Geophysical Research Abstracts, Vol. 9, 02996, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-02996

Direct measurements of turbulent fluxes in the near surface environment at high latitudes applying the eddy-covariance method. The Arctic Turbulence Experiment 2006 (ARCTEX-2006)

J. Lüers (1) and J. Bareiss (2)

(1) University of Bayreuth, Dept. of Micrometeorology, Germany
(johannes.lueers@uni-bayreuth.de), (2) University of Trier, Dept. of Climatology, Germany

Accurate quantification of turbulent fluxes between the surface and the atmospheric boundary layer in polar environments, characterized by frequent stable to very stable stratified conditions, is a fundamental problem in soil-snow-ice-vegetation-atmosphere interaction studies. The observed rapid climate warming in the Arctic requires improvements in the monitoring of energy and matter exchange; accomplished by setting up appropriate (adapted to polar conditions) observation sites to measure turbulent fluxes. To address these problems, it is essential to improve the databases with high-quality in-situ measurements of turbulent fluxes near the surface applying the Eddy-Covariance method. These direct measurement data (CSAT3 sonic anemometer, KH20 krypton hygrometer, and laser scintillometer) obtained during the first Arctic Turbulence Experiment (ARCTEX-2006) in May 2006 at the French-German Arctic Research Base in Ny-Ålesund (AWI/IPEV) on Spitsbergen (Svalbard) allowed a comparison with simulated results from simple flux gradient-parameterizations used today to force atmosphere-ocean-ice models. In addition, the results of this pilot study shows the problematic of direct measurements (e.g. snow drift through the sensor path ways) under rough weather conditions as well as they reveal that the misestimating of sensible heat fluxes can result from inaccurate measurements or calculation of the surface temperature and inaccurate treatment of the neutral and stable conditions (e.g. intermittency, gravity waves) in the bulk parameterization.