



Paleomagnetic tests for tectonic reconstructions of the Late Jurassic–Early Cretaceous Woyla Group, Sumatra

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SE Asia consists of multiple continental blocks, volcanic arcs and suture zones representing remnants of closing ocean basins. The core of this mainland is called Sundaland, and was formed by accretion of continental and arc fragments during the Paleozoic and Mesozoic. The former positions of these blocks are still uncertain but reconstructions based on tectonostratigraphic, palaeobiogeographic, geological and palaeomagnetic studies indicate the continental terranes separated from the eastern margin of Gondwana. During the mid-Cretaceous, more continental and arc fragments accreted to Sundaland, including the intra-oceanic Woyla Arc now exposed on Sumatra. These continental fragments were derived from Australia, but the former position of the Woyla Arc is unconstrained. Interpretations on the former position of the Woyla Arc fall in two end-member groups.

The first group interprets the Woyla Arc to be separated from West Sumatra by a small back-arc basin. This back arc basin opened in the Late Jurassic, and closed mid-Cretaceous, when the Woyla Arc collided with West Sumatra.

The other group interprets the Woyla Arc to be derived from Gondwana, at a position close to the northern margin of Greater India in the Late Jurassic. Subsequently the Woyla Arc moved northwards and collided with West Sumatra in the mid-Cretaceous. Since these scenarios predict very different plate kinematic evolutions for the Neotethyan realm, we here aim to place paleomagnetic constraints on paleolatitudinal evolution of the Woyla Arc.

The Woyla Arc consists mainly of basaltic to andesitic volcanics and dykes, and volcanoclastic shales and sandstones. Associated limestones with volcanic debris are interpreted as fringing reefs. This assemblage is interpreted as remnants of an Early Cretaceous intra-oceanic arc.

West Sumatra exposes granites, surrounded by quartz sandstones, shales and volcanic tuffs. These sediments are in part metamorphosed. This assemblage is interpreted as a Jurassic–Early Cretaceous Andean margin above a NE dipping subduction zone.

We sampled limestones of the Woyla Group, and sediments of the West Sumatra margin for paleomagnetic analyses. Here we present new paleomagnetic data from Upper Jurassic–Lower Cretaceous limestones of the Woyla Arc. Preliminary results suggest that the Woyla Arc was formed near equatorial latitudes. This precludes interpretations that the Woyla arc was derived from Gondwana, near the northern Indian margin.

To account for (1) synchronous magmatism at the Woyla Arc and the West Sumatra continental margin, and (2) the juxtaposition of unmetamorphosed units of the Woyla Arc to highly metamorphosed units of the West Sumatra margin, we interpret the Woyla Group to be intra-oceanic arc formed above a SW dipping subduction zone in the Early Cretaceous, which was subsequently thrust over the West Sumatra margin during the mid-Cretaceous.