

The characterization and impact of extreme winds along Nares Strait

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due 15 February 2024

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Extreme winds in the Arctic can affect sea ice flow, the formation of open-water areas called polynyas, ocean convection, and maritime and aviation activity. This work aims to study a severe wind event that occurred along Nares Strait in April 2005 that demolished an ice camp established to investigate the oceanography of the region. Our aim is to determine whether the event was extreme or typical for the region and quantify its exceptionality. Nares Strait is a long, narrow body of water between Ellesmere Island (Nunavut, Canada) and Greenland. There are steep mountains on both sides, which significantly impact meteorological phenomena and make it difficult to accurately model weather events in the area. Therefore, we used the new Copernicus Arctic Regional Re-analysis (CARRA) data which has 2.5 km horizontal resolution, 21 height levels in the lower 2 km of the atmosphere, and covers the period 1991-2022 to characterize the wind climate of the region. Our results indicate that the winds are extreme at specific points in space and time during the April 2005 storm, briefly exceeding the 95th percentile, but most winds did not exceed this mark. Additionally, the re-analysis generally concurs with the oceanography camp's description of events, although some of the highest observed wind speeds were not captured in the dataset.