Geophysical Research Abstracts,
Vol. 11, EGU2009-6162, 2009
EGU General Assembly 2009

The Australia – Indonesia continent to island arc collision: a case study of the Sunda-Banda Arc based on seismic and gravity modeling

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The eastern Sunda arc represents one of the few regions globally where the early stages of continent-arc collision may be studied. Our study area south and east of Sumba Island is located along the western limit of the collision zone at the Sunda-Banda arc transition, where the Australian margin collides with the Banda island arc, causing widespread back arc thrusting. The current system may be regarded as a precursor of a fold-and-thrust belt, which may develop in the forearc as the collision progresses. We present integrated results of a refraction/wide-angle reflection tomography, gravity modeling, and multichannel reflection seismic imaging using data acquired in 2006 along a 355 km long N-S oriented profile at 121°E. The composite structural model reveals the previously unresolved deep geometry of the collision zone. Changes in crustal structure encompass the 10-12 km thick Australian basement in the south and the 22-24 km thick Sumba ridge in the north, where backthrusting of the 130 km wide accretionary prism is documented. The structural diversity along the transect may be characteristic of originating collisional systems at the transition from oceanic subduction to continent-arc collision.