Seismogenic Zone Experiment (SEIZE) and the IBM Arc

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Ever since Uyeda and Kanamori (1979) first proposed two end member classifications (Chilean and Marianas) for subduction zone behavior, the IBM Arc has been considered the archetype of a weakly coupled plate interface, believed incapable of generating a large to great underthrusting earthquake. The angle of subduction (low for Chilean and high for Marianas) has been considered the primary factor controlling the degree of coupling along plate interfaces. Several factors influencing the angle of subduction have been proposed, but the most popular remains the age of the subducting lithosphere with younger, buoyant lithosphere subducting at a shallower angle than older more dense lithosphere.

The occurrence of the August 8, 1993 (Mw=7.7) underthrusting event beneath the island of Guam in the southern Mariana island arc challenges the IBM arc’s aseismic reputation. Similarly, rapid variations in the angle of subduction along the Andean margin challenge the assumption that lithospheric age controls subduction angle and the degree of seismic coupling. The Seismogenic Zone Experiments (SEIZE) in Central America and Nankai have been collecting data on the geometry and characteristics of the plate interface in these regions that are beginning to address the question of what controls seismic coupling at subduction margins. This talk will review some SEIZE results and their implications for the IBM Arc.