Estimation of hypocenter and magnitude using 3-D velocity and attenuation structure

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As for the automatic hypocenter decision in the routine processing of the network of seismic stations, the case to calculate the wavy line simply by using the first former structure of the speed of the stratification from the viewpoint of deciding the position and the magnitude of the hypocenter while processing a large amount of data that comes in real time at high speed and to decide the hypocenter is most. However, it can be easily presumed that the Japanese Islands under is decided with a big error margin from a true hypocenter position because the structure sinks and is very complex in three dimensions. On the other hand, the three-dimensional speed structure and the attenuation structure of the Japanese Islands are requested by the tomography etc. in detail, and examined by Sekine and 2003 another by using the aftershock activity of the Miyagi Prefecture offing of 2003 for the case how the run and the hypocenter distribution change between the first former speed structure and the three-dimensional speed structure for instance. It is thought that enhancing the technique had been used by the first former speed structure so far when an automatic hypocenter was decided from such a flow by the routine processing to a three-dimensional structure and calculating are a big problems. Moreover, the hypocenter distribution and the magnitude, etc. that suit the reality or more by doing this processing are expected to the target at once as it is possible to obtain it.

In this research, the code in which the hypocenter calculation and magnitude calculation when a three-dimensional velocity and attenuation structure each P wave and S waves were given based on the technique of the hypocenter decision formulated by Hirata and Matsu'ura (1987) was developed. The three-dimensional speed structure and the attenuation structure used by this research are NIED Hi-net, respectively. It is a tomography from the data of net, a requested structure (Matsubara et. al. (2003), Sekine et. al. (2004), respectively), and ray tracer is used the parameterized shooting method (Sekine and Koketsu 2001).