

## Optimization of offshore tsunami meter network using Green function.

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Nowadays, a tsunami waveform inversion plays a major role not only for scientific purposes, such as to determine the initial sea level change, but also for a practical application of tsunami disaster prevention. The effectiveness of the offshore tsunami meter has been long recognized for the tsunami inversion. The tsunami inversion using offshore tsunami meter network and the tsunami inversion has been the a popular subject in tsunami science. Japan is not the largest tsunami-affected country in the world, but it has one of the most advanced technologies in relation with the tsunami disaster prevention. Japan has been affected by many tsunami disasters in history, but the number of victims of each tsunami was about tens of thousands or so, owing to the well-established tsunami observing systems. In contrast, the o 2004 Sumatra island Tsunami (December 26, 2004 M9.1) killed approximately 230 thousand people in Indonesia being the largest damaged country, in which the number of the victims was about ten times of the 311 Tohoku tsunami. Unfortunately, it may be difficult for a developing country to develop a tsunami observation system equivalent to S-net independently, considering Indonesia's GDP is only 1/5 of Japan' s. If an offshore tsunami observation system is designed at costs of 1/5 of S-net, it can contribute to many tsunami-affectable countries. Several approaches and methods such as data resolution matrix have been studied as an objective method for optimally placing observation points using a linear inversion through the Green function. Furthermore, the amount of information obtained at each observation point can be increased by including flow velocity components. Therefore, we can achieved more accurate results using less observation points leading to the significant cost reduction. In this research, we present the result of virtual observation networks placed off Sanriku sea region. We conclude that by using three observed components (elevation, u, v) and data resolution matrix, we can properly assess the effectiveness of observation points which are equipped three component meters; located above the wave source; expanded from the Japan Trench to the Pacific Ocean.

Keywords: tsunami, inversion, observation network, optimization