

Modeling Arctic seafloor biogeochemistry in E3SM for InterFACE

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The Arctic Ocean is distinctive not only for its regions of seasonal and perennial sea ice cover, but for its expansive shelves, rich coastlines and vast shallow seas. One consequence of this unique hydrography is the influence of the benthos (sea floor), where disproportionately high production and organic matter remineralization play critical roles in Arctic marine ecosystem function. However, rapid changes in Arctic sea ice and nearshore processes indicate a potential shift from the current tightly coupled pelagic (open ocean)-benthic production system to one that is predominantly pelagic, the consequences of which could be devastating for many higher trophic species. As part of Interdisciplinary Research for Arctic Coastal Environments (InterFACE), we have begun development of a benthic biogeochemical submodule in MPAS-O, the ocean component of E3SM, to quantify changes in consumption, degradation and remineralization of sinking organic carbon in Arctic coastal and shelf waters. We present details of model design and implementation and preliminary results from the Arkona Basin, a Baltic sea test case.