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Title: *Role of shelf water transport in western Arctic biological hot spots*

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A pan-Arctic ice-ocean model was redesigned to address the western Arctic basin ecosystem in the viewpoint of Pacific water transport with heat and biogeochemical materials. The physical part of model is COCO version 4.9. The model domain is composed of the entire Arctic Ocean and the northern North Atlantic. In this study, two experimental designs with different horizontal resolution were set up. First, a decadal experiment from 1979 to recent years was conducted using a 25-km grid version. The seasonal run with an eddy-resolving version (grid size of 5-km) was then integrated from the results of decadal experiment. The atmospheric forcing components were constructed from the NCEP/NCAR reanalysis daily data. The COCO model demonstrated realistic performances of physical fields, such as sea ice volume in the entire Arctic, sea ice export through the Fram Strait, major branches of northward current in the Chukchi shelf, and Beaufort shelf-break eddies. To address biological responses to these physical backgrounds, a lower-trophic marine ecosystem model NEMURO was coupled to the COCO. Since dissolution from sea bottom sediments is an important nutrient source in the Chukchi shelf, nitrogen and silicate fluxes from shelf bottom were also considered. As a first step, quasi-uniform nutrient distribution in bottom sediments was assumed accounting for bio-turbation. In addition, to visualize the transport of shelf bottom water, a virtual passive tracer was provided in the deepest layers just above the entire sea bottom. The model results suggested that local primary production and following food chain can explain a summertime peak of sinking mass flux observed in the Northwind Abyssal Plain. On the other hand, another maximum during winter would be caused by advection processes via combination of warm shelf-break eddies and the anti-cyclonic Beaufort Gyre.