

CHAPTER I

INTRODUCTION

The study of microfossils in Thailand has remained limited, largely due to the scarcity of local specialists. However, the exposed Silurian–Devonian outcrops at Ban Thung Samed in Satun Province presents a valuable opportunity for advancing microfossil research and paleoenvironmental interpretation. This thesis seeks to bridge this gap by investigating microfossils assemblages from the Silurian-Devonian Ban Thung Samed section in Satun Province, Thailand. Through detailed ostracod assemblage analysis and petrographic examination, this research aims to deepen our understanding of the paleoenvironment of the region. The age of the section will be established using conodonts and tentaculitoids, allowing for more precise paleoenvironmental interpretations.

1.1 Background and Rationale

Thailand primarily consists of four geological provinces, as illustrated in Figure 1.1: the west and south of Thailand are comprised of Sibumasu Terrane, the Inthanon zone in the northwest, the Sukhothai Terrane in the center, and the Indochina Terrane in the east (Thassanapak et al., 2019). According to Metcalfe (2017), Sibumasu Terrane was considered to be situated closely to northwest of Australian in Gondwana Supercontinent and then separated in Early Permian. Inthanon Zone was derived from Gondwana (see more discussion in Udchachon et al., 2022). Sukhothai Terrane or Sukhothai arc formed on the margin of the South China-Indochina Superterrane that was subducted by Palaeo-Tethys in Early Carboniferous–Early Permian. Indochina Terrane is a composite terrane that formed by miniterrane derived from peri-Gondwana in Late Silurian to Carboniferous (See Burrett et al., 2021). These terranes (Sibumasu, Inthanon, Indochina) were collided and formed Thailand in Middle to Late

Triassic. This study focuses on Silurian-Devonian section exposed at an abandoned quarry in Ban Thung Samed, La-Ngu District, Satun Province, Thailand.

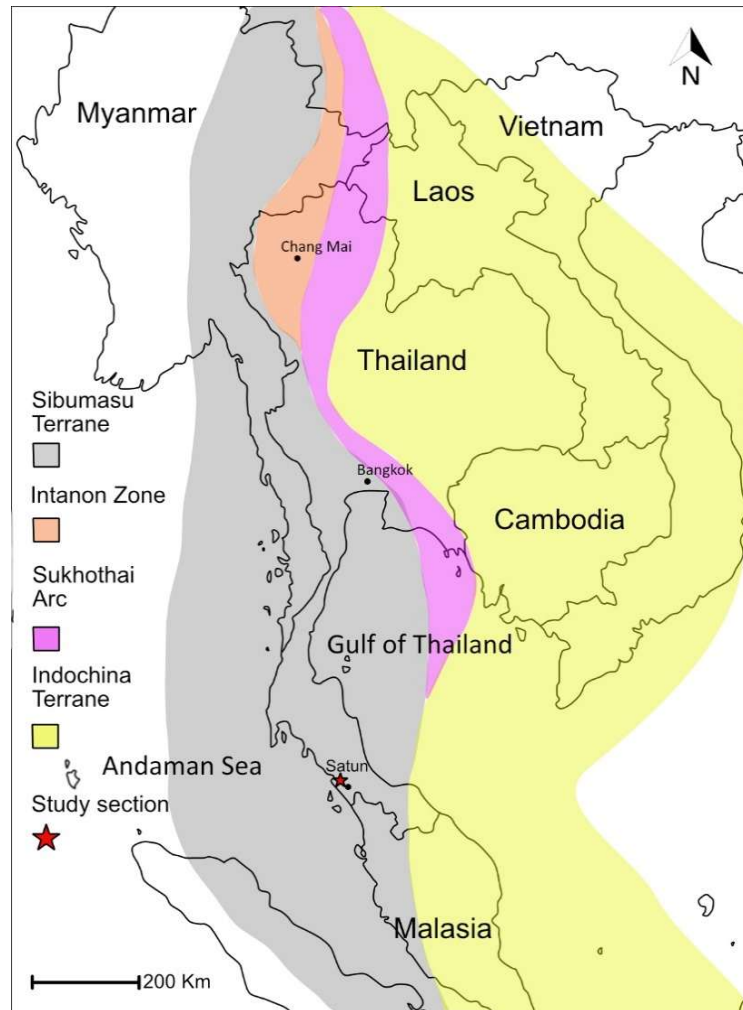


Figure 1.1 Geological Provinces of Thailand (modified after Thassanapak et al., 2019).

On mainland Satun, continuous rock sequences ranging from Upper Ordovician to probably Lower Carboniferous are exposed between Km 9 and Km 11 of the 416 roads from La-Ngu to Thung Wa Districts (Wongwanich et al., 1990). Wongwanich et al. (1990) described five geological units based on lithostratigraphy: the Pa Kae Formation (Ordovician), Wang Tong Formation (Ordovician-Late Silurian), Kuan Tung Formation (Late Silurian-Early Devonian), Pa Samed Formation (Devonian), and Khao Chu Nong Formation (Carboniferous). Later Khao Chu Nong Formation was revised and excluded

(Wongwanich and Boucot, 2011). For a long time, these continuous sequences have been the prime area for Paleozoic rock and fauna research (e.g., Agematsu et al., 2006a, 2007; Boucot et al., 1999; Crônier and Fortey, 2006; Kershaw et al., 2019; Long and Burrett, 1989; Wongwanich et al., 1990).

The Ban Thung Samed abandoned quarry in Satun Province provides well-preserved exposures of Silurian to Devonian strata. Although Itsarapong et al. (2023) conducted detailed lithostratigraphic and geochemical analyses that led to a revised interpretation of the Kuan Tung Formation, studies on microfossils, particularly Paleozoic ostracods, as well as the paleoenvironmental context of this section remain limited. Most Paleozoic ostracod studies in Thailand have focused on the Upper Paleozoic, particularly in central regions (Chitnarin and Ketwetsuriya, 2021; Chitnarin et al., 2008, 2012, 2017). Additionally, Dill et al. (2004) reported Late Paleozoic ostracods from Surat Thani Province in southern Thailand. Despite these contributions, ostracods from the Silurian-Devonian interval remain unexplored. In addition to ostracods, conodonts and tentaculitoids are widely recognized for their biostratigraphic value and have been used globally for age determination. Their integration enhances the potential for a more comprehensive, fossil-based interpretation. This thesis seeks to address these gaps by investigating Silurian-Devonian ostracods from the Ban Thung Samed section in Satun Province. By analyzing ostracod assemblages and thin sections alongside conodonts and tentaculitoids, this study aims to refine age estimates and deepen understanding of the paleoenvironmental conditions preserved in the succession.

1.2 Research objectives

1) To classify and establish a taxonomic record of ostracods, conodonts, and tentaculitoids from the Ban Thung Samed section in Ban Thung Samed, Kamphaeng Sub-district, La-Ngu District, Satun Province.

2) To analyze the depositional environment of the study section using ostracod assemblages with lithology data from thin section analysis.

- 3) To determine the age of Ban Thung Samed section.

1.3 Scope and limitations

- 1) The study focuses on rock samples collected from a quarry at Ban Thung Samed, Kamphaeng Sub-district, La-Ngu District, Satun Province.
- 2) Ostracod preparation follows the methodology of Crasquin-Soleau et al. (2005).
- 3) The lithology of the study section is analyzed through thin section analysis.
- 4) Conodonts and tentaculitoids are utilized to determine the age of the study section.
- 5) Conodont preparation follows Green (2001), with slight modifications.
- 6) The paleoenvironment is interpreted based on ostracod assemblages and rock lithology.

1.4 Contents of the thesis

This thesis is organized into seven chapters. Chapter I introduces the study, providing an overview of its objectives and scope. Chapter II presents the literature review, covering the geology of Satun Province and foundational knowledge of ostracods, conodonts, and tentaculitoids from the Silurian-Devonian period. Chapter III outlines the methodology, detailing field investigations, sample collection, laboratory processes for ostracods, conodonts, tentaculitoids, and thin section analysis, as well as data interpretation. Chapter IV provides the geology and stratigraphy of the Ban Thung Samed section, including its age determination. Chapter V focuses on the taxonomy of ostracods, conodonts, and tentaculitoids identified in the study section. Chapter VI provides an analysis of the lithology of the study section based on thin sections. Finally, Chapter VII concludes with a discussion of the paleoenvironmental interpretations of the study section and offers recommendations for further research.