

THREE-DIMENSIONAL TOPOGRAPHIC AND GRAVITY ANOMALY
MAPS IN AND AROUND MIZUHO PLATEAU,
EAST ANTARCTICA (ABSTRACT)

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A re-compilation of gravity data around Syowa Station, East Antarctica (68–78°S, 25–55°E) was made, to present three-dimensional contour maps of free-air and Bouguer anomalies. Ice sheet and bedrock topographies contour maps were also obtained. Gravity values calculated by Potsdam System are unified to IGSN71 System, and the accuracy of the gravity values was evaluated.

In the Mizuho Plateau, some free-air and Bouguer anomalies were calculated based on the ground survey by the Japanese Antarctic Research Expedition snow traverse parties, and others were by the height from WGS-72 ellipsoids (NNSS). Therefore, in the latter case, to remove this confusion, we re-calculated free-air and Bouguer anomalies using the geoid height estimated by a geoid model (GEM-10b). In this study, we regarded that the geoid model corresponds to the mean sea level at Syowa Station. The results are as follows: 1) The accuracy of the gravity value determination is better than 3 mgal. 2) An accuracy of free-air anomaly is about 10 mgal. The latter accuracy is dependent on the accuracy of height determination.

However, an ice thickness (in other words, bedrock topography) obtained by a radio echo sounding sometimes showed large differences in values at the same observation point by different observations (the maximum difference is larger than 300 m). This may be caused by the incorrect identification of an internal boundary of ice layer as a real boundary between ice and bedrock. Therefore, simply obtained Bouguer anomaly may have a large error in some cases. One of our final goals is to make a bedrock topography map taking into account the results of the gravity data.

(Received April 9, 1991; Revised manuscript received May 7, 1991)