



The influence of the distribution of sea-water conductivity on the ocean induced magnetic field

Jan Saynisch (1), Christopher Irrgang (1), Jan Hagedoorn (1), Maik Thomas (1,2)

(1) Helmholtz Centre Potsdam GFZ German Research Centre, Potsdam, Germany, (2) Freie Universität Berlin Institute of Meteorology, Berlin, Germany

The variability of oceanic contributions to Earth's magnetic field ranges from sub-daily scales to thousands of years. To study the sensitivity and the range of oceanic magnetic signals, an induction model is coupled to an ocean general circulation model. In the presented study, the sensitivity of the induction process to spatial and temporal variations in sea-water conductivity is investigated. In current calculations of ocean induced magnetic fields, a realistic distribution of sea-water conductivity is often neglected. We shown that assuming an ocean-wide constant conductivity is insufficient to accurately capture the spatial and, more important, the temporal variability of the magnetic signal. Using a realistic global sea-water conductivity distribution changes the temporal variability of the magnetic field up to 45%. Vertical gradients in sea-water conductivity prove to be a key factor for the variability of the oceanic induced magnetic field.