

Relocation of the aftershocks of the Suruga Bay earthquake using waveform cross-correlations

Sayumi Kimura^{1*}, James Mori¹

¹DPRI, Kyoto University

The Suruga Bay earthquake (M_w 6.2) was an intraplate earthquake that occurred at 05:07 (JST) on August 11 2009. The focal mechanism was mainly a thrust fault. The aftershocks distribution can be divided into two sections. The northwestern portion appears to dip toward the northeast and the southeastern portion appears to dip toward the south. The purpose of this study is to accurately relocate aftershocks to confirm the geometry of the fault planes of the earthquake. We used waveform cross-correlations for improving the estimates of arrival times of the P and S waves at stations around Suruga Bay. The data are waveforms recorded at 10 borehole stations of Hi-Net, operated by the National Institute for Earth Science and Disaster Prevention, for aftershocks of M_j 1.8 to M_j 2.5. We used several relocation techniques to determine the hypocenters, including a simultaneous inversion of hypocenters and a one dimensional velocity structure (SIMULPS), a simultaneous inversion of hypocenters and a three dimensional velocity structure (SIMULPS), and a one-dimensional velocity structure with hypoDD. The results show the clear difference in the pattern of aftershocks for the two regions of the fault plane. Comparisons of the various relocation procedures help to estimate the uncertainty of the hypocentral locations.