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# Did the Malaysian Main Range record a weak hot Mega Shear?

Benjamin Sautter (1,2) and Manuel Pubellier (1)

(1) Laboratoire de Géologie, Ecole Normale Supérieure, Paris, France (benjamin_sautter@hotmail.fr), (2) Department of Petroleum Geosciences, Universiti Teknologi PETRONAS, Tronoh, Malaysia

The Main Range of Peninsular Malaysia is a batholith that extends over more than 500km from Malacca in the South to the Thailand border in the North. It results from the subduction/accretion history of the western margin of Sunda Plate by Late Triassic times. We present a structural analysis based on geomorphology, field observations and geochronological data. While most of the basement fabrics are characterized by N-S structures such as granitic plutons, sutures, and folds, a prominent oblique deformation occurred by the End of the Mesozoics synchronous with a widespread thermal anomaly (eg Tioman, Stong, Gunung Jerai, Khanom, Krabi plutons). Morphostructures and drainage anomalies from Digital Elevation Model (SRTM and ASTER), allow us to highlight 2 major groups of penetrative faults in the Central Range Batholith: early NW-SE (5km spaced faults some of which are identified as thrust faults) cross-cut and offset by NNE-SSW dextral normal faults. The regularly spaced NW-SE faults bend toward the flanks of the Batholith and tend to parallel both the Bentong Raub Suture Zone to the East and the strike slip Bok Bak Fault to the West, thus giving the overall fault network the aspect of a large C/S band. Hence, a ductile/brittle behavior can be proposed for the sigmoid faults in the core of the Batholith, whereas the NNE faults are clearly brittle, more linear and are found on the smaller outlying plutons.
Radiogenic crystallization ages are homogenous at 190±20Ma (U-Pb Zircon, Tc>1000°C and K-Ar Muscovite, Tc [U+F07E] 350°C) whereas Zircon fission tracks(Tc=250°C) show specific spatial zoning of the data distribution with ages at 100±10Ma for the outlying plutons and ages at 70±10Ma for the Main Range.
We propose a structural mechanism according to which the Main Range would be the ductile core of a Mega-Shear Zone exhumed via transpressive tectonics by the end of Mesozoic Times. A first stage between 100 and 70Ma (Upper Cretaceous) of dextral transpression affected Peninsular Malaysia at a lithospheric scale, accommodated by N-S faults (C planes) such as the Bentong Raub Suture Zone, the Bukit Tinggi fault and the Kledang Fault. This lead to the formation of NW-SE fractures in already exhumed peripheral plutons (< 250°C) and deep level (> 250°C) sigmoid faults (S planes) in the Main range. Later a brittle stage of exhumation occurred in the same system, after 70Ma, leading to NNE-SSW dextral Riedel type faults reactivating pluton flanks, and offsetting older faults as well as quartz dykes. The occurrence of such a structure could be linked to the subduction of the Wharton Ridge at the western margin of Sunda Plate. As a result, a collapse of this hot and thin crust occurred accommodated by LANF's reactivating the basement fabrics including intrusive edges and folds hinges.