On the cause of the 'mode' noise of the superconducting gravimeter

Yuichi Imanishi[1], Mitsuyuki Hoshiba[2], Kazuya Kokubo[3], Hidee Tatehata[4]

[1] ORI, Univ. of Tokyo, [2] Matsushiro Seis. Obs., [3] Matsushiro Seis. Obs.,JMA, [4] Matsushiro Seismological Observatory, JMA

The so-called 'mode' noise that is inherent in the superconducting gravimeter is investigated. Tilt spectra and gravity spectra are found to be well correlated at the period of the mode (90 s). Also, the admittance of gravity with respect to tilt is very similar to that of a second-order resonant dynamic system with its resonance period of 90 s. Moreover, it is observed that the mode noise almost vanishes when the tilt compensation system is turned off. In conclusion, the mode noise must be related to some rotational mode of the superconducting sphere that is excited by torque mainly from the tilt compensation system. The mode noise has little contribution to the observational noise of the superconducting gravimeter in the frequency band of the Earth's free oscillations.