



Dragging and segmentation of the Burma and Sunda slabs caused by increasing curvature of the Sunda Trench

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We reconstruct the Cenozoic evolution of the Sunda Trench and segmentation of the Sunda and Burma slabs. Around 45 Ma, the Australian Plate became coupled to the Indian Plate and started moving rapidly northwards causing subduction underneath Eurasia. At the time of this subduction initiation, the Sunda Trench had a linear NW-SE trending geometry along Burma, Sumatra and Java. The eastern section of the Sunda Trench offshore Java experienced subsequent $\sim 45^\circ$ counterclockwise rotation during the Late Eocene–Early Miocene, thus acquiring a orientation perpendicular to the motion of the Indian-Australian Plate, and became stationary relative to the mantle, which may be an effect of slab anchoring into the mantle. Synchronously collision of India with Eurasia caused at least 15° clockwise rotation of the Burma section of the Sunda Trench, thus acquiring an orientation nearly parallel to the motion of the Indian-Australian Plate, where the Burma slab experienced increasing trench parallel dragging by the motion of the Indian-Australian Plate. This increasingly different orientation along the strike of the Sunda Trench caused increasingly differential motion between different sections of the slab, ultimately leading to tearing and segmentation into the Burma and Sunda slabs respectively during the Oligocene. Another consequence of the curved geometry of the Sunda Trench is that the slab became folded and faulted at depth, which may explain why segmentation of the slab is localized below the Andaman Sea. We propose similar mechanisms may also be responsible for slab dragging and slab segmentation at other strongly curved subduction zones.