

2015 Sea Ice Outlook Initial Condition Experiment Guidelines:

Experiment participants are invited to make the following pair of forecasts:

1. An initial control set initialized with climatological (2007-2014) 1 May sea ice thickness taken from PIOMAS.
2. A second set initialized with 2015 May 1 sea ice thickness, also from PIOMAS.

In both sets, all other ICs are to be 1 May 2015 native model ICs.

Both sets are to be run until 1 October 2015, or optionally 1 December 2015. The goal is for participants to vary the thickness or ice-thickness distribution (ITD) north of approximately latitude 70° North (approximately 83° North in Atlantic facade of Arctic). This is to prevent the models from sustaining excessive initialization shock in the May 1 sea ice edge region, and so varying the thickness should have little immediate effect on the ice extent. Yet, the IC perturbation should have a large impact on predicting late summer ice conditions.

- The ICs for the control climatological run are processed and available at:
http://www.atmos.washington.edu/~ed/piomas_may1_climo.nc.

- The ICs for the second set, the ITDs for May 1 2015, are processed and available at:
http://www.atmos.washington.edu/~ed/piomas_may1_2015.nc.

The ICs are an ice-thickness distribution (12 categories) from PIOMAS on a ~1 degree grid of 360x120 cells. There are four variables in this file: ITD, latitude, longitude, and weight. 'Weight' is a weighting mask that is equal to '1' north of latitude 70° north over most of the Arctic, and farther north in the Atlantic (~latitude 83° north), and equal to '0' south of this boundary, with a 3° 'buffer zone' where the mask linearly increases from 0 to 1 (See Figure 1 below). This mask is designed to be 1 north of the sea ice edge on 1 May 2015 and is to be used as follows:

- $\text{New ITD} = \text{old ITD} + \text{weight} * (\text{PIOMAS ITD} - \text{old ITD})$ where new ITD are the ITDs to be run, and old ITDs are the native model pre-experiment ITD.
- Individual models will have to re-grid the PIOMAS ITD to their native ITD discretization and spatial grid. The ITDs in PIOMAS are center-grid values, as follows:
 - The center thicknesses (in meters) of the 12 thickness categories are: 0.00, 0.26, 0.71, 1.46, 2.61, 4.23, 6.39, 9.10, 12.39, 16.24, 20.62, and 25.49. (Note: the first category is open water.)
 - An example script that re-grids PIOMAS's ITD to the CICE 5-category ITD is available here: http://www.atmos.washington.edu/~ed/ITD_conversion.m.

For questions, please contact Edward Blanchard-Wrigglesworth (ed@atmos.washington.edu).

Discussion Forum for Issues with Model Initialization:

ARCUS will host a collaborative workspace as an online forum in which participants can provide feedback on the experiment and discuss problems, issues, and suggestions related to model initialization. Modifying initial conditions is not a trivial process and the team hopes that collaboration will help to make it easier. For example, in CESM CICE, there is a necessary step that needs to be made in order for the model to run. As the ITD is changed, four other variables need to be changed in the same ratio: ice area, ice enthalpy, snow enthalpy and snow volume (CICE variable names: aicen, eicen, esnon, and vsnon). It is possible that other model architectures may have similar issues.

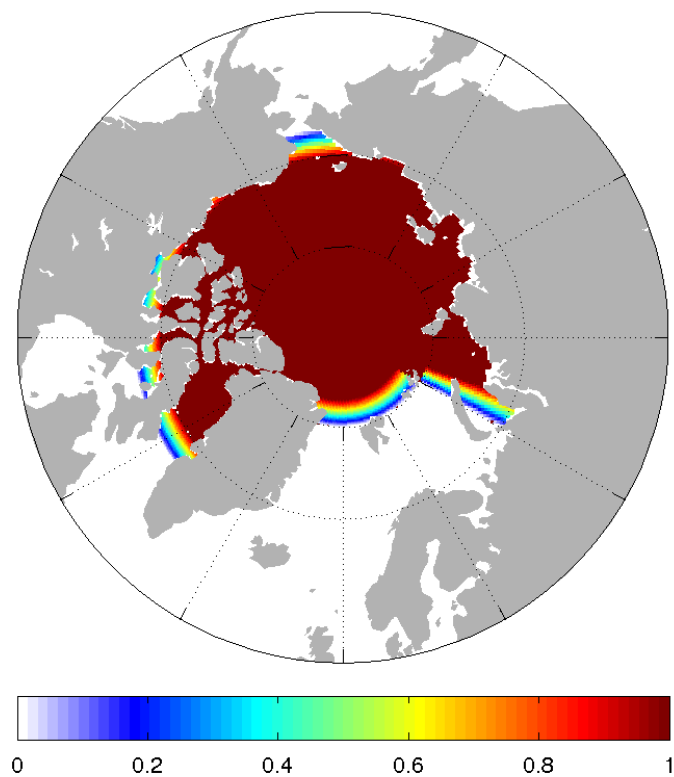


Figure 1. Weight variable in piomas_may1_climo.nc (also available in piomas_may1_2015.nc). Image courtesy of Edward Blanchard-Wrigglesworth.