

The CICE Consortium Column Physics Package Icepack

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The CICE Consortium is a group of stakeholders and primary developers of the Los Alamos sea ice model (CICE) that incorporates and maintains new research and development in collaboration with the international modeling community, in order to accelerate the transfer of scientific sea ice model development into operational use and for the research community. The CICE Consortium will release by Spring 2018 the sea ice column ice physics package “Icepack” version 1.0 (<https://github.com/CICE-Consortium/Icepack>). The column physics code was separated from CICE version 5.1.2 by removing all references to the horizontal grid and other infrastructural CICE elements (e.g., MPI tasks, calendar), and Icepack is now implemented in CICE as a git submodule. Icepack includes several options for simulating sea ice thermodynamics, mechanical redistribution (ridging) and associated area and thickness changes. In addition, the model supports a number of tracers, including thickness, enthalpy, ice age, first-year ice area, deformed ice area and volume, melt ponds, and biogeochemical tracers describing the sea ice ecosystem. Icepack is available freely to the ice model community, and can be coupled to, or incorporated into an independent sea ice model. Icepack has a driver for testing in 1-dimensional mode and includes datasets for testing with climatological and a full year of hourly atmospheric forcing. A test suite includes a host of test scenarios, which run on platforms with Unix or Linux. Ice modelers are encouraged to test Icepack within their own sea ice model configurations or in a standalone mode. New physics parameterizations contributed by the general community may be incorporated into future release versions. Planned follow-on contributions to Icepack include a floe size distribution, improved representation of snow on sea ice, biogeochemistry improvements, thermodynamically consistent melt ponds and under-ice ponds, and a new, variational-principle ridging parameterization.