



Exhumation of the Thabsila metamorphic complex in the Three Pagodas shear zone, Kanchanaburi Province, western Thailand: Geothermobarometry and Geochronology

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Within the NW-SE trending Three Pagodas shear zone, western Thailand, a narrow lenticular basement slice of high grade metamorphic rocks, called Thabsila metamorphic complex, is exposed. It is juxtaposed by fault contacts to the very low to non-metamorphic rocks of the shear zone and composed of marble, mica schist, quartzite, mylonites, calcsilicate, and varieties of gneisses. Classic geothermobarometry and pseudosection calculations were used in order to estimate the P-T variation between the exposed metamorphic rocks which can be divided into four units. Unit A experienced medium amphibolite facies conditions of $\sim 545\text{--}575$ °C and 7–8 kbar while units B, C and D experienced upper amphibolite facies metamorphism, $\sim 610\text{--}650$ °C and 7–9.2 kbar. Age of metamorphism and the cooling history were constrained from LA-ICP-MS U-Pb zircon ages and Rb-Sr biotite isochron ages. Metamorphic zircon rims yield a metamorphic age of $\sim 50\text{--}60$ Ma. These P-T-t data suggest that the Thabsila gneiss experienced peak upper amphibolite facies metamorphism during the early collision between India and Eurasia. Subsequently, it was exhumed due to strike-slip faulting along the Three Pagodas shear zone in the transtensional regime. The observed deformation stages D1 (constriction) and D2 (sinistral shearing) can be related to such exhumation stage. Final cooling of the basement rocks down to a temperature of $\sim 350\text{--}300$ °C is indicated by the biotite Rb-Sr biotite age around 32–36 Ma.