Global comparison of superconducting gravimeter records of GGP and OHP networks at normal-mode frequencies

Kazunari Nawa[1], Naoki Suda[2]

[1] GSJ, AIST, [2] Earth & Planet. Sys. Sci., Hiroshima Univ.

Superconducting gravimeter (SG) records of GGP (Global Geodynamics Project) and OHP (Ocean Hemisphere Project) networks are now available for investigating global gravity change at very broadband frequencies. Using these records we can study not only Earth and ocean tides at periods longer than several hours but also Earth's free oscillations at periods shorter than several minutes. The records are also useful for analysis of the Earth's background free oscillations (BFO).

We analyzed the records of GGP and OHP networks for evaluating noise level at normal-mode band and examined visibility of BFO. The method for creating averaged power spectrum is almost the same as in Nawa et al. (1998, 2000) and Suda et al. (1998). Referring to Harvard CMT catalogs, we selected power spectra for seismically quiet periods, which include no earthquakes larger than Mw=5.7, and then stacked them for each station.

BFO signal was detected stably and distinctly at least noisy stations: CB (Canberra), MA (Matsushiro) and ST (Strasbourg). Noise level at the quietest SG station CB was, however, still higher than those at quiet IRIS and GEOSCOPE STS-1V stations, which achieved at a level of 1 x 10^{-18} m^2s^{-3} (e.g. Nishida et al., 2000). At BO (Boulder), MB (Membach), ME (Metsahovi), SY (Syowa Station) and VI (Vienna), the signal was less clear because of relatively higher noise levels but it can still be identified. Noise levels of records from new CT-type SGs with a small dewar and bottom-mounted thermal levelers were generally lower than those from old TT-type SGs with a large dewar and top-mounted thermal levelers. We require more environmental data to clarify the origin of higher noise level: sensor itself and/or site environment.