



Late Cretaceous and Cenozoic exhumation history of the Malay Peninsula

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The evolution of Peninsular Malaysia up to the collisional period in the Triassic is well described but the evolution since the collision between Indochina and the Sukhothai Arc in Triassic times is less well described in the literature. The processes affecting Peninsular Malaysia during the Jurassic up to current day times have to explain the emplacement multiple intrusions (the Stong Complex, and the Kemahang granite), the Jurassic/Cretaceous onland basins, the Cenozoic offshore basins, and the asymmetric extension, which caused the exhumation of Taku Schists dome. The orogenic period in Permo-Triassic times, which also formed the Bentong-Raub suture zone, resulted in thickening of the continental crust of current day Peninsular Malaysia due to the collision of the Indochina continental block and the Sukhothai Arc, and is related to the subduction of oceanic crust once present between these continental blocks. The Jurassic/Cretaceous is a period of extension, resulting in the onland Jurassic/Cretaceous basins, synchronous melting of the crust, resulting in the emplacement Stong Complex and the Kemahang granite and thinning of the continental crust on the scale of the Peninsular, followed by uplift of the Peninsular. Different models can explain these observations: continental root removal, oceanic slab detachment, or slab delamination. These models all describe the melting of the lower crust due to asthenospheric upwelling, resulting in uplift and subsequent extension either due to mantle convective movements or gravitational instabilities related to uplift. The Cenozoic period is dominated by extension and rapid exhumation in the area as documented by low temperature thermochronological ages. The extension in this period is most likely related to the subduction, which resumed at 45 Ma, of the Australian plate beneath the Eurasian plate after it terminated in Cretaceous times due to the collision of an Australian microcontinental fragment with the Sunda margin in the Jurassic/Cretaceous period. This resumed subduction resulted in back-arc extension and the development of the Great Sumatran Fault. Back-arc extension as a result of slab roll back has been reported to account for rift basins present in Thailand, Malaysia, and Laos. It has also been reported to cause asymmetric extension structures. This leads to the suggestion that the extension that affected Peninsular Malaysia caused the exhumation of core complex and window structures like the Taku Schists as a result of localised, asymmetric extension. The extension is likely to have localised around the Central Belt and the Bentong-Raub suture zone as there are older structures related to the collisional of Indochina and the Sukhothai Arc present in these areas.