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A description of the Ross Ice Shelf air stream (RAS) based on automatic weather station observations and numerical modeling studies

M. W. Seefeldt, J. J. Cassano

CIRES / Department of Atmospheric and Oceanic Sciences, University of Colorado at Boulder, USA (seefeldm@cires.colorado.edu)

The surface wind field across the Ross Ice Shelf, Antarctica is composed of katabatic drainage winds, barrier winds, and wind flow associated with the passage of cyclones and mesocyclones. Recently, an expanded array of automatic weather stations (AWS) has been installed on the Ross Ice Shelf. Research using this AWS network, combined with operational mesoscale numerical model output, has produced a greater understanding of the Ross Ice Shelf air stream (RAS). The RAS is a northward transport of atmospheric mass through the Ross Ice Shelf corridor. The results indicate that this dominant northward transport of mass results from a combination of katabatic and barrier winds, and the passage of cyclones and mesocyclones over or near the Ross Ice Shelf. A sequence of a decreased pressure gradient, barrier wind flow, katabatic wind drainage, in association with the passage of a cyclone, is understood to be a RAS event. The RAS events are found to be routine for the region.