The impact and characterization of extreme winds in the Nares Strait

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Background

The Nares Strait is located between Ellesmere Island and Greenland in the High Arctic. There is steep topography on both sides of the Strait. A severe windstorm on April 13–15, 2005, destroyed an ice camp that had been set up to study the area (Melling 2011).

Data

Our primary dataset is the Copernicus Arctic Regional Reanalysis (CARRA), which has 2.5-km spatial resolution, much better than ERA5. This is important for the steep topography because it means CARRA captures topographically forced winds that ERA5 cannot.

Methods

All April data between 1991 and 2022 was used for climatological analysis. Data from the storm time period was compared with the 95th percentile for each spatial gridpoint.

Results

We focused on the timepoint with the highest wind speeds at the camp location, April 14th at midnight UTC.

- Winds exceed the 95th percentile at the 700-800 m levels
- Similar timeline to Melling (2011)
- Most extreme observed wind speeds still not captured
  - CARRA surface max. ~15 m/s
  - Melling (2011) surface max. 25 m/s