

ABSOLUTE GRAVITY MEASUREMENT AT SYOWA STATION, ANTARCTICA (ABSTRACT)

Satoshi FUJIWARA¹, Kazuo WATANABE¹ and Yoichi FUKUDA²

¹*Geographical Survey Institute, 1, Kitasato, Tsukuba 305*

²*Beppu Geophysical Research Observatory, Kyoto
University, Noguchibaru, Beppu 874*

An absolute gravity measurement was carried out for the first time at the class A absolute gravity station of International Absolute Gravity Basestation Network (IAGBN) in Syowa Station by the 33rd Japanese Antarctic Research Expedition (JARE-33). A transportable absolute gravimeter, which adopts a symmetrical free rise-and-fall method (called Sakuma-type gravimeter) was used.

In 1962, JARE-6 carried out a gravity measurement at Syowa Station using a pendulum-type gravimeter. The gravity value which was obtained has been used as the reference gravity value at Syowa Station (69.0°S, 39.6°E). However, the pendulum measurement is not an absolute gravity measurement and the precision does not meet recent geodetic and geophysical standards. Moreover, the International Union of Geodesy and Geophysics/International Association of Geodesy (IUGG/IAG) meeting has selected Syowa Station as one of the IAGBN stations. This station is going to be the reference point for relative gravity measurements around Syowa Station, and secular change of gravity will be detected by repeated absolute gravity measurements.

Our absolute gravity measurement was carried out on the IAGBN station in the gravity observation hut which had been built by JARE-32 (February 1991). The total number of measuring days was 15 during the period from January 4 to January 28, 1992. The adopted corrections for the data processing were as follows; (1) Earth tides reduction: The observed tidal parameters (OGAWA *et al.*: J. Geod. Soc. Jpn., **37**, 13, 1991) were used. (2) Response to air pressure: The actual observed air pressure variations were used. (3) Earth rotation changes: The polar motion reduction (INTERNATIONAL GRAVITY COMMISSION-WORKING GROUP II: Bureau Gravimetrique International Bull. D'information, **63**, 51, 1988) was used. (4) Gravity gradient: The observed gravity gradient (dg/dz) by four LaCoste & Romberg gravimeters was used (G515, G583, G590 and D73). The obtained results were:

Number of measurements	: 834
Gravity value	: 982524.187 ± 0.001 mGal (mGal = 10^{-5} m/s ² , No Honkasalo correction)
Standard deviation of	
a single measurement	: 0.030 mGal
Gravity gradient	: 0.334 mGal/m

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