



Surges in Ross Ice Shelf Air Stream (RAS) due to propagation of a coastally trapped wave

A. Adams (1), G. Tripoli (1)

(1) University of Wisconsin-Madison, 1225 W. Dayton St., Madison, WI 53706, USA

The Ross Ice Shelf Air Stream (RAS) is a prominent in the lower atmosphere over the Ross Ice Shelf region of Antarctica. The northward flow associated with the RAS serves an important role in mass transport off the Antarctic continent. While the RAS is a consistent feature of the Ross Ice Shelf region, the strength and spatial extent of the RAS varies from day to day. Days when the RAS is particularly strong pose a hazardous threat to operations at McMurdo Station on Ross Island. Simulations performed with the University of Wisconsin-Nonhydrostatic Modeling System (UW-NMS) demonstrated that there are surges in the RAS associated with the propagation of a topographically trapped Kelvin-wave like feature. These waves form near Edward VIII. Peninsula and propagate southward along the Siple Coast until reaching the barrier of the Transantarctic Mountains which force a change in direction resulting in a surge in the RAS. These events are shown to occur due to the uniquely shallow and extremely stable air mass forming over the Antarctic continent. Automated Weather Stations (AWS) observations are consistent with the simulated progression of these events. The events are characterized by wind speeds in excess of 30 m/s following temperature drops of 10-20 degrees Celsius. Results will be shown from UW-NMS simulations designed to explore these surges in the RAS. The formation mechanism for the Kelvin like waves associated with RAS surges, the role of topography and atmospheric thermal structure in trapping these waves, and the characteristics of these waves (depth, speed, horizontal extent, associated temperature gradient, etc.) will be presented.