QOS2016-333, 2016
Quadrennial Ozone Symposium of the International Ozone Commission

In-service Aircraft for Global Monitoring : 20 Years of MOZAIC-IAGOS ozone measurements

V. Thouret
Laboratoire d'Aérologie, Université de Toulouse, CNRS, UPS, France (thov@aero.obs-mip.fr)

Climate change, air quality, and the oxidizing capacity of the atmosphere are major issues that require detailed, long-term observations of ozone and other atmospheric chemical compounds on a global scale. For already 22 years MOZAIC and its successor IAGOS have successfully harnessed the potential of in-service aircraft to respond to these needs. IAGOS is now a European Research Infrastructure established in 2014 (http://www.iagos.org) from two previous research projects, MOZAIC and CARIBIC with the goal of establishing a sustainable observing system for monitoring of atmospheric trace gases (ozone and major precursors), aerosol and cloud particles from commercial aircraft at a global scale.
The presentation will give the ultimate goals of IAGOS, the current status of the technical implementation, and the planned developments. A particular focus will be made on the ozone measurements and procedures applied to ensure high quality standards and consistency of the entire data set. From the beginning of the program in 1994, records of ozone were taken every four seconds from take-off to landing. Based on the dual-beam UV absorption principle (Model 49-103, Thermo Environment Instruments, USA), the measurement accuracy is estimated at $\pm$[2 ppbv + 2%] (Thouret et al., 1998). In IAGOS, O_3 and CO are combined and measured by optimised methods such as UV absorption and IR correlation, respectively (Nédélec et al., 2015). The measurement quality control procedures have remained unchanged. Using overlapping years of MOZAIC/IAGOS, it has been shown that IAGOS can be considered as the continuation of MOZAIC with the same data quality of O_3 and CO measurements. A selection of scientific results will be presented in order to highlight the value of 20 years of regular airborne data from commercial aircraft for a better understanding of ozone distribution throughout the troposphere and in the UTLS along with its interannual variability and trends. IAGOS ozone data are also widely used by the Copernicus Atmosphere Monitoring Service (CAMS) to evaluate forecast model runs in near real time as well as reanalysis. Examples of such process-oriented validation will be given.