



Aircraft-based observations of air-sea fluxes over Denmark Strait and the Irminger Sea

G. N. Petersen (1) and I. A. Renfrew (2)

(1) Icelandic Met Office, Reykjavík, Iceland (gnp@vedur.is), (2) University of East Anglia, School of Environmental Sciences, United Kingdom

During the Greenland Flow Distortion experiment (GFDex) aircraft-based observations of air-sea fluxes were obtained over Denmark Strait and the Irminger Sea. High frequency observations of velocity, temperature and water vapour have been used to calculate turbulent fluxes of momentum, heat and moisture using the eddy covariance method. These are the first direct air-sea flux observations in this region and add to the relatively small collection of direct air-sea flux observations made in high wind speed conditions. The aircraft-based turbulence legs were flown at remarkably low-levels - only 30-50 m above the sea surface and so within the atmospheric surface layer. Results are presented for 145 flux runs, each of 2 minutes (approximately 12 km), 131 over open water and 14 over sea ice and the marginal ice zone. The flux data were obtained in 10-m neutral wind speeds of up to 25 m s^{-1} , with 80% of the flux data in the range $15\text{--}19 \text{ m s}^{-1}$.

The observations show large air-sea fluxes of both momentum and heat. Over open water, the wind stress varied from 0.2 to 1.9 N m^{-2} and the surface sensible and latent heat fluxes from 50 to 300 W m^{-2} - resulting in total surface heat fluxes of up to 600 W m^{-2} . The observed momentum exchange coefficient is in line with previous studies, however both the heat and moisture exchange coefficients are at the upper end of those previously observed. The data set presented is a valuable addition to the small number of air-sea turbulent data sets obtained in high wind speed conditions.