Geophysical Research Abstracts
Vol. 18, EGU2016-5703-2, 2016
EGU General Assembly 2016

Measurement of nitrogen oxides (NO_x) measurements in the Upper Troposphere and Lowermost Stratosphere within IAGOS – Instrument Performance and First Results

Florian Berkes (1), Norbert Houben (1), Hans-Werner Pätz (1), Marcel Berg (1), Torben Blomel (1), Günther Rupsch (1), Marlon Tappertzhofen (1), Andreas Volz-Thomas (1), and Andreas Petzold (1)

(1) Forschungszentrum Juelich, Institute of Energy and Climate Research - Troposphere, Juelich, Germany (f.berkes@fz-juelich.de), (2) IAGOS-AISBL, Brussels, Belgium

NO_x (sum of NO and NO_2) play a central role in atmospheric chemistry related to ozone and oxidation capacity (OH and NO_3 radicals). The most important sources of NO_x in the upper troposphere are lightning, transport from the boundary layer (combustion processes, from biomass burning, agriculture, and industry) and aircraft emissions. Measurements of NO_x in the upper troposphere and lower stratosphere (UTLS) are rare but important for understanding the local photochemistry and for the assessment of the impact of aircraft on the budgets of greenhouse gases such as ozone and methane, and for validation of satellite observations of NO_2.
The European Research Infrastructure IAGOS (In-service Aircraft for a Global Observing System) operates on a global-scale monitoring system for atmospheric temperature, trace gases, aerosols and clouds in the UTLS at high spatial resolution by passenger aircrafts. The IAGOS NO_x instrument is designed for the autonomous measurement of nitrogen oxides in the atmosphere. The measurement principle is based on the well-established chemiluminescence technique. For installation on commercial aircraft and for long deployment periods, the instrument is designed with one chemiluminescence channel and operably on a low measurement flow. Hence, measurements of NO and NO_2 are made sequentially every 50 s.
We present the instrument performance and first results from more than 200 flights in May to November 2015 over the North Atlantic. We focus on night time observations and discuss the occurrence and distribution of NO_2 within the UTLS region.