



An oceanic plateau subduction: A case study offshore Eastern Java.

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The area offshore Java represents one of a few places globally where the early stage of subduction of an oceanic plateau is observed. Our study area is located south of eastern Java and covers the edge of the Roo Rise plateau, the Java trench and the entire forearc section. For the first time the detailed deep structure of the Roo Rise is studied, subduction of which has a significant effect on the forearc dynamics and evolution and the increase of the geohazards risks. The tsunamogenic earthquakes of 1994 and 2006 are associated with the oceanic plateau edge been subducted. 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 corridor centered around 113°E and composed of a 340 km long N-S profile and a 130 km long E–W oriented profile. The composite structural models reveal the previously unresolved deep geometry of the collision zone and the structure of the oceanic plateau. The crustal thickness of the Roo Rise plateau is ranging from 18 to 12 km. The structure of the upper crust of the incoming oceanic plate shows the extreme degree of fracturing in its top section, and is associated with a plate bending. The forearc Moho has a depth range from 16 to 20 km. The gravity modeling requires a sharp crustal thickness increase below Java. Within our profiles we do not recover any direct evidence for the presence of the bathymetric features on the oceanic plate currently present below the accretionary prism, responsible for the tsunamogenic earthquake triggering. However vertical variations of the forearc basement edge are observed on the trench-parallel profile, which opens a discussion on the origin of such basement undulations, together with a localized patchy uplift character of the forearc high.