



Katabatic wind impact on oceanic surface winds around the Antarctic

X. Yuan and C. Li

Lamont-Doherty Earth Observatory of Columbia University, New York, USA
(xyuan@ldeo.columbia.edu / Fax: +01 845 365-8736 / Phone: +01 845 365 8820)

Katabatic wind is a unique meteorological feature in the Antarctic continent. The intense radiative cooling over the Antarctic plateau during non-summer seasons generates intermittent but strong drainage flows that are highly controlled by the Antarctic orography. The strongest drainage flows occur at the steep coast terminus of the continent. Katabatic winds have been observed a few hundreds of kilometers off the Antarctic coast with only nominal reduction in the strength. Previous studies mostly employed automatic weather station data and satellite AVHRR images as well as numerical modeling to investigate katabatic winds. Although numerical simulations suggested that katabatic winds could disturb the mean atmospheric circulation in the subpolar to mid-latitude regions, no direct observations of such winds have been documented off the sea ice cover. The extent of katabatic wind impact remains unresolved. This study investigates the potential katabatic wind interference with wind field off the sea ice edge in polar seas. QuikSCAT observations depict much stronger northward wind than southward wind accompanying low-pressure systems adjacent to the sea ice edge during katabatic wind active periods. Such strong northward winds can reach above 40 m/s. Our study suggests that local mesoscale cyclones can encourage katabatic winds to penetrate further north, reaching about 2000 km from the Antarctic coast. Such strong wind events can propagate beyond the winter sea ice cover and influence air-sea energy exchanges in the open ocean north of sea ice edge.