

AOMIP : Experiments

AOMIP has been focused on Arctic regional coupled ice-ocean model intercomparisons and investigations of different aspects of ocean and sea ice changes for the time period 1948-present. In the course of these investigations, problems with numerical implementation, and validation against observations have been emphasized. Some problems have been found to occur only in a few models, while others have been found in many or most. Exposing these issues is an extremely important part of AOMIP, and would have been difficult or impossible to achieve without coordinated activities. Here we describe a set of coordinated experiments conducted by AOMIP in 2001-2007 and 2008-2011.

Comparing results of coordinated model runs with observations allows AOMIP to:

- Estimate results of model improvements;
- Validate models against observations and
- Evaluate model uncertainties.

Common grids, coordinated interpolation techniques, a set of integrated parameters such as heat, freshwater content, potential vorticity, topography (defined as $f \times V \cdot S$, where f is Coriolis vector, V is model velocity vector, and S is gradient of total depth; Holloway et al., 2007), ice area and extent, etc. have been used to intercompare and to validate models. These procedures also include data mining and data reconstruction methods with data assimilation in order to obtain monthly gridded data sets for periods of model validation (see Pantelev et al., 2007). Conventional statistical methods including EOF, spectral, and wavelet analysis techniques have been employed as well for data analysis and interpretation of intercomparison and validation results.

In addition, model results are used for the investigation of Arctic climate variability.

2008-2011 experiments

A set of scientific problems to be supported by coordinated experiments was identified during the 12th and 13th AOMIP workshops. Team leader names (PIs of experiments responsible for experiment formulation, activation, data collection, analysis and publications) are shown in bold. Also note that each of these experiments will possibly have a set of sub-experiments with sub-leaders.

[Bering Strait volume, heat and salt fluxes](#)

[Canada Basin: shelf-basin exchange and mechanisms](#)

[Pacific Water circulation \(origin, forcing, pathways\)](#)

[Canada Basin: major mechanisms of halocline formation and variability](#)

[Circulation and fate of fresh water from river runoff](#)

[Beaufort Gyre: mechanisms of fresh water accumulation and release](#)

[Fresh water balance of the Arctic Ocean](#)

[Atlantic Water circulation](#)

[Ecosystem experiments](#)

[Observations, state estimation, and adjoint methods](#)

2001-2007 experiments

The first AOMIP experiment involved an intercomparison of the [seasonal cycle](#) of the various AOMIP models. That experiment did not involve common forcing, but rather each AOMIP model was run using forcing data sets exactly as had been used by any given model prior to the beginning of the AOMIP.

The second and third AOMIP experiment involved a coordinated intercomparison of the last 50 years (1948 - present) as simulated by the various AOMIP models using a carefully-defined common forcing data set. The experiment consisted of a [coordinated spin-up phase \(1948 - 1978\)](#) and a [coordinated analysis phase \(1979 - 2004\)](#).

The fourth AOMIP experiment was conducted involving a [coordinated intercomparison of the last 100 years](#) (~ 1900 - present).

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