



Arctic sea ice variability, its interaction with the subpolar Gyre and impact on lower latitudes

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Understanding the variability of the Arctic sea ice is important because of its potential impact on the atmospheric circulation and extreme weather in lower latitudes. In the recent retreat of the Arctic sea ice, the relative importance of natural climate variability compared to anthropogenic warming has not been well investigated. The rate of decrease in sea ice accelerated in the late 1990s and slowed down after 2007 but reasons for these rapid changes are not well understood. Here, we use both reanalysis data and the EC-Earth model to understand Arctic sea ice variability, the factors controlling it and its impact on lower latitudes. Based on reanalysis data, we show that approximately half of the September sea ice reduction in the past decades is due to multidecadal variability. Moreover, we find that the dipole-like mode (EOF2) of August sea level pressure and the spring sea surface temperature (SST) anomalies in the subpolar Gyre (EOF2 of the NAtlantic SST) play a dominant role in controlling the sea ice variability. The Arctic sea ice variability has a significant impact on lower latitudes. To confirm these findings and understand the dynamical processes involved, we will run sensitivity experiments using EC-Earth model and prescribing anomalies in the Arctic sea ice and subpolar Gyre SST. We will investigate the atmospheric teleconnections and extreme events that are associated with the variability of Arctic sea ice, subpolar Gyre as well as the linkage between high and low latitudes.