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Quantitative Analysis of Magnetic Signals induced by the 2011 Tohoku Tsunami Flow around Chichijima Island(Part 2).

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Magnetic field generated by the 2011 off the Pacific Coast of Tohoku Earthquake Tsunami (March 11) was observed at the Chichijima geomagnetic observation station. Significantly at first, the onset of the geomagnetic perturbation precedes the tsunami observation at Chichijima tide gauge (Futami observation station) by 20 minutes. In order to interpret this phenomena, we constructed a numerical model has 10∗10 girds spacing 100km around Chichijima island, and estimates the sea water flow and height at each gird. These tsunami data were also estimated the influence to the geomagnetism according to Hamano model (Hamano et al., 2011).

Comparing the results to the geomagnetic observation, the preceding geomagnetic perturbation is considered that it was induced by the earliest arrival tsunami waves at north-west offshore area of the island. And it is also shown that the geomagnetic observation can detect tsunami waves in wide area comparing to the tsunami observation by tide gauge. But we could say that the simulation results were not sufficient, because 10∗10 grids might not be enough for induced magnetic field by tsunami waves.

At this lecture, we will show the enough results using 100∗100 grids spacing 2km. Moreover, we will show the simulated induced magnetic field by the fictitious geomagnetic observatory at the coast of Iwate and Miyagi prefectures where damaged by the 2011 Tsunamis. These results could have the meaning to the disaster prevention. Although the magnetic observation at coast has disadvantage for tsunami detection, because of shallow water depth around the station does not have A strong excitation magnetic field. However, this method or equipment does not need to soak in the ea water, the observation method using generated magnetic field can observe tsunami waves even from hill on land. Therefore, it may be able to continue observation when tide gauge stations will be destroyed by huge tsunamis. It will be shown the simulated results in this case.

Keywords: tsunami, geomagnetic field, motional induction, Chichijima, Kakioka, Faraday’s Law