TOWARDS MONITORING MAGNETIC SIGNALS GENERATED BY OCEAN TIDES

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The existence of magnetic signals generated by the tidal motion of ocean has been deduced from measurements of the geomagnetic observatories and CHAMP satellite mission. These signals are clearly evident in measurements taken at geomagnetic observatories close to ocean shorelines; however, the observatories are too sparsely placed to allow a global analysis of the motional induction effects in the ocean. The identification of these signals in satellite observations explicitly needs to minimize the uncertainties arising from magnetospheric and ionospheric contributions. The first clear detection of the signal related to the most strongest ocean tide (M2 tide) in magnetic satellite observations was based on the first two years of CHAMP data, only. However, since then the data have been triplicated and the understanding of contributions from multiple sources to measurements has been advanced.

In this study, we seek the magnetic signals of major ocean tides in satellite observation from 2001 to 2008. Therefore, we apply a forward modelling approach to predict the magnetic signal during this period. In some recent studies the barotropic velocity fields have been deduced from altimetry data by applying the geostrophic method.

Here, we predict the magnetic signal of individual tides using output from an unconstrained ocean model OMCT driven by the lunisolar tidal potential calculated form analytical ephemerides. So it is expected that the prediction of the magnetic signal is different when one or the other approach is considered, and we analyze this in more detail. Furthermore, the discrepancies between magnetic measurements and predictions may give detailed insights to the conductivity distribution within the ocean and the upper mantle.

Motional induction, magnetic signals of ocean tides

Ingo Wardinski, 52.3827 North, 13.0637 East