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Accretionary complex related to Paleo-Tethys subduction in northern Thailand

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The Paleo-Tethys, which opened in response to the Devonian separation of the North China, South China and Indochina blocks from Gondwana, occupied a large area around the equator from the Devonian to Triassic, where carbonates, chert, and basalt were deposited in a pelagic domain (e.g., Metcalfe, 1999). These Paleo-Tethyan rocks characterized by Ocean Plate Stratigraphy were subducted beneath the Indochina Block during the Permian to Triassic (Wakita and Metcalfe, 2005).

In the Inthanon Zone of northern Thailand, melanges occur in association with oceanic rocks of Paleo-Tethys origin. According to Hara et al. (2009), melange formation was characterized by hydrofracturing and cataclastic deformation, with mud injection under semi-lithified conditions followed by shear deformation and pressure solution. Illite crystallinity data suggest metamorphic temperatures below 250 degree during melange formation. The combined structural and metamorphic data indicate that during melange formation, the accretionary complex related to Paleo-Tethys subduction developed at shallow levels within an accretionary prism. Asymmetric shear fabrics in melange indicate top-to-south shear. After correction for rotation associated with collision between the Indian and Eurasian continents, the trend of the Paleo-Tethys subduction zone is estimated to have been N80E. We conclude that the Paleo-Tethys was subducted northward beneath the Indochina Block from the Permian to Triassic. Sandstones are dominant within melange, generally characterized by lithic greywacke. Based on the composition and geochemistry of sandstones collected from melange within the Inthanon Zone, provenance of sandstone is characterized by mostly continental arc, and slightly continental margin. We interpreted that the origins of sandstones are from both of continent (Indochina Block) and arc developed along the Indochina Block, which is possibly the Sukhothai Zone. Based on melange kinematics and sandstone provenance, we reconstruct island arc system by the Paleo-Tethys subduction during Permian to Triassic time.

Keywords: accretionary complex, Paleo-Tethys, melange, sandstone geochemistry, Inthanon Zone, Thailand