



New thermochronological constraints on the timing of shear from the Khlong Marui and Ranong faults, Peninsular Thailand: implications for Himalayan lateral extrusion.

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New Ar-Ar data from the strike-slip faults of Peninsular Thailand indicate rapid uplift of mid-crustal ductile shear zones during the Eocene. The cooling ages are consistent with a northwards younging pattern of Ar-Ar cooling ages from the NW-trending Three Pagodas and Mae Ping faults in Northern Thailand, to the Ailao Shan-Red River fault in Vietnam and Yunnan, taken to reflect the northwards movement of India during the Cenozoic.

The peninsular structures: the Khlong Marui fault (KMF) and Ranong fault (RF), are major NNE trending strike-slip faults of respectively 220 km and 420 km length. Exposed mylonitic rocks bear consistently dextral kinematic indicators, unlike the sinistral mylonites of the NW-trending structures to the north. Brittle strike-slip and dip-slip faults overprint all the shear zones.

Rocks ranging from low grade mylonites to syn-kinematic amphibolite facies migmatites from the RF and KMF yield similar biotite Ar-Ar cooling ages, suggesting that uplift from all depths in the shear zone was rapid. Retrograde shear fabrics in places show that dextral shear may have continued during uplift.

While the new thermochronological data show that the peninsular mylonites cooled during the Eocene, constraint from pre- and post-kinematic granitoids strongly suggests that ductile shear occurred during the Late-Cretaceous to Paleocene. Since this is well before the onset of India-Eurasia collision, much of the ductile shear must pre-date that orogeny, and therefore cannot be related to Himalayan lateral extrusion, as has been speculated. The regional cooling pattern, however, shows that Indian indentation may have triggered progressive northward exhumation of mylonitic rocks. If the model of the peninsular faults is applied to the NW-trending faults in northern Thailand, then a pre-Himalayan history may also be recorded by those mylonites, rather than a simple, lateral extrusion-related history.