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Insights into the transitions in the Banda Arc-Australian continental collision from seismic imaging of deep slab structures

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We investigate the structure of the subducting Indo-Australian slab by utilizing data from 30 recently installed, temporary broadband seismometers (YS network) in the Banda Arc region of the Indonesia archipelago. This region is of particular tectonic interest as it is the archetypal example of a young arc-continent collision along with known varied lithospheric structure of the incoming plate. Previous (e.g. Widiyantoro et al. 2011) and preliminary body wave tomography indicate complex subducted slab structures, where gaps in fast velocity anomalies in the upper mantle are interpreted as slab tears and are linked to the variation in the incoming plate structures. The detailed shape and location of these tears are important for kinematic reconstructions and understanding the evolution of the entire subduction system. We image the mantle structure using a combination of methods, including body and surface wave tomography and infer mantle flow from seismic anisotropy. However, tomographic images are inherently smooth due to being produced with damped inversions and will then underestimate the sharpness of these structures. Therefore, we also investigate possible sharp-sided structures within and at the edges of the subducted plate with deep focus earthquakes beneath the Banda Arc that occur beneath the seismic stations. This combination of methods provides insight into not only imaging deep slab structure, but also assessing of the spatio-temporal evolution of the collision of oceanic to continental lithosphere of the Indo-Australian plate with the active volcanic arc.