Regional Stress Variations in Southeast Asia

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During the Fall 2022 New Mexico State University and the University of Missouri, Columbia, plan to deploy 17 seismic stations in northern Thailand to study the tectonics of the Indo-Burma back-arc and southern Shan Plateau as part of the BACKSTOP (Burma Arc from Collision Kinematics to Subduction Tectonics as Observed from a Passive seismic experiment) project. One of the goals of the BACKSTOP project is to understand what are the driving forces that is causing the crustal deformation in the back-arc region of the Indo-Burma subduction zone. Could the deformation in the back-arc of the Indo-Burma subduction zone predominately related to the NNE- advancing of the Indian plate? Or could crustal and mantle flow around the eastern Himalayan Syntaxis also contribute to the deformation of the back-arc of the Indo-Burma subduction zone? Complementary to BACKSTOP project we are investigating the variations of regional stresses from moment tensor inversion in various parts of the Indo-Burma subduction zone. In order to determine regional variation in crustal stress, we plan to separate the Indo-Burma subduction zone into four sub-regions – Indo-Burma ranges, the Central Valley (including both the forearc and backarc basins), the Sagaing Fault region, and the Shan Plateau. We will use deeper earthquake's moment tensor solutions to determine the average stress in the subducted Indian plate. Initially, we have collected moment tensor solutions from the Global Centroid Moment Tensor (GCMT) catalog from 1976-2020. In a long run we will include moment tensor solution determined by individual scientists using analog data. Initial stress inversion of all shallow events (with depth less than 40 km) in the Indo-Burma subduction zone shows a tightly constrained principal NNE-striking compressive axis and this direction is approximately parallel to the plate motion between India and Eurasia. It seems to suggest that the compressive stress from the NNE advancing Indian plate relative to Eurasia is the dominate driving force for the crustal deformation. Over the next month we will separate moment tensors into separate tectonic domains as discussed above and determine the regional stress of variations of the Indo-Burma subduction zone. Slab events will be treated separately, and stress inversion will resolve if the down-dip extension due to slab pull is the dominate driving force of slab deformation within the Indian slab.