CGD SEMINAR

NCAR

DATE: Tuesday, 18 October 2016

TIME: 11:00 am

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Modeled air-sea interactions around southeastern Greenland

SPEAKER: Alice DuVivier, NCAR/CGD

ABSTRACT:

The coast along the southern tip of Greenland is one of the windiest locations in the world due to strong mesoscale barrier winds and tip jets that form when synoptic scale flow interacts with the topography of Greenland. This talk addresses how modeled mesoscale wind events around southeastern Greenland impact air-sea interactions and the ocean's response to this forcing. Case study comparisons between Weather Research and Forecasting (WRF) model simulations run at varying horizontal and vertical resolution, in-situ observations, and satellite data indicate that resolutions of 50 km and higher explicitly represent mesoscale winds and strongly affect the resulting surface fluxes. To understand longer duration impacts of resolution, the self-organizing map (SOM) algorithm was used to identify and classify the range of 10 m wind patterns present during ten winters (1997-2007, NDJFM) in the ECMWF Interim Reanalysis (ERA-I) and a 50 km WRF simulation. WRF simulated patterns with strong barrier-parallel flow more frequently than ERA-I, and WRF also had faster coastal winds than ERA-I during all types of strong wind events. The SOM algorithm was then used to identify 12 wind patterns present during 20 winters (1990-2010, NDJFM) in the fully coupled Regional Arctic System Model (RASM). For all wind patterns the ocean loses buoyancy, primarily from turbulent sensible and latent heat fluxes. Patterns with westerly winds at Cape Farewell had the largest buoyancy loss over the Irminger and Labrador Seas while patterns with easterly flow at Cape Farewell have large buoyancy loss along the sea ice edge in the Denmark Strait and a secondary maximum immediately west of Cape Farewell. The ocean mixed layer is anomalously deep for wind patterns that have northerly flow with either easterly or westerly winds at Cape Farewell; mixed layer deepening is positively correlated to the frequency of those patterns and of greater magnitude for longer duration events.

Live webcast: http://www.fin.ucar.edu/it/mms/ml-live.htm

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