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In-situ 40Ar/39Ar Laser Probe Dating of Micas from Mae Ping Shear Zone, Northern Thailand

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The Mae Ping Shear Zone (MPSZ, also known as Wang Chao Fault Zone), which trends NW-SE from Myanmar to central Thailand, was considered as the southern boundary of the SE extrusion of Indochina and Sibumasu block during the Cenozoic escape tectonic event of SE asia. Many analyses of 40Ar/39Ar dating on biotite and K-feldspar, K/Ar dating on biotite and illite, zircon fission-track and apatite fission-track dating had been accomplished to constrain the shearing period. Nevertheless, it is hard to convince that the ages could represent the end of the shearing since none of the dated minerals have been proved to be crystallized syn-tectonically. Meta-granitoid and gneiss from the MPSZ were analyzed in this study by applying in-situ 40Ar/39Ar laser probe dating with combination of petrology and micro-structural analysis in the purpose to decipher the geological significance of the dates. Plagioclase was replacing K-feldspar for K-feldspar was cut and embayed by plagioclase observed by SEM + EDS. Muscovite in the granitoid own fish shapes of sinistral sense of shearing, and are always in contact with plagioclase and quartz, which suggests that the muscovite crystallized from the dissolving K-feldspar under amphibolite facies condition. 117 spots on 12 muscovite fishes yield ages from 44 Ma to 35 Ma and have a mean age of 40 Ma. Since the growth condition of the muscovite is higher than the closure temperature, thus we can interpret these muscovite ages as cooling ages. Hence left-lateral shearing of the MPSZ can be deduced as syn- to post-muscovite growth and uplifted the crystalline rocks within the shear zone. The ages of matrix biotite in gneiss has a mean age of 35 Ma, which is consistent with the cooling path reconstructed from previous studies. While the ages of inclusion biotite in the K-feldspar phenocryst scatter from 40 to 50 Ma due to the isotopes were not totally re-equilibrated during the shearing. Consequently, the left-lateral shearing of the MPSZ was supposed to initiate prior to 44 Ma and lasted till 35Ma, which is earlier than previously proposed.