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Variability of the oceanic bottom pressure from sensor observations and ocean models

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We discuss time series of ocean bottom pressure (OBP) computed by the Finite Element Sea Ice-Ocean Model (FESOM) driven by realistic forcing. The influence of atmospheric pressure and mesoscale eddies on the OBP and surface height anomalies on time scales up to years was investigated. Also, we estimated space and time scales of mass variability simulated by both climate-type (resolution about 1 degree) and eddy resolving (down to about 10 km) versions of the model.
We analyze the African sector of the Southern Ocean. A part of the OBP variance there is associated with eddy activity (especially in the Agulhas region) and explore its respective contribution. Assessment of averaging interval of simulated data for the purpose of minimizing aliasing in variability of OBP is additionally carried out. An important aspect of this study is the comparison of modeled and in situ OBP records.
High frequency measurements of OBP with sub-daily resolution available from Pressure Inverted Echo Sounders (PIES) used to infer temporal co-spectra of OBP variability. The PIES are placed along the prime meridian south of Africa can be used to evaluate variations of both barotropic and baroclinic geostrophic transport fluctuations of the Antarctic Circumpolar Current and verify corresponding GRACE estimates. The distance between PIES stations is chosen to resolve the major oceanic fronts for this region, which allows us to compare co-spectra of observed and simulated OBP variability.