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Seismicity of southern Nicaragua and northern Costa Rica: A combined offshore and onshore study

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As part of the collaborative research center SFB574, the Central America subduction zone is being investigated by a seismological research subproject conducted by Costa Rican and German partners. The general goal of SFB574 is to study the origin and influence of volatiles and fluids in subduction zones. The seismological subproject constitutes the structural and seismotectonical framework of these investigations. Under this framework, several seismological network installations had already been accomplished. The amphibious network TOMO was operated from November 2005 to May 2006 encompassing the Isthmus of Nicaragua and northern part of Nicoya Peninsula, Costa Rica. The network comprises 19 ocean bottom seismometers provided by IFM-GEOMAR, Kiel and 35 land stations provided by GFZ, Potsdam and Red Sismologico Nationale (RSN), Costa Rica. Approximately 2000 earthquakes were recorded during the observation period. These events are located using a previously defined 1D model for this region. We observe two prominent features: 1) The intermediate and deep events, giving a preliminary idea of the geometry and the dip angle of the slab. In comparison to central Costa Rica, the dip angle is steeper. 2) Clusters of events in the region of continental slope which are related to the faults. These faults can be possible pathways for fluid flow. Fluid flow may generate earthquake clusters. For further insights into the composition and physical state of the lithosphere and the dynamics of the subduction zone, focal mechanism solutions and local earthquake tomography are going to be performed in the continuation of this work.