

Establishing Earthquake Monitoring In Timor-leste

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The island of Timor is located in the center of collision between the Banda arc volcanic region in southeast Asia and the northern edge of continental Australia. This convergent margin is a highly seismogenic subduction zone setting and the complex geologic history of the island of Timor make for especially interesting research targets, but there has not been extensive geophysical research related to earthquake hazard and large-scale tectonics until recently. Our seismic experiment was designed to unravel the dynamics of the transition between oceanic subduction and collision of the Australian continental plate with the active volcanic arc and establish earthquake monitoring in Timor-Leste. This passive source experiment is composed of 30 broadband seismometers that extend across the Nusa Tenggara Timur region of Indonesia and Timor-Leste. This along-strike deployment allows for seismic imaging and assessment of the spatio-temporal evolution of this complex tectonic setting and recording of earthquakes across this zone. Our new, unique data allows us to compare to existing constraints on the degree of continental subduction, and will make it possible to produce new, high resolution images of the lithospheric structure and subducted slab morphology based on broadband seismic data recorded at this array. Initial results include records and initial locations of over 700 local earthquakes with magnitude greater than M4.5 in the Banda arc region. The large number of local events are providing a wealth of data to be used for many types of analyses such as waveform analysis to investigate deep slab structure, shear wave splitting to infer seismic anisotropy in the mantle, tomographic models of the crust and mantle, and importantly a new, regional earthquake catalog. In addition, teleseismic data will be used for structural seismology analyses that will provide new high-resolution images and inference into structure and evolution of the crust and mantle.