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Evaluation of an ensemble of global ocean circulation estimates against satellite altimetry and in-situ measurements

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We compare ocean dynamic topography estimates from an ensemble of ocean circulation hindcasts, performed with the Finite Element Sea-ice Ocean Model (FESOM), to the estimates of dynamic topography from Aviso, CSIRO, Altimetry Data System (GFZ Potsdam), operational ocean reanalysis by ECMWF (ORAS4) and to the Argo based product from JAMSTEC. The ensemble members used for the hindcasts differ by their initialization and by the model meshes. The meshes have been refined in various key regions for the large-scale ocean circulation, such as the equatorial belt or Denmark Strait, and also the background resolution was varied. We compare both the model sea level mean and variability. The modelled interannual variability agrees with the data within the spread of different datasets while the ENSO mode explains the major part of comparison between data and model. The model ensemble members under the same forcing differ primarily in the deep water formation regions. The largest discrepancies between model and data are also seen in these regions.