Geophysical Research Abstracts, Vol. 8, 07958, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07958

Air-Sea fluxes of CO2 in the Greenland Sea

L.L.Soerensen (1), S.E.Larsen (1) and S.W.Lund (1)

(1) Risoe National Laboratory, Denmark (lotte.geern@risoe.dk/+45 46775079)

Turbulent fluxes of momentum, heat, moisture and gases at the air-sea interface are important for many aspects in climate research. The sensible and latent heat fluxes represent inputs of heat and moisture into the atmospheric boundary layer to influence the convection and formation of clouds. The uptake or release of the climate gas CO2 from the oceanic surface is also partly driven by the vertical turbulent transport in the atmosphere. In order to construct models, which can predict future climate scenarios in a more accurate and reliable way it is important to be able to parameterise the air-sea exchange of the above mentioned parameters. Therefore flux data from the marine atmosphere are needed to improve current parameterisation and for model validation. However it is difficult to obtain good data sets of fluxes using the traditional and direct covariance technique in the marine atmosphere since this method is very sensitive to the motion on a ship and flow distortion caused by the large structure of a ship or a marine platform. The measurements are additionally challenging due to the very small fluxes occurring over the marine surface. Here we present the application of techniques using power spectra and co-spectra to estimate fluxes over marine surface of wind speed, water vapor and CO2. Momentum and gas fluxes are calculated from the dissipation technique utilizing the inertial sub-range of the power-spectra and from readings of the co-spectra amplitude, both are compared to covariance derived fluxes. It is shown how even data having poor signal/noise ratio can be used for flux estimations. Furthermore the technique is used for data taken in the Greenland Sea at different seasons and compared to fluxes estimated from parameterizations based on wind speed and atmosphere-ocean pCO2 gradients.