Teleseismic Peak Ground Accelerations from the 30 May 2015 Bonin Deep Earthquake

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We show that the characteristics of teleseismic peak ground accelerations (PGAs) from the 30 May 2015 Bonin deep earthquake (Mw7.9) are consistent with those of the 2013 Sea of Okhotsk deep earthquake (Mw8.3) and previous large deep earthquakes which were examined by Kuge (2015). PGAs from the Bonin deep earthquake decrease with distance up to 110 degrees, and have a peak at a distance of 150 degrees. PGA values at distances between 40 and 85 degrees are associated with vertical components of direct P waves, and the average values range from 0.37 to 0.90 times the values from the Sea of Okhotsk earthquake. The logarithm of the amplitude decreases by 13% with an increase in distance of 10°, which is smaller, compared to that of the Sea of Okhotsk earthquake (18%). The difference can be attributed to different radiation patterns that affect the decay curves of PGA with distance by changing the amplitude of P waves. The average decay of PGA with distance agrees with the decay of the P-wave amplitude predicted by the ray theory using lower-mantle attenuation in a range between the values predicted by PREM and Hwang and Ritsema (2011). This is consistent with the observations from the Sea of Okhotsk and previous large deep earthquakes (Kuge, 2015). Frequencies characterizing the PGA decay for the Bonin earthquake are between 1.0 and 1.8 Hz, which is similar to the range between 0.8 and 1.8 Hz for the Sea of Okhotsk earthquake. For the Bonin earthquake, we cannot see spatial variations of PGA characterized by the tectonic setting, which was observed for the Sea of Okhotsk earthquakes. This could be because Western Europe and North America, where dominant contrast in PGA was observed, are located near a node of P waves and at distances close to 90 degrees, respectively.

