Geophysical Research Abstracts
Vol. 19, EGU2017-6289, 2017
EGU General Assembly 2017

Velocity and stress distributions of deep seismic zone under Izu-Bonin, Japan

Guoming Jiang, Guibin Zhang, and Zhengyuan Jia
China University of Geosciences, Beijing, China (jiang_guoming@cugb.edu.cn)

Deep earthquakes can provide the deep information of the Earth directly. We have collected the waveform data from 77 deep earthquakes with depth greater than 300 km under Izu-Bonin in Japan. To obtain the velocity structures of P- and S-wave, we have inversed the double-differences of travel times from deep event-pairs. These velocity anomalies can further yield the Poisson's ratio and the porosity. Our results show that the average P-wave velocity anomaly is lower 6%, however the S-wave anomaly is higher 2% than the iasp91 model. The corresponding Poisson's ratio and porosity anomaly are -24% and -4%, respectively, which suggest that the possibility of water in the deep seismic zone is very few and the porosity might be richer. To obtain the stress distribution, we have used the ISOLA method to analyse the non-double-couple components of moment tensors of 77 deep earthquakes. The focal mechanism results show that almost half of all earthquakes have larger double-couple (DC) components, but others have clear isotropic (ISO) or compensated linear vector dipole (CLVD) components. The non-double-couple components (ISO and CLVD) seem to represent the volume around a deep earthquake changes as it occurs, which could be explained the metastable olivine phase transition. All results indicate that the metastable olivine wedge (MOW) might exist in the Pacific slab under the Izu-Bonin region and the deep earthquakes might be induced by the phase change of metastable olivine.