

CHAPTER VII

CONCLUSION

As a part of multi-disciplinary research of The Highland Archaeology Project, "Geoarchaeology of Tham Lod rock shelter, Changwat Mae Hong Son, Northern Thailand" was aimed to apply the geological or earth science methodology in the interpretation of archaeological data from prehistoric sites with two major objectives. The first was to study relationship among the stratigraphy, sedimentology and archaeological record (including artifacts and occupation layers from excavation). The second was to examine land use pattern and natural resources in the past. The result of research can be concluded as follows :

7.1 Stratigraphic Unit

Generally, stratigraphic sequences can be classified into 9 sequences from 3 series of geologic timescales as follows:

7.1.1 Older than Late Pleistocene Period

Unit A; Stratigraphic unit A lies in the bottom of all excavated areas which is represented by a lateritic soil. None of archaeological remain has been recovered in this layer. **Unit A1** appears only in area 1, is characterized by gravels deposited overlying unit A with granule – pebble – cobble particles grain size grading upwards into 2 sequences. It can be assumed that an old stream has once passed through the rock shelter.

7.1.2 Late Pleistocene Period

Unit B2 appears in only area 1 overlying Unit A and A1. The characteristic of the unit B2 was represented by a layer of calcrete found in full of excavated floor. TL dating suggested that the unit has been deposited approximately $32,380 \pm 292$ years BP. **Unit B** is a high density of occupation layers of Prehistoric human in Late Pleistocene. Numerous of archaeological remains including stone tools, animal remains, shell and human skeletons were preserved. Three samples of the sediment were dated by TL dating, and the result on one sample from the middle layer which contains a lot of animal bones fragment, indicated the age of 14,000 years BP, whereas two samples from the upper of layer collected from the contact boundaries between unit B and unit C, were given the age 9,980 years BP and 10,500 years BP, respectively. **Unit B1** appears both in area 1 and 2, includes almost of limestone rock fall. None of dating has been done. However, the age of this unit, overlying unit B which was dated from organic sediment by AMS dating and overlaid by calcrete layer which was dated by TL dating, can be assumed that rock fall might have been occurred sometimes between 13,000 years BP and 16,000 years BP. **Unit B3** appears only in area 1 overlying unit B1. This unit is dominated by calcrete layer that was dated by TL dating and given the age approximately 13,000 years BP

7.1.3 Holocene Period

Unit C1 shows clearly geological process as severe flooding occurred during Holocene epoch. Flooding was the main process made up of unconformable deposition between unit B and unit C and reworked or mixed archaeological remains which also made the difficulty in classifying of cultural layers. TL dating in sediment from the top and lower parts of this unit, which is the contact boundaries between unit C and unit D in area 3, suggested that the deposition started sometimes between 9,980 years BP to 2,933 years BP. **Unit C** appears in only area 1 overlying on unit B. New archaeological records such as potsherds and beads was

recognized. Stone tools and animal remains were also preserved but decreased in their amounts. New archaeological remains can be relatively determined the age by relative dating from artifacts and result indicated that most of them was late Holocene artifacts. **Unit D** comprises unconsolidated topsoil. The disturbance from recent activities was observed. A few artifacts such as flake, animal bones, potsherd and beads has been discovered mixing with of recent material.

7.2 The cultural chronology sequence

The cultural chronology at the Tham Lod rockshelter was analysed on the basis of stratigraphy, sedimentology and archaeological context that can be classified into 2 periods as late Pleistocene and Holocene. It was classified into 4 cultural phases of Late Pleistocene Period I , Late Pleistocene Period II , Early to Middle Holocene and Late Holocene, respectively.

7.2.1 Late Pleistocene Period I (32,000 – 13,000 years BP). Results of AMS and TL dating in this area show the earliest cultural layer were begun at $32,380 \pm 292$ years BP. The dating in high density of habitations based on AMS technique is given the age $22,190 \pm 160$ years BP and $16,750 \pm 70$ years BP (dated by shell remains). TL dating of sediment in layer 3 of area 3 suggests the age of deposition occurred approximately $14,055 \pm 47$ years BP. Archaeological remains indicate that the prehistoric people were the user and makers of stone tools. This rock shelter was used by them for multi-function activities such as processing food, stone tools manufacture, and refuse area. The cultural period can be concluded correspond to late Paleolithic or late Pleistocene age which temporary camp of hunter-gathers was used extensively for producing stone tools as the main tools.

7.2.2 Late Pleistocene Period II (13,000 - 10,000 years BP). Change of functional culture of the shelter was suggested by the occurrence of 2 burials. Based on the result of AMS dating from organic sediment nearby the both burials, burial I was given $12,100 \pm 60$ years BP and burial II was given $13,640 \pm 80$ years BP.

Archaeological remains as stone tools has been found in association with both burials. This rock shelter was used for temporary camp and then was changed to burial site from the late Paleolithic in late Pleistocene Period.

7.2.3 Early Holocene to Middle Holocene. The culture during early to middle Holocene was unclear to classify using only the archaeological remains because archaeological remains were mixed by flooding event. Base on TL dating in the upper part of unit B in area 3, two sediment samples were dated as $9,980 \pm 120$ years BP and $10,589 \pm 49$ years BP. Sediment in the upper part of this unit C was dated and given the age as $2,933 \pm 83$ years BP. However, the evidence such as potsherds, beads and polish stone were found indicating that during this period the Tham Lod rockshelter was occupied by people who used ceramics (potsherd).

7.2.4 Late Holocene (2,900 yr. BP to present). During early to middle Holocene, archaeological remains such as potsherds and beads were found continuously throughout stratigraphic C in area 1. The analysis in characteristic of potsherds and beads indicated that they were made in late Holocene epoch.

7.2 Landuse pattern and natural resources in the past.

The major site function of human used this rock shelter can be classified mainly into 4 functions as follows.

Temporary Habitation camp: The pattern of archaeological remains indicated that this camp has been exploited for food preparation and consumption. Small to large size animals and shell remains were also confirmed hunting and collecting activities.

Manufacture and maintenance stone tools site: Stone tools manufacturing and maintenance activities were occurred at the site. The lithic assemblages especially from area 1 to area 3 represent the entire production sequence since the beginning until finishing products such as utilized core, wasted core, broken

cores, hammer stones, primary wasted flakes, secondary wasted flakes and tertiary wasted flakes.

Refuse Site: Numerous parts of animals bone fragment, shells, wasted cores, primary wasted flakes and secondary wasted flakes have become unused material and remained there in the rock shelter. This is suggested that this rock shelter has been a refuse area. Animal bone fragments were tossed near the southern wall.

Burial Site: Two burials were preserved indicating that the site used to be a burial site.

Geographically, Tham Lod rockshelter is located in open doline suitable to use as a good setting site and habitation. This rockshelter is a dry, well protected from rain. In term of settlement pattern, the site is comfortable site transitional zone (karst and non-karst areas), which is surrounded by easily access abundant to natural resources. The main natural resources were from mountain and river. The resources from the mountain comprise cave or rockshelter for human to live and a lot wild animals was nature for hunting. The Lang river was probably full of shells, fishes and gravels. Gravel is the main raw material for human selecting and collecting to make the stone tools.

Finally, Tham Lod is one of very important prehistoric sites in Thailand and becomes a new dimension of prehistoric highland region of Thailand. This geoarchaeology study is the first among other disciplines that can provide a brief guideline in analysing history of the Tham Lod rockshelter. At the various stages, the research has attempted to point out the significance of the stratigraphy and described in detail as the expectation to help archaeologists make easy to further their research. Hereinafter is a summary of what problems and questions found apart from this research.

1. Stratified cultural deposits from the Late Pleistocene to Middle Holocene in this site are rare and the evidence is difficult to recognize particularly in Early Holocene to Middle Holocene because of mixing cultural remains by flooding.

2. There are some questions remained in some parts. The overwhelming impression left in the mind of the discerning reader that it is surely the urgent need for more excavation in area 1. The duration of investigation needs to extend. The more detailed geoarchaeological study will be able to integrate more precise history of highland archaeology in the area. Especially in area 1 which can not excavate cover all the area because the Highland Archaeology Projects had short time for excavated and found about numerous of archeological remains and complex of stratigraphy. Up to now , between area 1 and area 2 have gab and lack of evidence for correlation. However, a long term research need to continue in the study area in order to establish a history of the site.

3. The analysis of archaeological remains was primarily carried out in this research. The more detailed analysis from artifacts will make the more reliable interpretation of cultural development. However, if the complete analysis will complete in the future, this site would become one of the most significant archaeological site not only for Thailand but Southeast Asian as a whole.

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