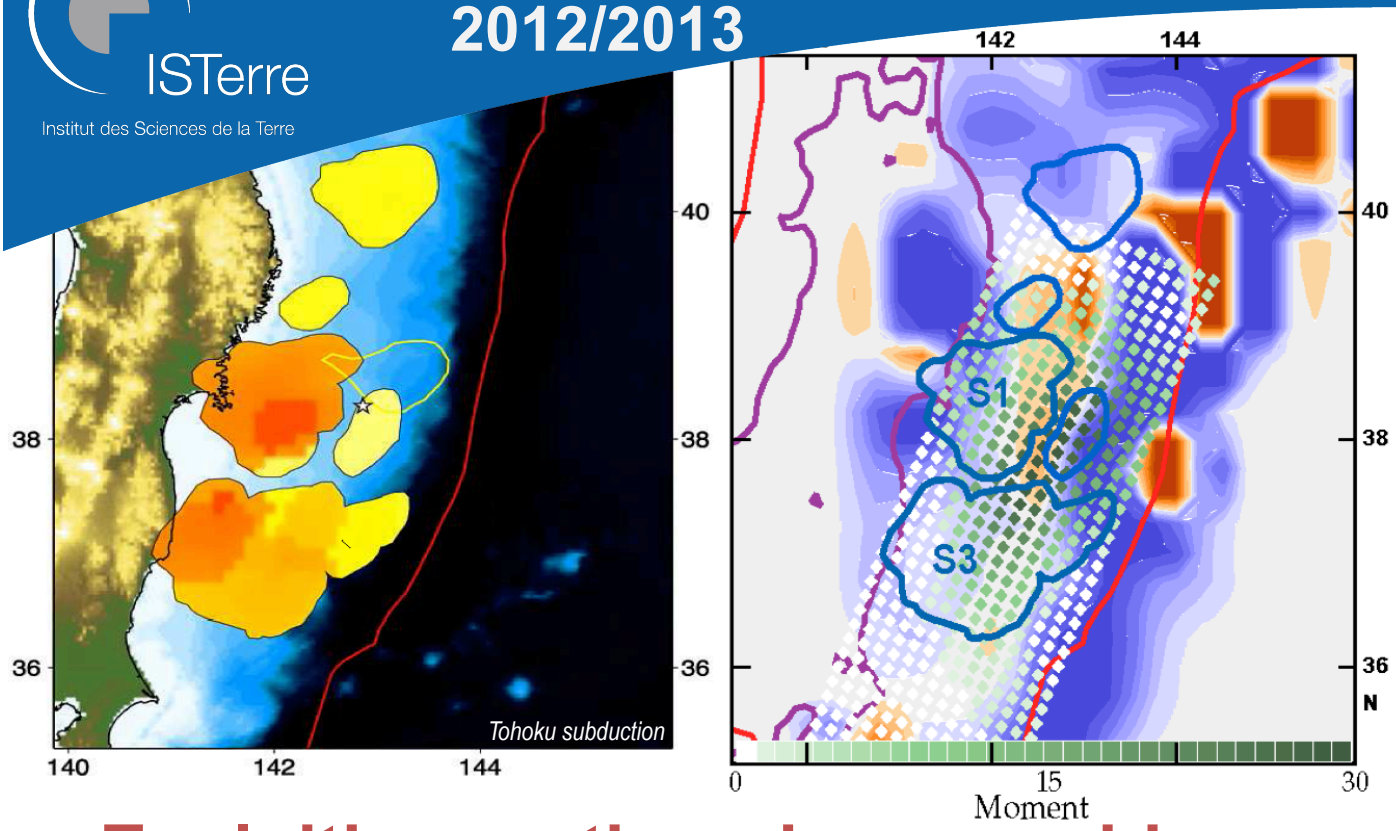
ISTerre
Institut des Sciences de la Terre

Grand Séminaire 2012/2013



Exploiting earthquakes – probing subduction zones

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Most of the world's earthquakes are associated with subduction zones where oceanic lithosphere descends into the Earth beneath an overriding plate. The growth of the sea floor through spreading at mid-ocean ridges is accommodated by recycling through the subduction process. The descending material is colder than its surroundings and the consequent variations in physical properties can be captured through their effects on the passage times of seismic waves between sources and receivers. Such seismic tomography is well suited to delineating the zones of faster wavespeed associated with the subducted plate.

By working with both compressional (P) and shear (S) waves we can develop multiple images of structure for each wavetype and so recognise changes within the subducting material. For the 2004 Sumatran-Andaman event (Mw 9.3) there is distinct segmentation of the earthquake that can be linked to changes in the physical properties of the subduction zone. More subtle features may well have controlled the source properties of the 2010 Mw 9.0 earthquake off the eastern coast of Japan that again produced a devastating tsunami.

High frequency energy from deep earthquakes carried up the subduction zone can cause significant ground shaking well displaced from the source. We would expect such energy to be rapidly shed from the zone of fast wavespeeds, but internal heterogeneity elongated along the plate is sufficient to trap the energy and bring it to the surface from even events as deep as 500 km. Such high frequency waves will be disrupted if the properties of the slab change, and provide useful probes to understand features in tomographic images.

Mercredi 29 mai 2013 à 11h

Salle de conférences d'ISTerre

OSUG-C, 1381 rue de la piscine, Campus Universitaire
Arrêt Tram B/C Bibliothèques universitaires

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