グローバルＣＯＥ地球惑星科学
フロンティアセミナー

講演者　：　Wen-che Yu　博士

所　属　：　Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan

日　時　：　2011 年 2 月 9 日(水)　14:00 – 15:30

場　所　：　地震・噴火予知研究観測センター　別館 第一会議室

担当教員　：　内田　直希　助教

内線# / E-mail:uchida@aob.gp.tohoku.ac.jp

Temporal velocity changes in the deep crust driven by aseismic afterslip of the great Sumatra earthquakes

講義内容：

We study temporal velocity changes associated with the great 2004 Sumatra (Mw 9.2) and 2005 Nias (Mw 8.7) earthquakes, using repeating earthquakes. The observations show several major features: (1) lag-times of high frequency coda waves grow monotonically as a function of lapse time for the 2005 repeating earthquake sequences; whereas lag-times of high frequency coda waves measured from the 2004 sequences fluctuate around zero and are sometimes negative against lapse time; (2) lag-times of S-wave coda are much larger than that of P-wave coda for the first few measurements immediately after the main shock, and lag-times of S-wave coda display a more prominent temporal decrease compared to that of P-wave coda; (3) normalized lag-time of high frequency S coda and long period Rayleigh waves display a progressive temporal recovery as a function of calendar time. In particular, the rate of temporal recovery of high frequency S coda is similar to the continuous GPS displacement time series at station LHWA near the 2005 Nias earthquake; (3) lag-time of long period Rayleigh waves is over 3-4 times larger than that of long period Love waves. Through forward modeling, we find two zones of temporal velocity reduction: A strong velocity reduction dVs of about -3% within a 250 meters superficial layer is primarily constrained by the relative amplitude in lag-times between Rayleigh waves and Love waves. We also find a weak, localized velocity reduction dVs of about -0.2% in the depth range of post-seismic afterslip in the overriding crust, determined by fitting the lag-time behavior of high frequency coda waves. A strong velocity reduction near the surface is most likely induced by co-seismic damage, and the subsequent temporal recovery is probably due to fault healing. The subtle velocity reduction would correspond to increase in crack density and the subsequent velocity recovery would correspond to decrease in crack density through diffusion of fluids in the deep crust.

主　催　：　東北大学　グローバルCOEプログラム
『変動地球惑星学の統合教育研究拠点』
拠点リーダー　大谷　栄治

連絡先:　宮城県仙台市青葉区荒巻字青葉
東北大学大学院理学研究科　地学棟 404 号
GCOE地球惑星科学事務室　苫米地　由布
TEL/FAX 022(795)6668