



Late Cretaceous extension and exhumation of the Stong Complex and Taku Schist, NE Peninsular Malaysia

Thomas François (1), Muhammad Afiq Md (2), Liviu Matenco (3), Ernst Willingshofer (3), Tham Fatt Ng (2), N. Iskandar Taib (2), and Mustaffa Kamal Shuib (2)

(1) Université Paris-Sud, GEOPS, Orsay, France (thomas.francois@u-psud.fr), (2) University of Malaya, Faculty of Science, Kuala Lumpur, Malaysia, (3) Utrecht University, Faculty of Earth Sciences, Utrecht, The Netherlands

Dismembering large continental areas by post-orogenic extension requires favourable geodynamic conditions and frequently occurs along pre-existing suture zones or nappe contacts as exemplified by the Stong Complex and Taku Schist of northern Peninsular Malaysia. For this particular case we have employed a field and microstructural kinematic study combined with low temperature thermo-chronology to analyse the tectonic and exhumation history. The results show that the late Palaeozoic - Triassic Indosinian orogeny created successive phases of burial related metamorphism, shearing and contractional deformation. This orogenic structure was then dismembered during a Cretaceous thermal event that culminated in the formation of a large scale late Santonian - early Maastrichtian extensional detachment, genetically associated with crustal melting, the emplacement of syn-kinematic plutons and widespread migmatization. The emplacement of these magmatic rocks led to an array of simultaneously formed structures that document deformation conditions over a wide temperature range, represented by amphibolite-facies mylonites and more brittle structures, such as cataclastic zones and normal faults that formed during exhumation in the footwall of the detachment. The formation of this detachment and a first phase of Late Cretaceous cooling was followed by renewed Eocene - Oligocene exhumation evidenced from our apatite fission track ages. We infer that an initial Cretaceous thermal anomaly was responsible for the formation of an extensional gneiss dome associated with simple shear and normal fault rotation. These Cretaceous processes played a critical role in the establishment of the presently observed crustal structure of Peninsular Malaysia.