

Importance of temporary GPS observations - Collaboration with GEONET and overseas deployment -

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Geographical Survey Institute of Japan has operated the nationwide continuous GPS array, now called GEONET, since 1994. With ongoing expansion and densification, the number of stations has increased to about 1200 and the average station separation has been shortened to 15-30km. Raw data obtained from the highly dense network and all the processed products are immediately opened to the public, which have made a great contribution to the development of geodetic and seismological studies. However, there still exist observation gaps in mountainous or deserted lands where commercial electric power and communication line are not available. Moreover spatial resolution of GEONET is not so high when we study local deformation relating to active faults, postseismic slip distribution after major earthquakes, or volcanic activities. Therefore temporary GPS observations that spatially interpolate GEONET are still important.

There is no dense continuous GPS array overseas except in southern California, USA and North Island, New Zealand. Though International GNSS Service (IGS) has currently organized more than 330 continuous tracking stations over the world, its main purpose is to maintain global and regional reference frames and to determine stationary plate motions. In addition, station distribution is so irregular that many stations are deployed in Europe and North America. In some countries where crustal activity is significantly high, only a small number of continuous GPS stations have been deployed mainly because of the economical reason. In these countries temporary GPS observation is the main tool not only for constructing public survey network but also for monitoring crustal deformation.

Compared with the continuous GPS observation, temporary observation has a disadvantage in accuracy. This is chiefly because of shorter data length, which makes difficult to estimate quantitatively and correct various error sources. Furthermore temporary observation requires more primitive data handling according to the observation style such as conversion of raw data, optimum baseline selection, and parameter estimation using adequate linear combination of phase data. Nevertheless we think temporary GPS observation is still important not only overseas but also in Japan. Temporary observation will fill observation gaps and open us new study fields.