Geophysical Research Abstracts
Vol. 21, EGU2019-2975-1, 2019
EGU General Assembly 2019
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Beaufort Gyre Observing System (BGOS) in 2003-2018 from observations and model results

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Goals of the Forum for Artic Modeling and Observing Synthesis (FAMOS) project include improving Arctic regional ice-ocean models and advancing understanding of the physical processes regulating variability of Arctic environmental conditions through synthesis of observations and model results. The Beaufort Gyre centered in the Canada Basin of the Arctic Ocean constitutes a natural laboratory for application of FAMOS modeling capabilities to resolve numerous scientific questions related to the origin and variability of this climatological flywheel and freshwater reservoir of the Arctic Ocean. The unprecedented volume of data collected in this region facilitates documentation of the ocean state and changes in this environmental system at synoptic, seasonal and interannual time scales. The in situ and remote sensing data characterizing ocean hydrography and sea surface height, ice drift, concentration and thickness, ocean circulation, and biogeochemistry have been used for model calibration and validation, been assimilated for historic reconstructions, and taken as initial conditions for numerical predictions. This presentation describes time series of Beaufort Gyre data, summarizes new methodologies in observing, modeling and analysis, discusses ideas about the mechanisms regulating Beaufort Gyre dynamics and speculates on the transition to a new Beaufort Gyre state under different climate forcing.