

## First seafloor observation of Vector Tsunameter

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We developed a new type of offshore tsunami meter called Vector TsunaMeter (VTM) for the purpose of providing an early and reliable information on the propagation and generation of tsunamis in order to predict the tsunami impact at the coastal area. The VTM observes three components of magnetic fields, two horizontal components of electric fields and tilts, and a differential bottom pressure for more than a year at sea floor up to 6000 m water depth. Based on the observational records, the VTM is designed to detect the temporal variations of sea level change, and particle motion associated with the tsunami passages. Arrival time, arrival direction, and phase velocities of tsunamis can also be calculated from the observed record. These characteristics of tsunamis observed at deep ocean far from the coastline are very useful to forecast the arrival time and the size of tsunamis before the tsunami reaches the coastline. The first seafloor observation of VTM was made during this winter, in which the VTM was installed by KR12-18 cruise of the research vessel KAIREI, JAMSTEC on November 20, 2012 at 25-45.94N, 137-00.48E, Depth=4894m. And the VTM was safely recovered during KR13-03 cruise on February 9, 2013. The VTM continuously records the data sets of, Bx, By, Bz, Ex, Ey, TiltX, TiltY, and Bottom Pressure from Nov. 20, 2012 to the recovery time, i.e. Feb. 9, 2013. Three days before the recovery date, a Mw=8.0 earthquake occurred at the Solomon islands (10.738S, 165.138E) on 2013-02-06 01:12:27UTC. The Solomon islands earthquake generated tsunamis, which hit near Solomon islands and causes damages to human beings and houses. Since the main energy of the tsunami propagates along the north-east to south-west direction from the epicenter of the earthquake, the tsunamis observed at Japanese coast were low. At the observational site of VTM, amplitude of the first wave is as small as 1 cm, but the VTM clearly records the variations of sea level change for more than several hours after the tsunami arrival around 2013-02-06 08:40 UTC. This observation indicates the resolution limit of VTM is less than 1 mm of the sea level change.

Keywords: tsunami, Electromagnetic observation, differential pressure gauge, ocean dynamo effect, Ocean Bottom Electro-Magnetometer