

## Station corrections of the NIED S-net stations for hypocenter determination assuming a 1-D inland velocity model

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We investigated arrival time residuals of hypocenter determination in order to evaluate feasible station corrections of the NIED S-net stations for hypocenter determination assuming a 1-D inland velocity model in the NIED Hi-net routinely hypocenter determination. Seismograms recorded at the S-net and Hi-net stations and other stations operated by the JMA, Tohoku University or Hokkaido University were analyzed in this study. For 393 earthquakes in the period of 2016 - 2017, we picked *P*- and *S*-wave arrival times and estimated their origin times and epicenter locations from these arrival times under constraints on their source depths. In this analysis, source depths were fixed to the relatively reliable depths estimated by using CMT analysis from seismograms observed at the NIED F-net broadband seismometers and the Hi-net tiltmeter stations. Obtained results for deeper earthquakes than 30 km show that the observed *P*-wave arrival times are well explained by the model predicted arrival times within 100-km epicentral distances. Residuals for *S*-wave arrival times in the same epicentral distances are scattered in 0 to 4 s without epicentral distance dependency. On the other hand, results for shallow earthquakes than 30 km show strong dependency on epicentral distance. These indicate that static station corrections are effective for only deeper earthquakes. However, we have to select station corrections as a function of source depth and epicentral distance for shallow earthquakes.

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