CHAPTER III

GEOLOGICAL SETTING

Introduction

On the basis of geographically, the most area of investigation is situated in a marginal zone of the mountainous area in the easthern part of Kanchanaburi ranges, adjoined with Uthai Thani mountain ranges. The previous geological investigation within this research area and adjacent terrain was proposed in a year 1975 by Bunopas and Bunjitradulya (fig. 3.1). The most coverage of Amphoe Bo Phloi including some part of Changwat Suphan Buri are presented in the geological map of Suphan Buri Quandrangle, ND 47-7. Rocks of the Precambrian to Recent excluding the Cretaceous and Early Tertiary were described. Paleozoic rocks and Quaternary deposits are widely distributed in the area. Precambrian rock of Thabsila gneiss is represented an old unit of metamorphic rocks, followed by Cambro-Ordovician U-Thong Marble, Ordovician of Thung Song Group, Silurian-Devonian of Bo Phloi Formation and Quaternary deposits respectively. The intrusion of Triassic granites are predominantly observed in the west mountain ranges. A prominent basaltic eruption coverring a small area is note worthy and also referred to the main source of sapphire and associate gemstones.

Structurally, the so-called Khao Chong Insi Faust is a thrust fault which introduced Thabsila Precambrian Gneiss to the surface. On the basis of airphotos interpretation, there appears to be minor faults trending NW-SE similar to the direction of the Three Pagoda Fault Zone in the southern part of the area.

Stratigraphically, most of the geological rock units as mentioned above can be described from the oldest to the youngest as follows :

Precambrian Rocks

The oldest rocks in the area are the sequences of paragneiss mica schist, marble and quartz schist of the inferred Precambrian age which predominantly expose in the highlands of Kanchanaburi , west of Khwae Yai, at Khao Chong Insi to the north of Bo Phloi, and at the vicinity of Ban Lad Ya Military area. These rocks belong to an amphibolite facies and are similar to those gneissic series being cropped out in the west of Tak (Bunopas and Bunjitradulya, 1975). The rock is composed of stained quartz, biotite, microcline, tremolite, plagioclase, chlorite, muscovite, apatite, zircon, and sericite. Most of rocks are dipping with 13-30 degrees from west to northwest direction.

Cambro-Ordovician Rocks

The U-Thong Marble comprises thin fine-grained marble which graded into Ordovician limestone. It observes in Rifle Ranges of Ban Lad Ya Military area and in the western part of Ban Thung Na Nang Rok.

Ordovician Rocks

The Ordovician limestones are found underlying the Silurian-Devonian quartzite. They locate in west of Amphoe Bo Phloi, Ban Thung Ma Kok and east of Bo Phloi contact with Khao Chong Insi. The general dipping is approximately 50 degrees to east direction.

Silurian-Devonian Rocks

The Silurian-Devonian rocks consisting of quartzite, tuffaceous sandstone, grey shale, chert beds and limestone bands are clearly exposed in east and southeast of Bo Phloi district. Type section of the formation locates at Khao Ka and Khao Yai approximately 10 kilometers southeast of this district. Rocks are composed of thick white to brown quartzite bands, consisting of quartz grains which occasionally recrystallized. In the eastern of Khao Chong Insi consists of brown quartzite and argillite band. Fine-grained quartzite observes at Khao Hin Lap southern of the area.

Quaternary Deposits

The Quaternary deposits are poorly unconsolidated terrace deposits and alluvial filling, and the age be comparable with the terrace and alluvial deposits in the Chao Phraya Basin. They are composed of lateritic gravel of high terrace and middle terrace landforms. In alluvial landforms, the central part of the Bo Phloi Basin, consist of unconsolidated sediment overlying on the gem-bearing gravel bed. Calcrete and rock fragments of alluvial sediments are extensively found along western mountain ranges to the present Lam Ta Phoen channel.

Igneous Rocks

1. Triassic Granite

The Triassic granite occurs as large batholith and small stock in west mountain ranges. The rock is coarse-grained granite and porphyritic granite. Ban Thung Ma Kok granite consists of biotite-muscovite and some tourmalines. Small

outcrops of medium-grained granite are found in contact with limestone at the valley of Khao Chong Insi.

2. Tertiary Basalt

The Bo Phloi basalt crops out covering an area of 600-800 squaremeters. Basalt contains microlite of plagioclase in the groundmass and larger crystals of olivine, pyroxene, spinel, and xenolith of gneiss. There is no evidence of the basaltic flow over the terrace gravel. According to Bunopas and Bunjitradulya (1975), Bo Phloi basalt occurs in fractured zone of the Silurian-Devonian sequences. The basalt shows common columnar jointing. Bo Phloi basalt has also been postulated to be the main source of sapphire in this area. The age of Bo Phloi basalt was 3.14 ± 0.17 Ma (Barr and Macdonald, 1978), and 4.17 ± 0.11 Ma. (Sutthirat et al., 1994).

Historical Geology of the Bo Phloi Basin

According to Bunopas and Bunjitradulya (1975), the Bo Phloi basin is situated between western range and eastern range of the highland area of Kanchanaburi mountainous zones which has been filled with thick clastic unconsolidated sediments. Pitting and Banka drills information indicate that the clastic unconsolidated sediments display the characteristics of a river channel deposits, for example, evidence of thick gravel bed of bedload character was observed. It is apparent that the basin has been developed along the fractures in north-south direction during Late Tertiary or Pliocene. The appearance of peats and giant trees found in the upper sedimentary sequence indicates the immediately flooding event during Holocene period.

The tectonics development occurred during Late Tertiary or Pliocene period also induced the extension of the basaltic rocks along the fractured zones in the eastern part of the region. Basalts are clearly observed in two localities, i.e. along the Huai Nam Pu (Huai Ma Kah) in Ban Chong Dan area and Khao Lan Tom at Bo Phloi district.

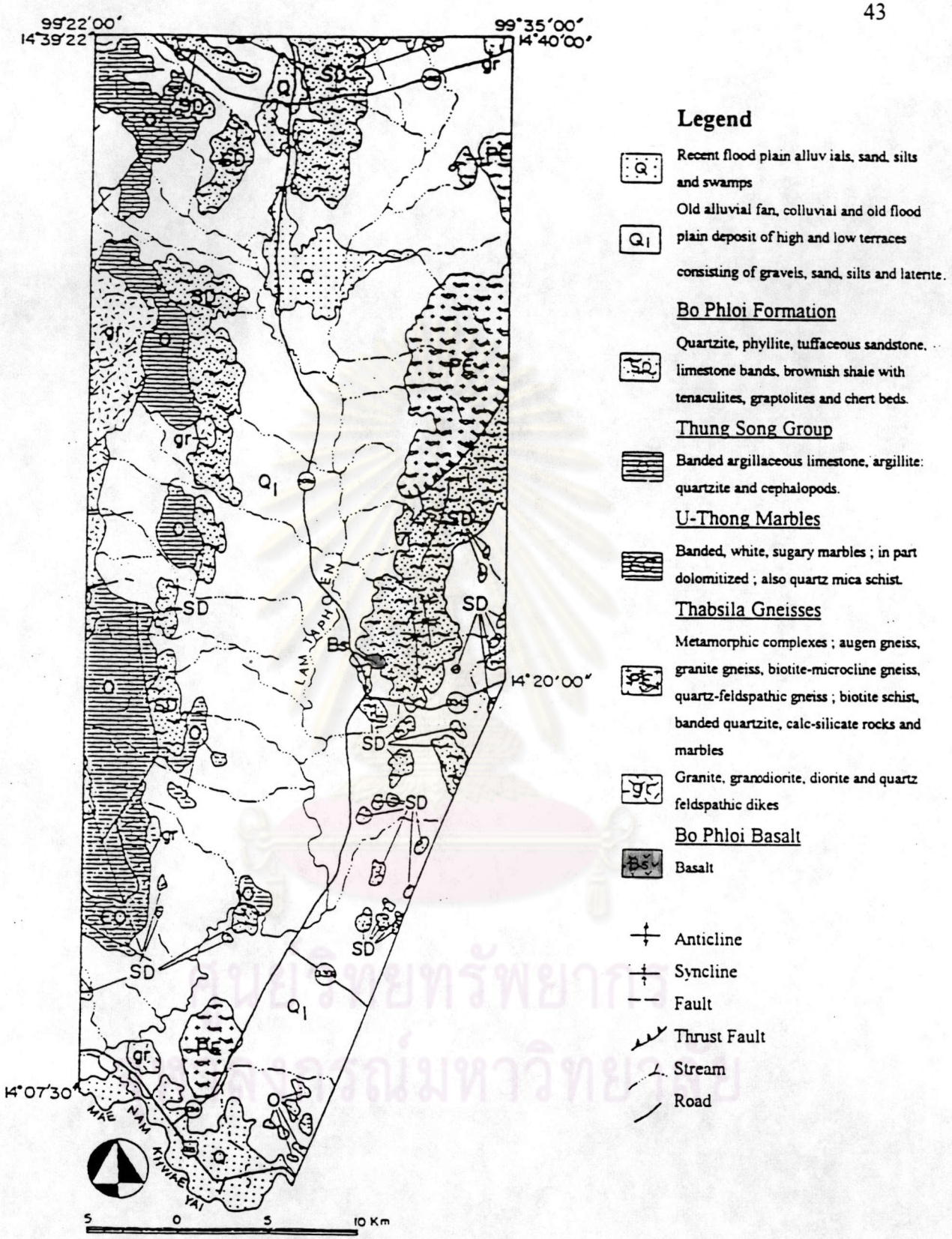

Figure 3.1 Generalized geological map of Bo Phloi area, Changwat Kanchanaburi. (modified from Bunopas and Bunjitradulya, 1975)