Extracting Ocean-Generated Tidal Magnetic Signals from Swarm Data through Satellite Gradiometry - DTU Orbit (08/11/2017)

Extracting Ocean-Generated Tidal Magnetic Signals from *Swarm* Data through Satellite Gradiometry

Ocean-generated magnetic field models of the Principal Lunar, M_2, and the Larger Lunar elliptic, N_2, semi-diurnal tidal constituents were estimated through a "Comprehensive Inversion" of the first 20.5 months of magnetic measurements from ESA's Swarm satellite constellation mission. While the constellation provides important north-south along-track gradiometry information, it is the unique low spacecraft pair that allows for east-west cross-track gradiometry. This latter type is crucial in delivering an M_2 estimate of similar quality with that derived from over 10 yrs of CHAMP satellite data, but over a shorter interval, at higher altitude, and during more magnetically disturbed conditions. Recovered N_2 contains non-oceanic signal, but is highly correlated with theoretical models in regions of maximum oceanic amplitude. Thus, satellite magnetic gradiometry may eventually enable the monitoring of ocean electrodynamic properties at temporal resolutions of one to two years, which may have important implications for the inference of ocean temperature and salinity.

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