

Future efforts to contribute to the International Height Reference System (IHRIS)

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High-precision geodetic reference frame and height reference system are required for measuring sea level and crustal deformation of mm level. These reference systems are constructed and maintained by space geodetic observation, gravity measurement, ocean tide observation, and geodetic survey.

Space geodetic observation data such as VLBI, DORIS, and GNSS in Syowa Station have been provided for over 20 years, and they are contributing to the construction and maintenance of the International Terrestrial Reference Frame (ITRF). We are going to continue the space geodetic observations and contribute to the maintenance of the geodetic reference system.

In addition, we plan to make efforts to improve the accuracy of the height reference system. In order to establish the height reference system with a high accuracy, it is important to measure the geoidal height and gravitational field in a wide area, and we aim to implement the following observations;

- (1) Airborne gravity measurement
- (2) Absolute gravity measurement on outcrop rock area and an ice sheet
- (3) Relative gravity measurement in outcrop rock areas based on absolute gravity measurement points
- (4) Sea level measurement using GNSS Interferometric Reflectometry (GNSS-IR)

Airborne gravity measurement is indispensable for the geoid determination of wide area, and we aim to realize the airborne gravity measurement for the coastal area from the western part of Lützow-Holm Bay to the Prince Olaf Coast. Because absolute gravity values are needed at several points in a wide range as reference values of the measurement, absolute gravity measurements are also required. Although absolute gravity measurements have already been made at four locations in the outcrop rock areas of the Soya Coast, absolute gravity value is obtained at only one site in the Prince Olaf Coast and no value on the continental ice sheet. Therefore, it is necessary to conduct absolute gravity measurements in the area without reference gravity value. Furthermore, we will carry out relative gravity measurement with RTK-GNSS measurement to increase the number of gravity measurement sites with three-dimensional position coordinate. In addition, sea level height measurement using GNSS-IR will be conducted in order to determine the geoid and ocean tide of the coastal sea area.