Special Seminar

Imaging and Monitoring Large Crustal Fault Zones

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Earthquake ruptures produce rock damage associated with reduction of seismic velocities and increased attenuation. During interseismic periods there is rock healing. Damage generation is resisted by normal stress and healing is enhanced by it, so rock damage is especially pronounced in the shallow crust. Generation and healing of damage over many earthquake cycles produces a flower-shape fault zone structure, with significant damage in the top few km that decreases in amplitude and width with depth. A hierarchical damage structure of this type is observed with multi-scale/signal seismic imaging of crustal faults. Analyses of earthquake waveforms indicate significant co-seismic reduction of seismic properties that can be 30% or more in the top 500 m of the crust, followed by log(t) healing. Analyses of ambient noise detect small changes of properties, using larges time steps and longer periods compared to the earthquake waveform studies. Interpreting the depth section sustaining temporal changes of properties requires using wide range of periods and multiple analysis time steps.

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Conference Room, 3/F, Mong Man Wai Building

EARTH SYSTEM SCIENCE PROGRAMME

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