[JJ] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

[S-CG65]Reducing risks from earthquakes, tsunamis &volcanoes: new applications of realtime geophysical data

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As the number of population centers grows in regions with earthquake, tsunami and volcano hazards, the importance of improving methods for rapid, realtime estimates of activity increases. Realtime monitoring, analysis, and prediction of seismic ground motion, crustal movement and tsunami will be powerful tools to contribute to earthquake and tsunami disaster preparedness/mitigation. Tsunami and Earthquake Early Warning systems exist today in many locations around the world. Now JMA has started to promptly provide Eruption Notices to inform people of impending and beginning volcanic eruptions. Large events like the 2011 Tohoku Earthquake (Mw9.0) have demonstrated some of the shortcomings of existing techniques. In this session, we invite presentations on new ideas, methods and applications of (near) realtime analysis of seismic, geodetic and tsunami data, to the problem of realtime prediction aimed at improving disaster preparedness/mitigation in the fields of earthquake, tsunami and volcano observation. Presentations are encouraged to bring together scientists, engineers, and practitioners from a broad range of backgrounds from around the world, and to promote collaborative communication at the leading edge of the science and technologies.

[SCG65-P02]Characteristic records of ocean-bottom presure gauges close to a submarine fault : Effects of complex source time function and dispersion

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New ocean-bottom tsunami observation networks such as S-net and DONET have been recently deployed in the offshore Japan. Both S-net and DONET systems record tsunamis in terms of water pressure changes. During an earthquake, water pressure changes not only by tsunamis (i.e., sea surface heights) but also by water depth change of instruments, vertical accelerations of a seafloor itself (i.e., reaction force from water column), and radiated seismic waves. Tsunami researchers in the past needed wave heights along coast lines and considering only the effect of tsunamis since there were no offshore stations to directly observe water depth changes or sea bottom accelerations.
In this study, we calculated ocean bottom pressure changes during a tsunamigenic earthquake with a two-dimensional fault on seafloor uplift model, in order to compare the effects of tsunamis, water depth changes, and sea bottom accelerations. We carried out two types of comparison: (1) two types of source time functions with a common duration time were compared, and (2) two assumptions between dispersion and its omission, were compared. We adopted the analytical formulation of Saito (2013), based on the Fourie transform for incompressible, non-viscous and homogeneous fluid.
Above the fault, the contribution of sea bottom accelerations dominates over the other factors. This effect is strongly affected by the complexity of source time functions. That is, the more complex the function or uplift history is, the more significantly sea bottom accelerations should affect the observed

pressure changes. In contrast, there are no differences in tsunami propagation with different source time functions. Only with a record on far from the epicenter, we therefore would not know details of the source time function. We also found that a low-pass filter effect acts not only sea surface elevation but also reaction force from water column, associated with dispersive character. This means that there are two low-pass filters between sea bottom and sea surface, by water column and by transmission from sea bottom to sea water.