



The March 1972 Northwest Greenland windstorm: evidence of downslope winds associated with a trapped lee wave

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In March 1972, a severe windstorm buffeted Thule Air Force Base in Northwest Greenland with sustained surface winds in excess of 30 m/s and peak winds in excess of 90 m/s - one of the highest wind speeds ever directly observed. The high winds were associated with an extra-tropical cyclone that propagated into the region on March 8/9 after deepening over the Labrador Sea. It has been argued that katabatic flow off of the nearby ice cap contributed to the high winds during the event. Here we use surface and radiosonde data from the region along with operational analyses as well as both conventional and 'surface data only' reanalyses to examine the evolution of the parent low as well as conditions in the region during the windstorm. We find that during the event there was southerly flow in the region suggesting that katabatic flow, which would have resulted in easterly flow, was not a significant contributor to the high winds. Rather, we find that the environmental conditions immediately prior to the event were conducive to the excitation of a trapped lee wave forced by the southerly flow over the high topography to the south of Thule. Radiosonde data during the event is consistent with this interpretation and suggests that downslope winds associated with this trapped lee wave were responsible for the high winds observed during the event. These events are not uncommon in the region and so represent a hitherto unrecognized threat to aviation operations.