System for automatic epicenter estimation of teleseismic events using large aperture arrays

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Array is one of powerful method for estimation of the location of teleseismic events. In the method back azimuth and slowness are first estimated and then the epicenters are determined using the information. Hoshiba and Kashiwabara (2002) discussed the array techniques and array operations using data observed at Hi-Net stations for the epicenter determination of teleseismic events. That is, Hi-Net was used as large aperture array. Semblance method was adopted here as one of the array techniques. They concluded that the precision of determination by using the Hi-Net array is a few hundreds km. Recently we constructed the system which automatically estimates the location of epicenter using the array technique. In this presentation, the system will be introduced.

In spring in 2002 Hi-net data are begun to transmit through satellite system operated by university group. Using the data semblance is always estimated at the interval of 1 second. When large amplitude and large semblance are estimated, the semblance is estimated again but more precisely. Using the back azimuth and slowness which give the maximum semblance, the location of epicenter is estimated. At present two computers are used: one is for estimation of semblance of every second and the other is for precise estimation of semblance.

For the computer of semblance estimation of every second, the CPU is occupied about 80 % for the calculation of 2 arrays that consist of 48 and 45 stations. Information of amplitude, semblance, back azimuth and slowness are displayed. Back azimuth and slowness are useful for detect of the phases and for discrimination of other events.

At present 4-5 minutes are required for the estimates of epicenter after the P wave incident at the array.