

Sensible and Latent Heat Fluxes from In Situ Aircraft Observations in Terra Nova Bay, Antarctica

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Within Terra Nova Bay (TNB), Antarctica, unique atmospheric and oceanic conditions have the potential to generate strong air-sea interactions. During the wintertime months in particular, downslope and katabatic flow from the continental interior produces a coastal polynya that recurs regularly throughout the season. Heat fluxes into the atmosphere from the interactions between the cold, dry continental air and the relatively warm open water within the polynya can have important implications for the atmospheric boundary layer and oceanic currents. In Septembers 2009 and 2012, unmanned aerial vehicles were flown over TNB with the purpose of collecting three-dimensional measurements of the atmospheric boundary layer overlying the polynya during the late winter months. Based on these measurements, sensible and latent heat fluxes were calculated from the aircraft measurements for the September 2009 flights, with sensible heat flux values over 500 Wm^{-2} and latent heat flux values over 100 Wm^{-2} calculated. This presentation will include the methodology of the flux calculation, an examination of atmospheric conditions surrounding the calculated flux values, and a comparison of the calculated fluxes to various model fluxes, including the Antarctic Mesoscale Prediction System and reanalysis data.