QA/QC of IAGOS NRT GHG data

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Within the European research infrastructure IAGOS, the In-service aircraft for a global observing system, globally distributed measurements of greenhouse gases (GHG) CO2 and CH4, as well as CO will start in 2017. A supplemental type certificate for installation of the CRDS system including two calibration gas cylinders in the avionics bay of Airbus A340 and A330 has been issued by EASA in late 2016. First integration is scheduled for June 2017 aboard an A330 (tail sign D-AIKO) operated by Lufthansa. Within the next years, about five aircraft from various airlines operating out of different parts of the world will be equipped. Near-real time (NRT) data transmission is foreseen for utilization of observations by the Copernicus Atmosphere Monitoring Service (CAMS) and by other users.

Due to the increasing use of NRT data for validation of data assimilation systems and their products, it is important to properly quantify the uncertainty of NRT observations so that the information can be utilized quantitatively. The presentation will discuss the various steps involved in ensuring traceability of NRT data to WMO calibration scales. Before each installation on board the aircraft for an observing period of several months, the CRDS system together with its two calibration cylinders is calibrated against in-house reference gases. During the deployment period, the system performs self-calibrations approximately every two hours using the two calibration cylinders installed within the aircraft, with longer (10 min. per cylinder) calibration on ground, and shorter (3 min. per cylinder) calibrations during flights. After each flight the data are transferred via GSM to the central IAGOS database in Toulouse, and a series of automated processing steps to assess housekeeping data and instrument drift are performed, including provisional uncertainty propagation for the NRT data. Data are then made available to users in NASA Ames 1001 format. The multiple calibration gas measurements during each deployment period will be used to assess instrument drift, and to quantitatively propagate uncertainties into the dry air mole fractions reported to the users. After an initial testing phase, it is envisioned to fully automate such assessments for the NRT data stream.