Project: **964**
Project title: **Detectability of non-tidal ocean signals in Earth's magnetic field (OceanMag)**
Project lead: **Jan Saynisch**
Report period: **2017-01-01 to 2017-12-31**

We had a very productive first project year. Within the OceanMag project the sensitivity of the induction process due to spatial and temporal variations in seawater conductivity could be investigated. We could shown that assuming an ocean-wide uniform conductivity is insufficient to accurately capture the temporal variability of the magnetic signal. Using instead a realistic global seawater conductivity distribution increases the temporal variability of the magnetic field up to 45 \% (Irrgang et al., 2016a). Furthermore, we investigated the signal uncertainty in the modeling of motional induction. OGCM ensemble simulation experiments are performed on the basis of different error scenarios and error covariances. This ensemble-based approach allowed us to estimate both the spatial distribution and temporal variation of the uncertainty in the ocean-induced magnetic field (Irrgang et al., 2016b). The invetigated sensitivities and uncertainties were used to estimate the impact of climate change on the global tidal oceanic magnetic field. We conclude that observations of tidal magnetic signals could be used as a tool to detect respective state changes in the ocean (Saynisch et al., 2016). Finally, we take part in several international benchmark sudies that compare the existing electromagnetic induction models and the assimilation of magnetic field observations was begun (initial manuscript, submitted). In addition, the results were presented in many national and international conferences.