## Detecting Regional Signature of Climate Variability and Change in the Beaufort-Chukchi Seas

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Arctic climate system has experienced pronounced changes during past decades. It has been manifested that these changes can be conspicuously amplified in specific regions to result in smaller scale extreme climate or weather events. Detecting regional signature of climate variability and change is therefore becoming significantly important not only for science but also for policy-decision. The Beaufort-Chukchi seas is one of such regions, where drastic, systematic changes have occurred across all climate system components strikingly evidenced by a decadelong acceleration of sea ice reduction and an extreme climate event of sea ice cover loss in summer 2007. This region is also one of important oil fields. Climate change and associated extreme events may hypothetically increase threat for environment and influence energy security given potential oil spills and infrastructure destruction. In this study, we investigated variability, long-term changes, and extremes of surface wind field in this region through a data-model synthesis approach based on the state-of-the-art regional model and the existing reanalysis products. We examined climatological wind field structures from various aspects and found a significant increase in surface windspeed in particular directions during the last decades. In addition, the newly merged high-resolution data-model products for this region through the WRF model assimilation system forced by the large-scale reanalysis data demonstrated a promising and improved representation of the observed real world. Because the Beaufort-Chukchi seas is a unique geographic region over the globe, featured by complex atmosphere-sea ice-ocean interactions subject to strong impacts by coastal and topographic processes, the study in this region could represent an outstanding test-bed for detecting regional signatures of global climate variability and changes.

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