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Advective pathways of nutrients and key ecological substances in the Arctic

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The Arctic Ocean is undergoing remarkable environmental changes due to global warming. The rise in the Arctic near-surface air temperature during the past decades is more than twice as high as the global average, a phenomenon known as the “Arctic Amplification”. As a consequence the Arctic summer sea ice extent has decreased by more than 40 % in recent decades, and moreover a year-round sea ice loss in extent and thickness was recorded. By opening up of large areas formerly covered by sea ice, the exchange of heat, moisture and momentum between the ocean and the atmosphere intensified. This resulted in changes in the ocean circulation and the water masses impacting the marine ecosystem. We investigate these changes by using a large set of hydrographic and biogeochemical data of the entire Arctic Ocean. To better quantify the current changes in the Arctic ecosystem we will compare our observational data analysis with high-resolution biogeochemical atmosphere-ice-ocean model simulations.