

Electric field variations induced by the tsunamis of the 2011 Tohoku-oki earthquake

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An ocean-bottom electromagnetometer (OBEM) emplaced 20 km west of the Japan Trench, 39.1 degrees north recorded the electric field variations around the March 11, 2011 Tohoku earthquake (M9.0). Two phases of the electrical field variation were recognized: 1) a large variation (8mV/km) between 14:47 and 14:51 in NNW direction and 2) a small variation (2mV/km) between 14:48 and 15:00 in ESE direction. These variations were possibly the first example of tsunami induced electric field variation because a former study that observed the tsunami-induced magnetic signal at the 50 km east of the trench did not record electric field due to instrumental problem (Ichihara et al., in rev). On the assumption that the electric signal are caused by tsunami, the variation 1) and 2) indicates short period wave (wave height: 5.0m) from ESE and long period wave (wave height: 1.4m) from SSW, respectively. The possible tsunami 1) is consistent to the impulsive wave from the narrow source along the trench in 39 degrees north (Fujii and Satake, 2013; Ichihara et al., in rev). The possible tsunami 2) is also consist to the long period tsunami by the wide source around 38 degrees north (e.g. Fujii and Satake, 2013).

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