

Speaker: Dr. Min Chen

Title: "The Nature of Deep Earthquakes in the Western Pacific Subduction Zones"

Abstract: The nature of deep earthquakes has long been controversial because the source region is subjected to high pressures and temperatures that should inhibit the brittle failure necessary to generate seismic waves. Several mechanisms that may promote seismic deformation below 300 km depth include dehydration embrittlement, phase transformational faulting, and thermal runaway instabilities. The most referenced mechanism, phase transformational faulting, involves the breakdown of metastable olivine within the core of a cold subducting slab. In this talk, I will present our latest findings with full waveform modeling and inversion and b-value analysis of the deep earthquakes in Western Japan Subduction Zones. We will present our explanations of the deep earthquakes' nature, based on the following new observations, improved seismological definition of slab structure, the spatial relationships between deep slab interfaces and seismicity, and the mineralogical, stress, thermal properties of the slab that may control deep earthquake genesis.