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# Analysis of ocean tide induced magnetic fields — Climate trends and the remarkable role of shelf regions

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Previous studies showed that ocean tide induced magnetic fields are sensitive to oceanic temperature and salinity variations. Based on in-situ observations of oceanic temperature and salinity, a time series of global ocean tide induced magnetic field amplitudes has been computed. The time series is analysed to compare current developments in the oceanic states with existing climate model scenarios. The preceeding studies have investigated the impact of global oceanic warming on ocean tide induced magnetic field amplitudes on one hand and the impact of Greenland glacial melting on the other. We combine oceanic temperature and salinity fields covering a time span from 1990 to 2016, with data of oceanic tidal flow, the geomagnetic field, mantle conductivity and sediment conductance to determine the relevant magnetic field amplitudes. From the seasonal variability and long term trends of these magnetic field amplitudes we find indications for both scenarios. The results show that magnetic field amplitude anomalies caused by oceanic climate variations are ten times larger in shelf regions than in the open ocean. Changes in the oceanic and therefore Earth's climate will consequently be observed first there so that climate variations are best monitored with targeted monitoring techniques. Preliminary results of an validation attempt of these findings by extracting trends of ocean tide induced magnetic field amplitudes from terrestrial magnetometer observations are also presented.