Geophysical Research Abstracts
Vol. 15, EGU2013-4004, 2013
EGU General Assembly 2013

Verifying Slab-Induced Waveform Effects beneath Central Taiwan by Three-dimensional Simulations

Yu-Ting Huang (1), Li Zaho (2), Po-fei Chen (3), and Ling-Yun Chiao (1)

(1) National Tiawan University, Oceanography, Marine Geology and Geophysics, Taipei, Taiwan, Province Of China (r00241306@ntu.edu.tw), (2) Institute of Earth Sciences, Academia, Taiwan, (3) Department of Earth Sciences, National Central University, Taiwan

Verifying Slab-Induced Waveform Effects beneath Central Taiwan by Three-dimensional Simulations

Yu-Ting Huang1, Li Zhao2, Po-Fei Chen3, Ling-Yun Chiao1
1Institute of Oceanography, National Taiwan University, Taiwan
2Institute of Earth Sciences, Academia, Taiwan
3 Department of Earth Sciences, National Central University, Taiwan

ABSTRACT
The Taiwan Island is a result of the convergence between the Eurasia and Philippine Sea plates. To what extent the east-dipping Eurasian slab extends northward beneath central Taiwan and the geometry of the slab east of Taiwan are important issues for understanding the geodynamics of the regional tectonics. However, structures in the upper mantle beneath Taiwan are poorly constrained in regional as well as global tomography models. The TAiwan Integrated GEodynamic Research (TAIGER) project deployed several well designed temporary arrays, and the broadband teleseismic data from stations along a north-south transect across Taiwan has been utilized to examine patterns of the first P waveform variations. The P waveforms observed in central Taiwan are generally characterized by earlier arrival times, reduced amplitudes, and broadened pulse widths relative to those observed in northern Taiwan, indicating the existence of a deep slab beneath central Taiwan. In this study, to verify those observations, we invoke the spectral-element method (SEM) to calculate the synthetic seismogram for the same dataset. Results for the 1D velocity model show that in central Taiwan the observed P waveforms have earlier arrival times, reduced amplitudes, and broadened pulse widths relative to the P waves in 1D model. We then invoke a hybrid model in which we use a regional 3D model as the background and introduce two slabs - an east-dipping slab south of Taiwan and a north-northwest-dipping slab offshore northeast Taiwan - with a suite of different slab configurations to determine the best velocity model that fits the previous observations.