



## **Three years of long-lived trace gas measurements in the lower troposphere over north-eastern Poland by means of light aircraft.**

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During the 3 years 2002-2004 regular measurements of long-lived trace gases were performed in the lower troposphere over north-eastern Poland by means of small aircraft, as part of the EU-projects AEROCARB, TCOS-Siberia and CarboEurope. The measurements were made about 60 km to the north of Bialystok (53°31'N, 22°4'E) at the area of the Biebrza National Park with a temporal frequency of 2-3 weeks. Continuous profiles of temperature, humidity, pressure and CO<sub>2</sub> mixing ratios were recorded, as well as mixing ratios of CH<sub>4</sub>, CO, H<sub>2</sub>, N<sub>2</sub>O and SF<sub>6</sub> from flask analyses, which were sampled at altitudes 300, 500, 1000, 1500, 2000, 2500 meters above ground level. The peak-to-peak amplitude of the seasonal cycle of atmosphere CO<sub>2</sub> within the atmospheric boundary layer (ABL) of 19 ppm is about twice the one observed in the free troposphere (10.9 ppm). ABL mixing ratios are larger than free troposphere values during winter time, and smaller during the summer reflecting the change of the continental biosphere from source to a sink. CH<sub>4</sub> mixing ratios show a seasonal variability with the highest values in the ABL during winter. N<sub>2</sub>O, CO and H<sub>2</sub> also show a slight seasonal cycle with similar phasing. In contrast, the measured mixing ratios of SF<sub>6</sub> exhibit a linear increase of 16% since the beginning of 2002 without any significant seasonal variations. The observed large variability caused by different air mass origins necessitates a higher frequency of measurement flights in order to obtain representative trace gas climatology in Eastern Europe, which will be implemented in 2006.