

History of geoid model development by Geospatial Information Authority of Japan

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Upon the emergence of GPS in geodetic and land surveying, Geospatial Information Authority of Japan (GSI) has been establishing geoid models for Japan since 1990's in order to provide common platform to accurate determination of orthometric height with GPS and the maintenance of vertical datum of Japan. Foundational geoid models are determined by gravimetric approach: the first gravimetric geoid model is called as JGEOID93, and GSI has continued to update gravimetric model through enhancing the coverage and quality of gravity data and introducing improved/advanced methods, resulting in the latest model, JGEOID2008. Then GSI has developed hybrid geoid models of Japan, such as GSIGEO2000 and GSIGEO2011, by fitting the gravimetric geoid models as the foundational model to geoid heights measured over the entire country by GNSS/leveling method. With this approach, the hybrid models become consistent with the vertical datum of Japan, since the long-wavelength errors inherent to the gravimetric geoid models were estimated and removed/reduced in the resulting hybrid models. These hybrid geoid models of Japan are made available to (public) surveys, contributing to the efficiency of land survey and benchmark installation at lower class with GPS/GNSS. In the future, GSI plans to conduct airborne gravity measurements throughout the Japanese islands and develop a gravimetric geoid model of Japan with much improved accuracy, in order to realize more accurate determination of orthometric height with GNSS everywhere in Japan. We will talk about the history of geoid model development by GSI and their roles in geodetic and land surveying.

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