Geophysical Research Abstracts
Vol. 14, EGU2012-4857-1, 2012
EGU General Assembly 2012

Gravity observations at the GOPE station and modeling of free oscillations

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The superconducting gravimeter OSG-050 with 1 Hz sampling frequency is located at the Geodetic Observatory Pecny (GOPE), Czech Republic. In March 2011, free oscillations excited by the great Tohoku earthquake were registered. Data from the collocated broadband seismometer CMG-3TD exhibit higher noise level below 2 mHz, i.e. in the frequency range of the longest modes. We analyzed the gravity data to demonstrate their quality in dependence on the chosen time window after the earthquake and compared them with our synthetic calculations for several source models. Our software based on matrix eigenvalue approach includes mode attenuations and frequency splitting due to the rotation and ellipticity, and allows us to compare long-time synthetic accelerograms with the data. Special attention is paid to degree-one overtones, e.g., we show that the mode 3S1 dominates the 3S1-2S2-1S3 triplet in the GOPE observations and present the synthetic results for the triplet over the globe.