

Gravity observation using a superconducting gravimeter at Ishigakijima, Japan (part 2)

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About one year has passed since we installed a superconducting gravimeter at the VERA Ishigakijima Station, National Astronomical Observatory Japan, in February 2012, with the aim of detecting possible gravity changes associated with the slow slip events (SSE) taking place beneath the Yaeyama Islands. In the first month, the condition of the gravimeter was not very good because the temperature control was unstable. We solved the problem in March 2012. In the end of September, there was a power failure caused by the typhoon Jelawat, which lasted for about one day. Although the observation system was not damaged, the gravity signal indicated an instrumental offset before and after the power failure. On January 7, 2013 an earthquake (M=5.4) occurred near Yonagunijima island, which also caused a small instrumental offset in gravity. Except for these problems, the gravimeter has been producing an almost homogeneous and continuous dataset of temporal gravity changes.

Up to now, the gravimeter has experienced two instances of slow slip events, one from May 2012 to June 2012 and one from December 2012 to January 2013. In order to clarify the gravity changes related with the SSE, the gravity data must be corrected for the effects of atmospheric pressure, ocean tides, and groundwater. We have noticed difficulties in these corrections because of possible interactions between these parts, resulting in complicated responses of gravity. Our tentative conclusion with simple schemes of corrections is that the gravity indicated an increase (~ 2 microGal) before the SSE and a decrease (~ 2 microGal) during the SSE. This may reflect some movements of mass beneath the Yaeyama region in addition to the crustal deformations caused by the SSE.

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