

Forcing Mechanisms of the Ross Ice Shelf Airstream

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The Ross Ice Shelf airstream (RAS) is a dominant stream of air originating in the Siple Coast confluence zone. It flows over the western to central Ross Ice Shelf and then to the north over the Ross Sea. The RAS drains cold, continental air from the interior of the continent and transports it to more northerly latitudes. The frequency of the RAS is approximately 34%, making it the most common wind regime located over the Ross Ice Shelf.

This study uses the method of self organizing maps (SOM) to identify the full range of RAS patterns that occur over the Ross Ice Shelf. The results indicate the RAS varies in both its position and strength over the Ross Ice Shelf. The atmospheric dynamics associated with the SOM identified RAS patterns are analyzed to investigate the forcing mechanisms that drive the variability in the RAS. Specifically, the contribution of katabatic, barrier wind, and synoptic forcing is evaluated for each pattern. It is shown that the contribution of katabatic, barrier wind, and synoptic forcing varies over the range of RAS patterns. A general synopsis of the forcing mechanisms that drive the different RAS patterns will be presented.