

The New Application of GEONET for Multi-GNSS Observation and Height Determination with New Japanese Geoid Model

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SUMMARY

The Geospatial Information Authority of Japan (GSI) has been operating the GNSS Earth Observation Network system (GEONET) since 1996, as a fundamental national infrastructure for surveying, crustal deformation monitoring and precise Location Based Services. With the advance of multi GNSS environment, more users require GNSS data other than GPS, such as GLONASS, Quasi Zenith Satellite System (QZSS), Galileo, and so on. In response to these demands, GSI updated most of the receivers and antennas of about 1,300 GEONET stations by the end of March 2013. While GSI registered six GEONET sites as IGS stations, four of them became IGS multi-GNSS monitoring stations. GSI started to provide QZSS and GLONASS data besides GPS data, from May 13, 2013. RINEX files, including GPS, GLONASS and QZSS data, of 30 seconds epoch are available from download site of GSI. Moreover, one second epoch data for a network-based RTK-GNSS positioning is usable for all over Japan by the private sectors' service. GSI also determined the orthometric heights of 850 GEONET stations by leveling survey from the first order leveling bench marks. Geoid heights of those stations are also calculated from the orthometric heights and ellipsoidal heights determined by GNSS observation. By combining the geoid heights and Japanese gravity geoid model, JGEOID2008, Japanese geoid model, GSIGEO2011, which cover the whole area of Japan, will be established by the end of March 2013. Utilizing the new geoid model, orthometric height determination by GNSS observation is authorized as public survey. GSI also defined the new work operation procedure of the survey, including this height determination method.