

Assimilation of sea surface temperature, sea ice concentration and sea ice drift in a model of the Southern Ocean

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Current ocean models have relatively large errors and biases in the Southern Ocean. The aim of this study is to provide a reanalysis from 1985 to 2006 assimilating sea surface temperature, sea ice concentration and sea ice drift. In the following it is also shown how surface winds in the Southern Ocean can be improved using sea ice drift estimated from infrared radiometers. Such satellite observations are available since the late seventies and have the potential to improve the wind forcing before more direct measurements of winds over the ocean are available using scatterometry in the late nineties. The model results are compared to the assimilated data and to independent measurements (the World Ocean Database 2009 and the mean dynamic topography based on observations). The overall improvement of the assimilation is quantified, in particular the impact of the assimilation on the representation of the polar front is discussed. Finally a method to identify model errors in the Antarctic sea ice area is proposed based on Model Output Statistics techniques using a series of potential predictors. This approach provides new directions for model improvements.