

# The Saraburi Group of North-Central Thailand: Implication for Geotectonic Evolution

Chongpan Chonglakmani

*School of Geotechnology, Suranaree University of Technology, Nakhon Ratchasima 30000, Thailand*

---

The Permian sequences, consisting predominantly of thick carbonate sediments, are distributed extensively in Thailand. They were well known as the Ratburi Limestone with its type area in the Ratchaburi province, western Thailand (Brown et al., 1951). Subsequent works in northern and northeastern Thailand led Bunopas (1981) to doubt the correlation of the limestone units found in these regions with those of the type area. He proposed the names Ngao and Saraburi Groups for the Permian limestones in northern and northeastern Thailand respectively. It is now widely accepted that the Ratburi Group, based on its faunal content, is quite different from the comparable limestone units in the north and northeast. The former belongs to the sediments deposited in the peri-Gondwana realm, whereas the latter two belong to the Tethyan realm (Ueno, 1999).

In Phetchabun fold-belt of north-central Thailand, a complex geosynclinal clastic-carbonate sequence (Nam Duk Formation) of Early-Middle Permian age was differentiated from the shelf sequence (Pha Nok Khao Limestone and Hua Na Kham Formation) found further to the east (Chonglakmani and Sattayarak, 1978). The deep sea Permian sediments have been confirmed and studied in more detail by subsequent investigations (Winkel et al., 1983; Wielchowsky and Young, 1985; Altermann, 1989).

In the Saraburi area about 300 km. south of Phetchabun province, the Permian Saraburi Group was subdivided into the Sap Bon, the Khao Khad, the Pang Asok, the Nong Pong, the Khao Khwang, and the Phu Phe Formations respectively in descending order. These range in age from Early to early Late Permian (Hinthonng et al., 1976). Detailed study of the Saraburi Group in the Saraburi-Pak Chong area allows the recognition of

various facies belts representing the shelf or platform, basin margin and deep basin environments. Platform facies consist predominantly of medium-to thick-bedded skeletal grainstones, packstones and wackestones of open shelf environment. Laminated micrites and dolomites representing the inner shelf are also present. The platform facies comprise the Phu Phe, the Khao Khad, and the Khao Khwang Formations. Slope or basin margin facies is represented by the Sap Bon, the Pang Asok and part of the Nong Pong Formations. They form a thick succession of bioclastic grainstones and packstones, tempestites, limestone breccias and conglomerates, allodapic limestones, siliciclastics and chert. Hummocky cross-bedding is common in grainstones of the upper slope particularly in the newly established Khao Phaeng Ma Formation. The deep basin or basin plain facies are characterized mainly by fine-grained sediments. They consist of thin-bedded shales, cherts, argillaceous micrites and allodapic limestones which are typical of the Nong Pong Formation.

The investigated area is structurally complex and belongs to the Loei-Phetchabun fold-belt. Many karstic terrains characterized by the shelf or platform facies are considered to be allochthonous based on stratigraphic, paleontologic, sedimentologic and structural evidences. No true oceanic crust is found in the Saraburi basin suggesting that the basin is relatively narrow and is not a true deep basin. Tectonically, the area including the Phetchabun fold-belt is part of a back-arc basin with a foreland area lying further to the east.

## References

- Altermann, W. (1989) Facies development in the Permian Phetchabun basin, Central Thailand. *Verlag fur Wissenschaft und Bildung*, p. 234.

- Brown, G.F., Buravas, S., Javanaphet, J., Jalichandra, N., Johnston, W.D. Jr., Sethaput, V. and Taylor, G.C. Jr. (1951) Geologic reconnaissance of the mineral deposits of Thailand. U.S. Geol. Surv. Bull. No.984, p.183.
- Bunopas, S. (1981) Paleogeographic history of western Thailand and adjacent parts of Southeast Asia-a plate tectonics interpretation. Unpubl. Ph.D. Thesis, Victoria Uni. of Wellington, New Zealand, 810 p.
- Chonglakmani, C. and Sattayarak, N. (1978) Stratigraphy of the Huai Hin Lat formation (Upper Triassic) in northeastern Thailand In: Nutalaya, P. (Ed.), Proc. 3<sup>rd</sup>. Reg. Conf. Geol. Min. Res. Southeast Asia, Thailand, pp. 739-774.
- Hinthong, C., Chuaviroj, S., Kaewyana, W., Srisukh, S., Pholprasit, C. and Pholachan, S. (1976) Geological map of Thailand 1:250,000
- Changwat Phra Nakhon Si Ayutthaya. Geol. Surv. Div., Dept. Min. Res., Bangkok, Thailand.
- Ueno, K. (1999) Gondwana / Tethys divide in East Asia: solution from Late Paleozoic foraminiferal paleobiogeography. In: Ratanasthien, B. and Rieb, S.L. (Eds.), Shallow Tethys 5. Proc. of Intl. Symp. on Shallow Tethys (ST) Chiang Mai, Thailand, pp. 45-54.
- Wielchowsky, C.C. and Young, J.D. (1985) Regional Facies variations in Permian rocks of the Phetchabun fold and thrust belt, Thailand. In: Thanvarachorn, P. (Ed.), Proc. Conf. Geol. Min. Res. Div., Northeast Thailand, Khon Kaen, Thailand, pp. 41-55.
- Winkel, R., Ingavat, R. and Helmcke, D. (1983) Facies and stratigraphy of the Lower-lower Middle Permian strata of the Phetchabun fold-belt in Central Thailand. In: Nutalaya, P. (Ed.), Proc. Workshop on Strat. Cor. in Thailand and Malaysia, Haad Yai, Thailand, v. 1, pp. 293-306.