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Geostrophic approach to observe electromagnetic oceanic signals

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Oceanic magnetic signals are sensitive to ocean velocity, salinity, and
heat content. The detection of respective signals with global satellite magnetometers would pose a very valuable source of information. While tidal magnetic fields are already detected, electromagnetic signals of the ocean circulation still remain unobserved from space. We propose to use satellite altimetry to construct proxy magnetic signals of the ocean circulation. These proxy time series could subsequently be fitted to satellite magnetometer data. The fitted data could be removed from the observations or the fit could be analyzed for physical properties of the ocean, e.g., the heat budget. We report when and where the EM proxy data describes the true magnetic signal sufficiently well.