

CHAPTER IV

STRATIGRAPHY OF BAN THUNG SAMED SECTION

This chapter summarizes the stratigraphy of the Ban Thung Samed section based on primary field investigations, integrated with biostratigraphic data from ostracod, conodont, and tentaculitoid studies. These findings also help establish the age of the section.

4.1 Geology of Ban Thung Samed section

The study area, located near the previous research sites of Wongwanich et al. (1990) and Agematsu et al. (2006a), is part of the Kuan Tung Formation (Wongwanich et al., 1990), originally described as comprising calcisiltite and stromatolitic algal polygons. Following the revision by Itsarapong et al. (2023), the Kuan Tung Formation is now subdivided into three members. The lower member consists of medium to thick-bedded grey limestone, overlain by thin to medium-bedded limestone interbedded with black shale. The middle member comprises thick-bedded black shale and siltstone interbedded with pyrite-bearing limestone and is unconformably overlain by fossil-rich black shale. The upper member consists of grey to pink, thin to thick-bedded limestone with laminations and argillaceous bands. The Ban Thung Samed section includes only the lower and middle members of the revised Kuan Tung Formation. The area is also characterized by the presence of multiple faults (Figure 4.1).

4.2 Stratigraphy of Ban Thung Samed section

The Ban Thung Samed section (Figure 4.2), part of the Kuan Tung Formation and previously studied by Itsarapong et al. (2023), extends approximately 50 meters

and features well-exposed, well-bedded rock layers. On average, the bedding orientation is around $080^{\circ}/40^{\circ}$ (strike/dip). This section is subdivided into lower, middle,

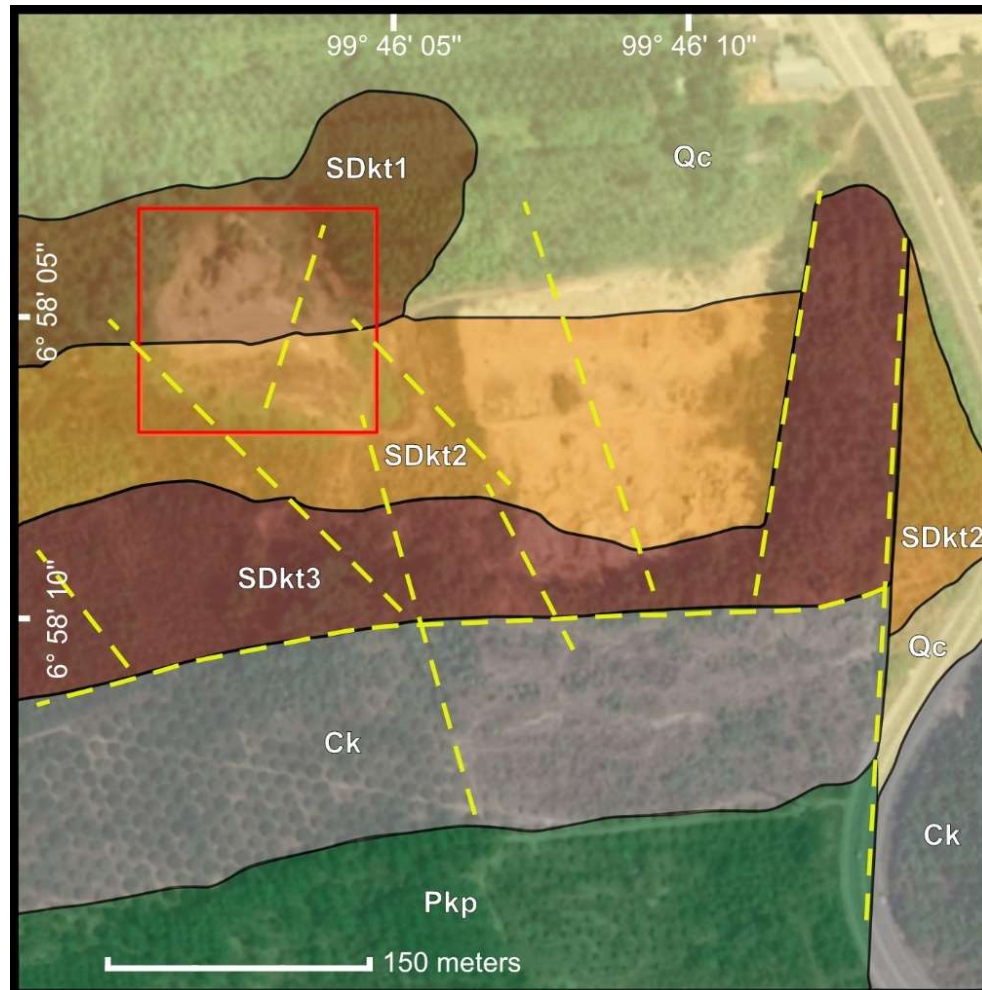


Figure 4.1 Geological map of study area. The geological data is adopted from Itsarapong et al. (2023). Red box = study area, yellow dashed line = fault, SDkt1 = Lower member of revised Kuan Tung Formation, SDkt2 = Middle member of revised Kuan Tung Formation, SDkt3 = Upper member of revised Kuan Tung Formation, Ck = Kuan Klang Formation, Pkp = Kao Phra Formation, Qc = Quaternary sediment.

and upper subunits. The lower subunit, about 22 meters thick, primarily consists of medium to thick-bedded, red-grey limestone associated with thin argillaceous layers. The middle subunit is approximately 8 meters thick, and is mostly covered by soil, composed of medium-bedded red-grey limestone interbedded with black shale. The upper subunit, approximately 20 meters thick, is well exposed and primarily composed of black shale and thin to medium-bedded dark grey limestones, with an increasing concentration of black shales toward the top.

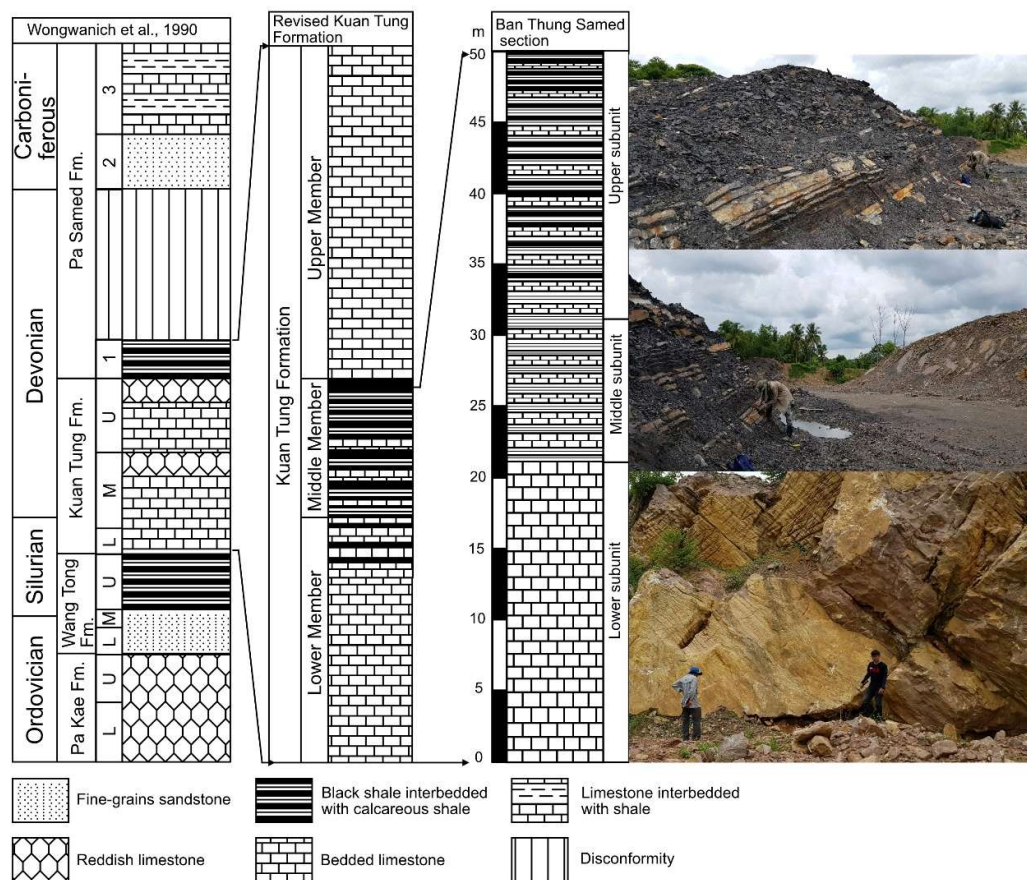


Figure 4.2 The lithostratigraphy of Ban Thung Samed section with previous study. The revised Kuan Thung Formation is after Itsarapong et al. (2023).

4.3 The age of Ban Thung Samed section

The concurrence of conodonts (Figure 4.3) such as *Pseudooneotodus beckmanni* (Bischoff and Sannemann, 1958), *Zieglerodina eladioi* Valenzuela-Rios, 1994, and *Belodella resima* (Philip, 1965) in the middle and upper subunits suggests a stratigraphic range from the Late Silurian to Early Devonian. These species, particularly *B. resima*, *P. beckmanni*, and *Z. eladioi*, are commonly associated with the Silurian–Devonian boundary (Corradini et al., 2020). In the lower subunit, the presence of *Ozarkodina crista* (Walliser, 1964) marks the *O. crista* Biozone (Corradini et al., 2015), which is defined by the First Appearance Datum (FAD) of *O. crista* in the uppermost Ludlow and continues to its Last Appearance Datum (LAD), marking the Ludlow–Pridoli boundary. Although *O. crista* may extend slightly beyond this boundary into the lower Pridoli (Bancroft and Cramer, 2020), its stratigraphic range remains confined to the Late Silurian. However, due to the limited sample size and frequency, it remains unclear whether the occurrence of *O. crista* represents its FAD or LAD. Therefore, the lower subunit can only be broadly assigned to the Upper Silurian, likely the uppermost Ludlow.

Tentaculitoids such as *Nowakia* sp., *Guerichina* sp., and *Striatostyliolina* sp., identified in the upper subunit (Figure 4.3) are typically Devonian in age. Although these identifications are restricted to the genus level, the associated presence of the graptolite genus *Monograptus* (see Itsarapong et al., 2023; Promduang and Chitnarin, 2025) suggests correlation with the dacryoconarid–monograptid bearing shales. These shales have been sparsely documented in Thailand, Malaysia, Myanmar, and Yunnan, and are dated to the Early Devonian (late Pragian or earliest Emsian) (Hassan et al., 2013). Further research is needed to more precisely constrain the age of the upper part of the section.

In conclusion, the Ban Thung Samed section spans from the Late Silurian to the Early Devonian, specifically from the late Ludlow to the late Pragian or earliest Emsian.

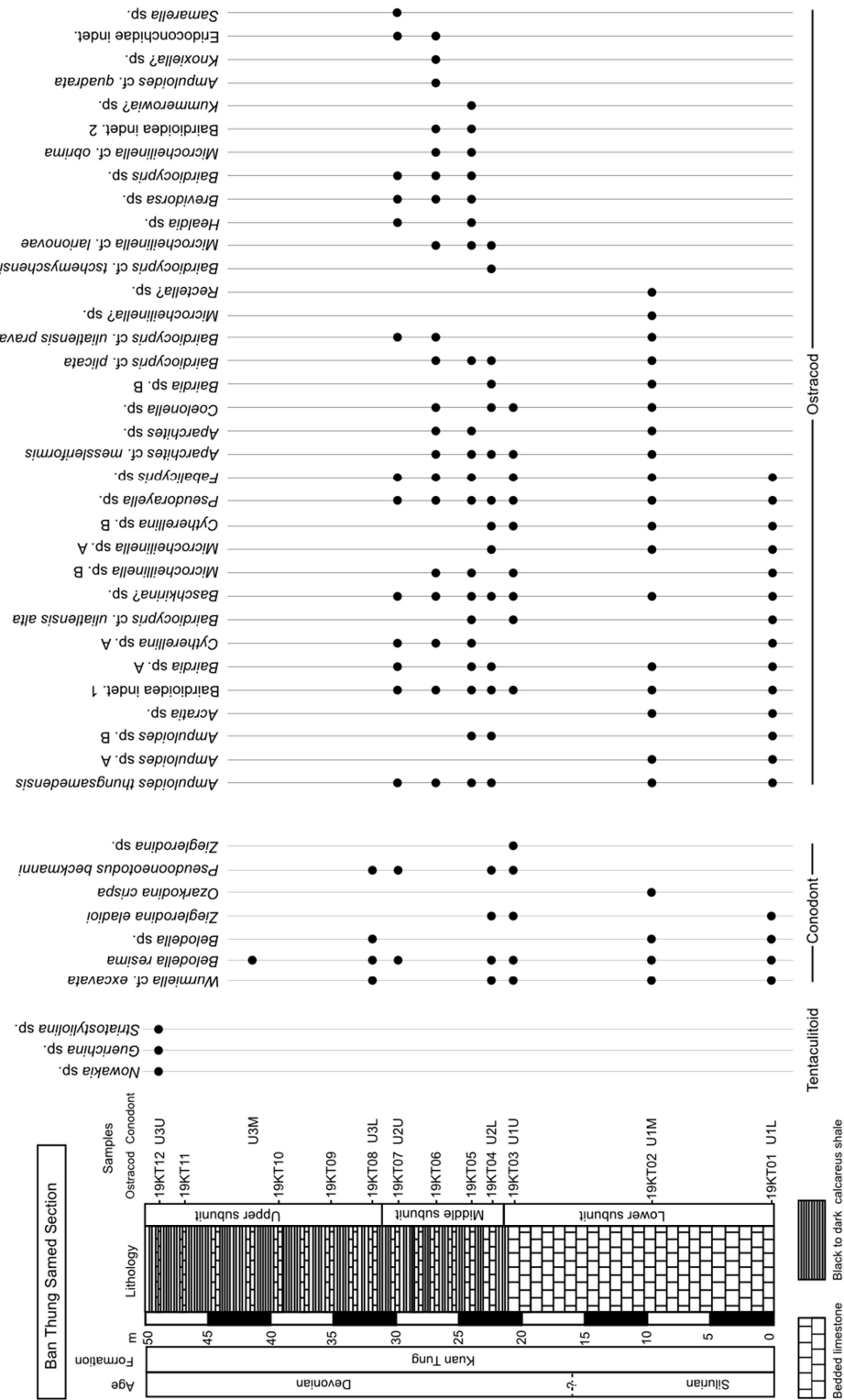


Figure 4.3 Distribution of ostracods, conodonts and tentaculitoids found in this study.