

Oral.4: 17:00-17:15. **Examining the Effect of Climate Change on Arctic Cyclone Behavior in a Regional Climate Framework**

^{1,2}Chelsea Parker, ³Priscilla Mooney, ⁴Melinda Webster and ¹Linette Boisvert

¹*NASA Goddard Space Flight Center*

²*ESSIC University of Maryland*

³*NORCE, Bjerknes Centre for Climate Research*

⁴*University of Alaska Fairbanks*

contact: chelsea.l.parker@nasa.gov

Abstract

Cyclones are synoptic weather events that transport heat and moisture into the Arctic, and have complex impacts on sea ice, marine ecosystems, and socio-economic activities. However, the effect of a changing climate on Arctic cyclone behavior remains a topic of active research. This study uses high resolution (4km), Weather Research and Forecasting (WRF) model regional simulations of cyclone events and downscaled global climate reconstructions and projections from the Climate Model Intercomparison Project (CMIP6) to examine how recent and future climatic changes alter spring cyclone behavior. Results from this pseudo global warming, event-based storyline framework suggest that recent climate change has not yet had an appreciable effect on Arctic cyclone characteristics during early spring. However, the convection-permitting simulations show that future sea ice loss and increasing surface temperatures by the year 2100 drive large increases in the near-surface temperature gradient, sensible and latent heat fluxes from the surface to the atmosphere, and deep convection during cyclone events. The future climate alters cyclone trajectories and increases and prolongs cyclone intensity, with significantly augmented wind speeds, temperatures, and precipitation rates. The increasing extreme nature of weather events such as Arctic cyclones has important implications for atmosphere-ice-ocean interactions in the new Arctic.