



Intermittent turbulence in the upper stable boundary layer over Greenland: aircraft measurements from IGLOS

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The experiment IGLOS (**I**nvestigation of the **G**reenland boundary **L**ayer **O**ver **S**ummit) was conducted in June and July 2002 in central Greenland in order to investigate the turbulence structure of the stable boundary layer (SBL) over a Polar inland plateau region. The aircraft based measurements taken during IGLOS are evaluated in comparison as well as in combination with other measurements made at Summit Camp, especially radiation fluxes and turbulent quantities measured on the 50 m tower operated by the ETH Zürich.

Six SBL flight missions were performed that cover a quite wide range of different synoptic situations. In any case, a well developed stable boundary layer was found. The SBL-thickness was mostly below the values suggested from previous studies and did not exceed roughly 100 m, even in high wind conditions. The turbulent height of the SBL was found to be much smaller than the surface inversion thickness. Vertical transports on the (spectral) turbulence scale were very small (mostly $< 10 \text{ Wm}^{-2}$) and occurred only intermittently in areas of the order of a few kilometers.

Intermittency was quantified by the turbulent event fraction. This measure used in mid-latitudes was adapted for the Polar SBL by adjusting the threshold setting. The dependence of the intermittency on stability was found to be consistent with previous studies.

The behavior of the turbulent events alone was investigated and turned out to be very similar to continuous turbulence. The stability dependence of the turbulent momentum

flux agrees slightly better to continuous turbulence than that of the turbulent sensible heat flux.