

## **Automatic arrival time picking using many parameters for the onset discrimination**

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Many authors developed the methods of automatic P and S wave arrival time picking in 1980's. Most of them are based on mathematical methods using AIC. However, reliable picking data are not obtained. Owing to the poor accuracy of automatic pickings, manually picked data is still used for the hypocenter location or the studies of seismic tomography. Because the performance of the recent computer rose drastically compared with that in 1980's, we can develop high quality automatic arrival time picking system, which can measure arrival times as accurate as nearly the same level with human being. We developed picking software, which firstly picks several candidates of arrival times and select a correct arrival time by using various algorithms and parameters for the judgment. Offline seismic observation was continued since 1995 at western Nagano Prefecture. Sampling frequency is 10 KHz. It is found that our new system can pick P wave arrival times with accuracy of about 1 -2 m sec for nearly 99 % of events.