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Wintertime observations of air-sea fluxes in an Antarctic polynya

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Unmanned aerial vehicles (UAVs) were used to observe the atmospheric and ocean/sea ice surface state over the Terra Nova Bay polynya during September 2009. Observations from the UAVs include surface skin temperature, atmospheric temperature, humidity, pressure, and winds, net radiative fluxes, and images of the surface state. This data was used to estimate the surface turbulent sensible and latent heat fluxes and the turbulent momentum flux. Sensible heat fluxes were estimated to be as large as 600 W/m^2 with latent heat fluxes up to 150 W/m^2. Large variability in the fluxes was observed over the polynya and from day to day. The source of this variability is related to changes in surface conditions (open water or sea ice) and changes in atmospheric forcing (winds, temperature, and humidity). Plans for additional observational studies of the Terra Nova Bay polynya will also be discussed.