The ECCO 1st global WOCE Synthesis: The Approach


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The Simulation and Goals

The conventions for the "Estimation of the Circulation and Climate of the Ocean" (ECCO) is a NSF-funded initiative to construct a large-scale, comprehensive, multi-model ensemble regional assimilation system. The goal is to use a dynamical model to simulate the large-scale circulation of the ocean, driven by surface forcing, and then to provide an assimilation framework in which the circulation model is adapted to observations. The model framework is then used to conduct a series of experiments aimed at understanding the complex interactions between the atmosphere and ocean.

The ECCO 1st WOCE Synthesis

In the following, we describe results from the ECCO 1st WOCE synthesis on a 1° global grid and the (near-period 1996–97). The model is a subgrid-scale representation of the dynamics included in the standard-resolution circulation models that are run on a coarse-resolution grid. These results are based on the state of the ocean circulation and climate, including the state of the atmosphere, ocean, and sea ice.

The Optimization

We use the 2.22° general ocean circulation model which is based on the primitive equations on a sphere under the finite element approximation. The model is a set of conservation equations for horizontal and vertical momentum, volume, heat, and salt on an equal grid of state variables. For the purpose of this study, the model is applied to the two main ocean basins (North Atlantic and the Pacific Ocean) and the Arctic Ocean. The model is used to simulate the large-scale circulation of the ocean and the atmosphere. The computed fields are then compared with observations from various sources, such as drifter and satellite data, to assess the accuracy of the model predictions.

Changes of Control Terms

The optimization of ocean temperature and salinity, as well as surface forcing in 2-D versions of the entire optimization period as a function of the model data with the WOCE data. The following are some of the changes in the model data. The changes include the assimilation of observations such as drifter and satellite data, and the assimilation of the large-scale circulation of the ocean and the atmosphere. The computed fields are then compared with observations from various sources, such as drifter and satellite data, to assess the accuracy of the model predictions.

Discussion

The fundamental importance of a physically consistent state estimation for climate research and the interactions between it and the long-term changes of the climate system is an important issue. The aim of this study is to provide a consistent state estimation for climate research and to address the long-term changes of the climate system.

References
