

Time varying Earth's gravity field model for simulation study of satellite gravity observation

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Satellite gravity has become increasingly important after successful launch of GRACE mission (2002), from the view points of various studies (e.g. atmosphere, oceanography, and hydrology) and also observing Earth's environment.

In this moment, Ministry of Education, Culture, Sports, Science and Technology of Japan funded 3 years project of GPS occultation and satellite gravity mission studies in Japan (PI: Toshitaka Tsuda of Radio Science Center for Space and Atmosphere, Kyoto University, Sub-PI : Yoichi Fukuda of Graduate School of Science, Kyoto University) since 2002.

As one of the studies in this project, we had developed time varying Earth's gravity field. We used physical models of atmosphere, ocean, hydrology, PGR (Post Glacial Rebound) and earthquake provided by the studies in this project. The provided models had to be pre-processed before combine to gravity field model because of their difference in temporal-spatial spacing, unit, and data format. We applied height correction to atmospheric model, which given as sea surface pressure, on the land. We removed S2 tide component (12-hour cycle) from atmosphere and ocean model to filter out aliasing effect arises from their 6-hours sampling.

The final output of the gravity model will be 6-hours sampling, 1 deg. x 1 deg. grid data (IEEE Big-Endian format), or Stokes coefficient up to 180 degrees/orders. This gravity field model will be used for simulation study of gravity field sampling using artificial satellite.