Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MIS036-P114 Room:Convention Hall Time:May 27 14:15-16:15

Tsunami source area of the 2011 off the Pacific Coast of Tohoku Earthquake by back-propagation from offshore stations

Yutaka Hayashi[1*], Hiroaki Tsushima[1], Kenji Hirata[1], Kazuhiro Kimura[1], Kenji Maeda[1]

[1]Meteorological Research Institute

On 11th March, the largest earthquake (Mw 9.0 by JMA) since the recorded history of Japan occurred; JMA named it the 2011 off the Pacific coast of Tohoku Earthquake. Subduction zone along the Japan Trench have source areas on the plate boundary of several series of repeating large earthquakes. This paper determines the tsunami source area due to this huge earthquake by using tsunami arrival times detected by various offshore observatories (coastal wave gauges, RTK-GPS buoys, cabled deep ocean bottom pressure gauges, DART buoys) installed off Tohoku and its neighbor districts, and then determines which segments of repeating earthquakes are included. Although TM1-2 (cabled ocean bottom pressure gauges off Kamaishi) and seven GPS buoys stopped observation due to the tsunami or ground motions, most of them successfully detected tsunami arrivals before possible destruction of their inland facilities. Tsunami travel times are modified as much as 1 min corresponding to 150km distance from the epicenter, in order to consider difference of timing of tsunami source generation. Determined tsunami source area is approx. 2x10**2 km in width and 5.5x10**2 km in length; the area includes following segments of repeating large earthquakes, which are identified by Earthquake Research Committee, along the further side from the trench [last event]: southern half of Off Northern Sanriku [1968 M7.9], Off Central Sanriku [unknown], Off Southern Sanriku [1897 M7.7], Off Miyagi [1978 M7.4], Off Fukushima [1938 M7.5,7.3,7.4] and at northern half of Off Ibaraki [2008 M7.0]. In addition, it also includes center part of the area from off Sanriku to off Boso along the nearer side of the trench, where historically tsunami earthquakes [e.g. 1896 Mt8.2] have been generated. However, it suggested that the main shock did not rupture half part of Off Northern Sanriku and Off Boso nearer side of the Japan Trench [1677 Mt8.0].

Acknowledgements. Observation data distributed by MLIT (coastal wave gauges and RTK-GPS buoys), JAMSTEC (KPG-1, 2), ERI, Univ. Tokyo (TM-1, 2), JMA (Boso-2, 3), NOAA (DART 21413, 21418), and RFERHR (DART 21401) were engaged in this study.

Keywords: RTK-GPS buoy, cabled ocean bottom pressure gage, DART buoy, tsunami travel time, tsunami source area, multi-segment earthquake