[JJ] Evening Poster | H (Human Geosciences) | H-DS Disaster geosciences

[H-DS10]Tsunami and Tsunami Forecast

convener:Naotaka YAMAMOTO CHIKASADA(National Research Institute for Earth Science and Disaster Resilience), Kentaro Imai(Japan Agency for Marine-Earth Science and Technology), Hiroaki Tsushima(気象庁気象研究所)

Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

This session discusses issues related to improving real-time and long-term prediction accuracy of tsunami from earthquakes, landslides, and volcanoes, which include such as a better understanding of tsunami dynamics, new real-time tsunami observing systems deployed in the open ocean and coastal waters, methodologies of more rapid and accurate prediction during tsunami emergencies, more extensive and accurate inundation maps, and long-term tsunami potential forecast.

[HDS10-P03]Detectability of seismic wave from the assumed landslide of the 1998 Papua-New-Guinea tsunami

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The 1988 Papua New Guinea tsunami caused casualties over 2,200(Tappin 2008). The tsunami higher than 10 m followed an earthquakes of Mw 7.0. It is considered that the tsunami was caused by a submarine landslide because the tsunami was higher than that expected for an earthquake of magnitude 7, the tsunami generation was estimated about 10 minutes after the earthquake, and submarine topography which seemed to be related to the landslide was identified (e.g., Tappin et al., 1999; Synolakis et al., 2002). Tsunami caused by an ordinary earthquake can be aware of before its arrival by seismic analysis. In the case of the 1988 Papua New Guinea tsunami, it was impossible to prepare for the tsunami only by the ordinary seismic analysis. We discuss possibility of detecting landslides with seismic method. We checked additional seismic records closer than the previous report (Katsumata et al., 2016) and recalculated synthetic waves.

The PMG seismic station is located at a distance of 900 km from the source area of the 1998 tsunami event. We checked the seismic record obtained at PMG with band-pass filters of various pass bands from 0.2 s to 50 s. However no distinct phase was recognized 10 minutes after the seismic wave from the earthquake Mw 7.0. This was already pointed out by Synolakis et al.(2002). Seismic data at JAY station is archived at Ocean Hemisphere Project Data Management Center of ERI. The JAY station was located at a distance of 150 km from the source area. No distinct phase was recognized at JAY, either.

Watts et al. (2003) estimated the landslide which could caused the 1998 tsunami at the length of 4.5km, the width of 5km, and the thickness of 760m (half ellipsoid). The mass was considered to have slumped on a slope of 12 degree dip with characteristic time of 32 s and acceleration of $0.36 m/s^2$. The slump-supporting force should have changed during the landslide. Rough estimation of the force change is density ($2.15 X 10^3 kg/m^3$) X volume of the mass ($9 km^3$) X the initial acceleration ($0.36 m/s^2$). It turn out to be $7 X 10^{12}$N. Synthetic wave due to the force was calculated with the method of Takeo (1985). The amplitude of the synthetic wave was no more than the amplitude of the coda wave of the preceding seismic event. Detection of seismic wave from submarine landslide can not be anticipated after a seismic event. An alternative measure would be monitoring of off-shore tsunami gauges.

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We used seismic data archived in IRIS and Ocean Hemisphere Project Data Management Center of ERI. We used a program developed by Takeo (1985).

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