

Heavy snowfall in East Antarctica and recent weakening of the Chandler wobble observed with the superconducting gravimeter at Syowa Station.

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Continuous gravimetric observations have been made with three successive generations of superconducting gravimeter (SG) over 20 years at Syowa Station (39.6E, 69.0S), Dronning Maud Land (DML), East Antarctica. The third-generation SG, OSG#058, was installed in January 2010. Five years of OSG#058 data from January 2010 to January 2015 were of high quality, with no missing data and with no step-like noise. So we could examine the long-period gravity variation precisely. Non-tidal gravity variations derived from the OSG#058 data showed significant correlation with the accumulated snow depth observed at Syowa Station. We inferred the gravitational effect of the accumulated snow mass (ASME) detected by OSG#058. Moreover, the accumulated snow depth at Syowa Station was found to represent heavy snowfall (the snow accumulation) in a broad region in DML, which was estimated from the Gravity Recovery and Climate Experiment (GRACE) satellite gravity data. Such snow accumulation around Syowa Station was detectable by OSG#058. A gravitational response to the Chandler wobble (CW) was deduced from the OSG#058 non-tidal gravity variations after correcting the ASME. The observed response agreed roughly with the predicted response in both amplitude and phase. We also found that recent CW weakened and its period gradually decreased. We will discuss the relation between the heavy snowfall in DML and the weakening of CW, which were observed with OSG#058.

Keywords: Superconducting gravimeter, Increase of snow accumulation in East Antarctica