AOB Seminar

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講演題目&要旨：

Continental subduction induced tremor activity?

Southern Central Range of Taiwan, a place where deep-seated tectonic tremors (a proxy of slow slip) and earthquake swarms are closely located in space and highly correlated in time, provides rare opportunity towards the understanding of physical mechanisms governing different style of slip. To identify tremor events, we used the identification scheme similar to Ide et al. (2015) but applied slightly different techniques: (1) Higher waveform cross-correlation coefficient (>0.6) (2) careful visual inspection for excluding local earthquakes and short-lasted event (duration < 60 s) (3) Signal to noise ratio higher than 1.2 and lower than 30 (4) No spatio-temporal clustering technique used. During the study period of 2007-2012, we identified 2320 tremor events with duration ranging from 60 s to 1550 s. They are located underneath southern Central Range, forming a NS-striking and SE-dipping pipe-like structure at a depth of 20-40 km. The up-dip extension of this tremor structure reaches an aseismic zone under the western flank of Central Range at shallow depths, where is an area characterized by high heat flow, low Vp and Vs anomaly that indicates slightly metamorphosed sediments of the Pingtung Plain. Such seismic gap was explained by the buoyancy induced crust detachment during continental subduction of Eurasian Plate. This detachment may open a new channel for hot and ductile material ascending to shallow depth, producing high temperatures along the way. This provides a common mechanism for down-dip tremor and up-dip shallow seismic gap along the same eastern dipping channel. We argue that the tremors in Taiwan represent a combination of active prograde metamorphism (i.e., dewatering at moderate to high temperatures) and detachment and buoyancy-driven uplift. In addition, the tremor events are found to be mostly occurred in high tides and exhibit higher correlation with tide data from west coast of Taiwan. This may again imply the association between tremor activity and subduction of Eurasian Plate.