

AOB&COE Seminar

Lecturer: Dr. Stephen Kirby (USGS)

(1) April 13, 2007 (Fri) 10:00-12:00

Title: Seismicity of Hawaii

--Abstract--

The recent large earthquakes under the Island of Hawaii have prompted a review of the hypocenter distribution and focal mechanisms and tectonic environment of this active hot-spot setting in light of the physical processes of flexure of the Pacific Plate by the island mass loading, the gravitational spreading of the island, and the magmatic fluids released by magma ascent.

We suggest that previous suggestions that the Pacific Plate is thinner and/or weakened under the active volcanic sources are consistent with the spatial distributions of hypocenters and focal mechanisms. This physical state is also consistent with flexural models and the seismic wavespeeds inferred from seismic reflection surveys. Widespread release of supercritical CO₂ by ascending mafic magmas is thought to enable deep seismogenesis through their effect on reducing effective normal stresses at mantle depths. The deep mantle events are compressional in nature and resemble compressional deep events in outer-rise/near-trench flexural states in subduction zones.

(2) April 18, 2007 (Wed) 14:00-16:00

Title: Factors favoring the occurrence of giant interplate thrust earthquakes and tsunamis based on earthquake physics

--Abstract--

The M9.3 giant Banda Aceh earthquake and Tsunami of 26 December 2004 was a surprise and shock to the Earth Science Community. A fundamental question is whether there are other subduction systems that could also spawn such previously unexpected events. We have reviewed the instrumental and historical records of $M \geq 8.5$ earthquakes and giant tsunamis worldwide and have evaluated the various geological and geophysical factors that favor such giant events based on the perspective of earthquake physics. Using this knowledge, at least 15 subduction systems are considered potential candidates for being future sources of giant interplate thrust earthquakes and tsunamis that are destructive across ocean basins.

Place: Lecture Room #1 (Annex of RCPVE)

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