Large-scale ocean modeling on unstructured meshes: current status and perspectives

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Unstructured meshes allow the development of global ocean circulation
models with a regional focus which avoid nesting and open
boundaries. We present several applications simulated with the
Finite-Element Sea-ice Ocean circulation Model (FESOM) to illustrate
the success of this approach. They include analysis of long-term (500
years) behavior under CORE-I forcing, and process studies in setups focused on
the Southern Ocean, Canadian Archipelago and the vicinity of Greenland
on multidecadal time scales.

Models formulated on unstructured meshes are more expensive (per
degree of freedom) than their regular-mesh counterparts, which
explains ongoing search for optimal discretization. We briefly review
some of discretizations tested by us or other groups and outline our
view on short-term perspective in large-scale ocean modeling on
unstructured meshes.