3D attenuation and velocity structure of the Cocos subduction zone in Mexico

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Background

MASE line: 01/2005 - 07/2007, consists of 100 broadband sensors.  
SSN local station

718 local events (3.1 < M < 6.6) with depths larger than 50 km, recorded by MASE, VEOX and SSN stations.

Attenuation

We use spectral decay method (Eberhart-Phillips and Chadwick, 2002) to determine the attenuation parameter *t* = *t*0, assuming a Brune-type source.

Velocity

Direct P wave arrival picked on HHZ (BHZ) component  
Direct S wave arrival picked on HHT (BHT) component

Inversion

The package simul2000 (Thurber and Eberhart-Phillips, 1994) is used for the inversion.

Data and analysis

718 local events (3.1 < M < 6.6) with depths larger than 50 km, recorded by MASE, VEOX and SSN stations.

Comparison

MT studies

High attenuation, low velocity, low resistivity in the lower crust beneath the Trans-Mexican Volcanic Belt (TMVB) suggests the existence of partial melts or fluids.

Along line CC

High attenuation and low velocity are observed beneath the Veracruz Basin.

Along line DD

High attenuation and low velocity are observed beneath the Veracruz Basin.

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The P-wave velocity tomography results are overlaid on top of the receiver functions results (Kim et al., 2011). The high V anomaly dipping from the Gulf of Mexico coincides with the discontinuities from the receiver functions, and is probably related to the collision between the Nubian block and Mexico in the Mesozoic.