

ERS scatterometer observations of katabatic winds over a polynya

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Abstract

Wind fields derived from ERS scatterometer data C acquired over the polynya present in the western Ross Sea, Antarctica, during the austral summer season C are used to study mesoscale atmospheric flow patterns associated with surges of katabatic air from the Terra Nova Bay convergence zone for the period 1992/93 to 1995/96. The wind fields reveal that over the ocean these katabatic winds may turn northward C as expected given the mean southerly geostrophic wind and influence of the Coriolis force C but also southward, or divide into separate northward- and southward-turning components. A case study is used to illustrate the latter situation, and analysis of automatic weather station (AWS) data, concurrent with this particular katabatic surge event, suggests that the most likely mechanism for the observed southward turning is the existence of a highly-localised low pressure centre south of Terra Nova Bay. Comparison of multi-temporal ERS scatterometer wind fields with AWS wind measurements demonstrate that the satellite data are able to correctly portray changes in mesoscale circulation patterns related to the onset and cessation of katabatic surge events, and C despite a less than ideal temporal coverage C are suitable for the routine monitoring of katabatic winds when open water is present around the Antarctic coastline.

Keywords: ERS scatterometer, katabatic winds, mesoscale atmospheric flow