



Age and provenance of Triassic to Cenozoic sediments of West and Central Sarawak, Malaysia

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Sarawak is located on the northern edge of Sundaland in NW Borneo. West and Central Sarawak include parts of the Kuching and Sibul Zones. These contain remnants of several sedimentary basins with ages from Triassic to Cenozoic. New light mineral, heavy mineral and U-Pb detrital zircon ages show differences in provenance reflecting the tectonic evolution of the region.

The oldest clastic sediments are Triassic (Sadong Formation and its deep marine equivalent Kuching Formation). They were sourced by a Triassic (Carnian to Norian) volcanic arc and reworked Paleoproterozoic detritus derived from Cathaysia. The Upper Jurassic to Cretaceous Pedawan Formation is interpreted as forearc basin fill with distinctive zircon populations indicating subduction beneath present-day West Sarawak which initiated in the Late Jurassic. Subsequent subduction until the early Late Cretaceous formed the Schwaner Mountains magmatic arc. After collision of SW Borneo and other microcontinental fragments with Sundaland in the early Late Cretaceous, deep marine sedimentation (Pedawan Formation) ceased, and there was uplift forming the regional Pedawan–Kayang unconformity. Two episodes of extension followed and were responsible for basin development on land in West Sarawak from the latest Cretaceous onwards, probably in a pull-apart setting. The first episode is associated with sediments of the Kayang Group, deposited in the Latest Cretaceous (Maastrichtian) to Eocene, and the second episode with Upper Eocene sediments of the Ketungau Basin.

Zircon ages indicate volcanic activity throughout the Early Cenozoic in NW Borneo, and inherited zircon ages indicate reworking of Triassic and Cretaceous rocks. A large deep marine basin, the Rajang Basin, was north of the Lupar Line Fault in Central Sarawak (Sibu Zone) from the Late Cretaceous to the Late Eocene. Zircons from sediments of the Rajang Basin indicate they have similar ages and provenance to contemporaneous terrestrial sediments of the Kayang Group and Ketungau Basin to the south, suggesting a narrow steep continental Sundaland margin at the position of the Lupar Line, and a large-scale sedimentary connection between the terrestrial and deep marine basins in the Late Cretaceous to Late Eocene.

A recent reconstruction for the proto-South China Sea proposed an isolated so-called Semitau terrane colliding with SW Borneo and Sundaland in the Late Eocene. Our data show that the area of the Kuching and Sibu Zones were connected with SW Borneo and Sundaland from the Cretaceous onwards. The Cretaceous and Cenozoic sedimentary basins were sourced by alternations of Schwaner Mountains and Malay Tin Belt rocks. Our new age and provenance data cannot be explained by an isolated Semitau terrane and a Late Eocene collision.