

**Title:**

Seasonal Probabilistic Forecasting of the September Minimum Sea Ice Extent in the Arctic Ocean/Journey to the Frozen North Aboard the MOSAiC Expedition

**Abstract:**

Sea ice cover in the Arctic Ocean has dramatically decreased since the beginning of satellite observations in the late 1970s with the most pronounced reduction occurring during the summer months. As sea ice cover diminishes, access to previously inaccessible regions has piqued the interest of stakeholder groups such as the shipping industry, tourist industry, military, and the scientific community. Accessing these regions requires months of planning and require accurate seasonal forecasts of summer sea ice cover. Here, we present a Bayesian logistic regression framework that is capable of providing skillful probabilistic forecasts of Arctic sea ice cover, along with quantifying the attendant uncertainties. The presence or absence of ice is modeled using a categorical regression model, with atmospheric, oceanic, and sea ice covariates at 1- to 7-month lead times. The model is fitted and validated to September minimum sea ice extent data from 1980 through 2018. Results show overall skillful forecasts of the minimum sea ice edge at all lead times, with higher skills at shorter lead times, along with a direct measure of forecast uncertainty to aide in assessing the reliability.

September of 2019 marked the inauguration of a scientific expedition 10+ years in the making to study the coupled Arctic system, the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC). A German icebreaker, the RV Polarstern, traveled to the sea ice edge north of Siberia and docked itself to a drifting hunk of ice, cutting its engines to drift with the sea ice across the Arctic ocean for 1 year. The expedition involves 600 participants from 20 countries including 20 early career polar researchers who were selected to participate in the MOSAiC School 2019 put on by the Association of Polar Early Career Scientists (APECS). Here I'll present my experience as one of the 20 students aboard the Russian support vessel, the RV Akademik Fedorov.