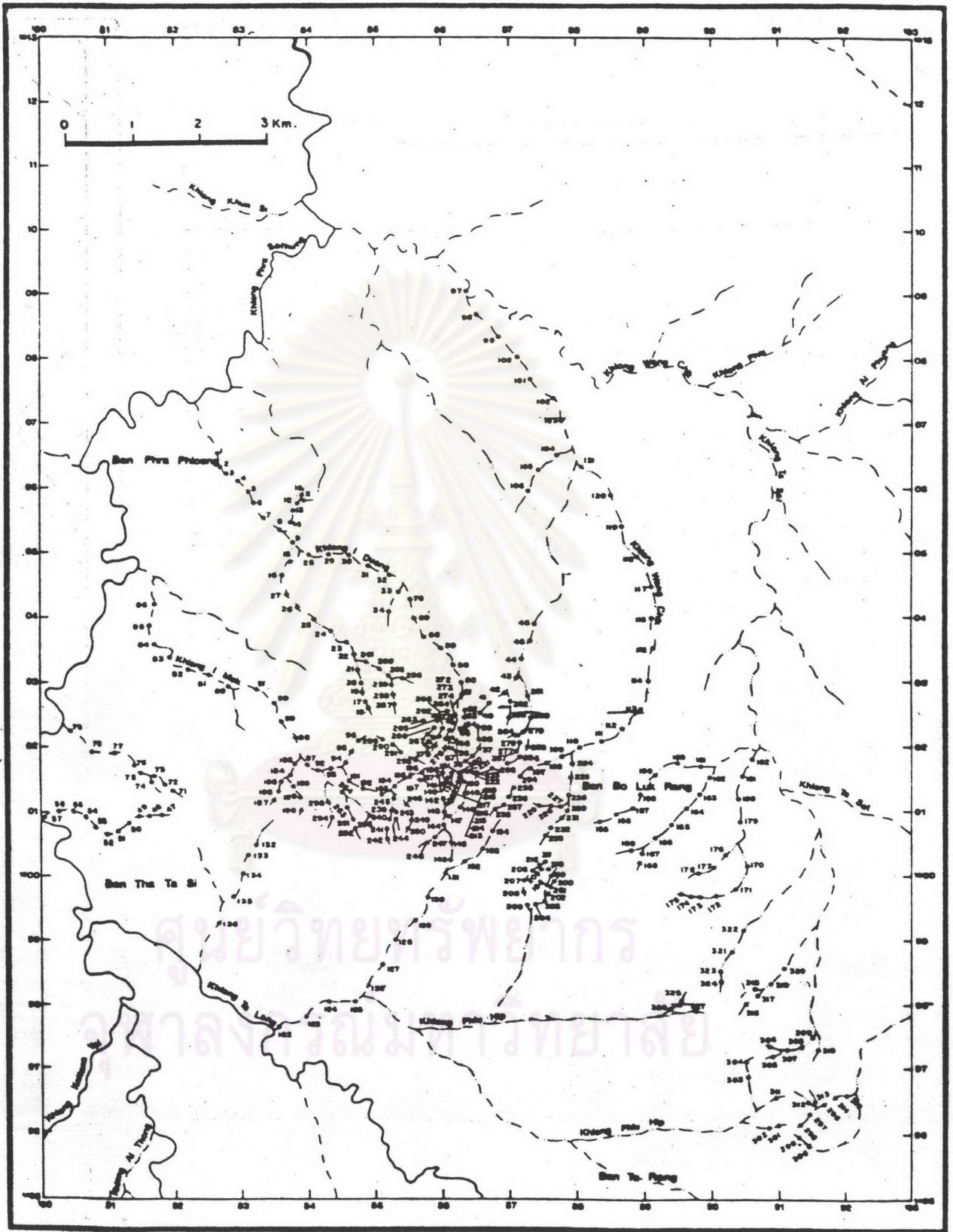


Fig. 1.4 Sample location map of investigated area, Amphoe Wang Nam Yen, Changwat Prachin Buri.