2-Dimensional Numerical Simulation of Internal Acoustic Waves at the Time of Tsunami Generation due to Seafloor Movement

Masanori Suzuki[1]; Hitoshi Mikada[2]; Yoshinori Sanada[3]; Yuzuru Ashida[4]; Hiroyuki Matsumoto[5]

[1] Dept. of Civil and Earth Resources Eng., Kyoto; [2] Kyoto Univ.; [3] Dept. of Civil and Earth Resources Eng., Kyoto Univ.; [4] Faculty of Engineering, Kyoto Univ.; [5] DSRD, JAMSTEC

At the 2003 Tokachi-oki earthquake of M8, seafloor phenomena such as a generation process of tsunami, seafloor uplifts, etc., were observed using a cabled observatory installed on the seafloor. Pressure fluctuations that took place co-seismically showed about 100 times in amplitude to those observed as the uplifts. It has been already studied by many authors that the uplift of seafloor generated not only tsunami but high amplitude acoustic waves which reflects the compressibility of seawater. Both the tsunami and acoustic waves were generated by the uplift and superposed to each other. In our study, we focused on this phenomena of acoustic wave generation associated with tsunami. After introduction of 2-dimensional numerical simulation, we try to see if this phenomena could be usable for future monitoring of tsunamis or not when seafloor moves up with a set of conditions in rise-time, water depths, etc. We demonstrate that either ocean bottom pressure gauges or GPS antennas installed right above the focal area of megathrust earthquakes or both would be able to detect the acoustic waves depending on the conditions of seafloor movement. We think that tsunami generation should be discussed in detail not only in long waves but in acounstic phenomena in terms of source-time function.