

Preliminary report of absolute gravity measurements in Australia and Syowa Station, Antarctica.

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For enhancing the absolute gravity station network in southern hemisphere and calibrating superconducting gravimeters at GGP (Global Geodynamic Project) observation sites, we have carried out absolute gravity measurements in Perth, Australia and Syowa Station, Antarctica, as a part of activities of the 45th Japanese Antarctic Research Expedition (JARE-45) during 2003-2004. We will also carry out parallel observation of an absolute gravimeter and the superconducting gravimeter in Canberra, Australia from late March to mid April, 2004.

The measurements in Perth were conducted on November 25 and 26, 2003, using the FG-5 (#210) of Kyoto University at the Perth observatory (Station code 7999.0117) located approximately 25km from the center of Perth. We conducted 5400 drops including test measurements, and obtained more than 5200 effective drops. Preliminary gravity value at the gravity point is 979403619.9 +/- 0.16 micro gal (formal error), +/- 3.0 micro gal (accuracy) using 0.3396 mgal/meter as the gravity gradient.

With the aim of detecting secular gravity changes and calibrating the superconducting gravimeter (CT-043) in Syowa Station, Antarctica, we carried out absolute gravity measurement using the FG-5 #210, which was employed for the measurements in Perth, and FG-5 #203 of Geographical Survey Institute.

There is a category 'A' point of International Absolute Gravity Basestation Network (IAGBN) in the gravity observation hut of Syowa Station and continuous superconducting gravity observation is conducted in the same hut. We conducted absolute gravity measurements using the two FG-5s; one occupied the basement on which the IAGBN point is located and the other occupied a spare basement in the gravity observation hut. Exchanging the occupied points to check the instrumental offset between two meters, parallel observation with CT-043 were conducted from December 30th, 2003 to February 1st, 2004. Although absolute gravity measurements by mean of FG-5 were conducted twice in Syowa Station so far, this is the first time to employ two meters at the same time. Furthermore, making use of lessons of the past, we tried to diminish human noises and to keep the room temperature stable. Consequently we obtained very good data, and preliminary result shows the discrepancy between two meters is only 2 to 3 micro gals.

In late March, Icebreaker 'Shirase' will call at Sydney during the return trip to Japan. On the opportunity, we will conduct parallel measurements with the superconducting gravimeter and the FG-5 #210 at Mt Stromlo observatory in Canberra. Status and preliminary results of the measurements will be also reported.