Geophysical Research Abstracts
Vol. 15, EGU2013-8644, 2013
EGU General Assembly 2013

The European Research Infrastructure IAGOS - From dedicated field studies to routine observations of the atmosphere by instrumented passenger aircraft

Andreas Petzold (1), Andreas Volz-Thomas (1), Christoph Gerbig (2), Valerie Thouret (3), Jean-Pierre Cammas (3), Carl A.M. Brenninkmeijer (4), and the IAGOS team ()

(1) Forschungszentrum Jülich, Institute of Energy and Climate Research 8: Troposphere, Jülich, Germany (a.petzold@fz-juelich.de), (2) Max Planck Institute for Biogeochemistry, Jena, Germany, (3) Laboratoire d'Aérologie, CNRS, Université Paul Sabatier, Toulouse, France, (4) Max Planck Institute for Chemistry, Mainz, Germany

The global distribution of trace species is controlled by a complex interplay between natural and anthropogenic sources and sinks, atmospheric short- to long-range transport, and in future by diverse, largely not yet quantified feedback mechanisms such as enhanced evaporation of water vapour in a warming climate or possibly the release of methane from melting marine clathrates. Improving global trace gas budgets and reducing the uncertainty of climate predictions crucially requires representative data from routine long-term observations as independent constraint for the evaluation and improvement of model parameterizations.

IAGOS (In-service Aircraft for a Global Observing System; www.iagos.org) is a new European Research Infrastructure which operates a unique global observing system by deploying autonomous instruments aboard a fleet of passenger aircraft. IAGOS consists of two complementary building blocks: IAGOS-CORE deploys newly developed high-tech instrumentation for regular in-situ measurements of atmospheric chemical species (O_3, CO, CO_2, NO_x, NO_y, H_2O, CH4), aerosols and cloud particles. Involved airlines ensure global operation of the network. In IAGOS-CARIBIC a cargo container is operated as a flying laboratory aboard one passenger aircraft.

IAGOS aims at the provision of long-term, frequent, regular, accurate, and spatially resolved in-situ observations of the atmospheric chemical composition in the UTLS and the extra tropical troposphere and on vertical profiles of greenhouse gases, reactive trace gases and aerosols throughout the troposphere. It builds on almost 20 years of scientific and technological expertise gained in the research projects MOZAIC (Measurement of Ozone and Water Vapour on Airbus In-service Aircraft) and CARIBIC (Civil Aircraft for the Regular Investigation of the Atmosphere Based on an Instrument Container). The European consortium includes research centres, universities, national weather services, airline operators and aviation industry.

IAGOS provides data for fundamental scientific research and for policy makers, including air quality forecasting, verification of CO_2 emissions and Kyoto protocol monitoring, numerical weather prediction, and validation of satellite products. There is also a strong interest of the aviation sector by means of airlines who agreed to provide free transportation of the equipment. Reasons are their intention to contribute to a better understanding of climate change and the budgets of greenhouse gases with particular emphasis on the impact of aviation. Such knowledge forms the scientific basis for the development of abatement strategies and emission trading.

IAGOS is planned to be an open infrastructure in two aspects. The data measured onboard the aircraft will be transferred to a central data base and interested users can access the data base free of charge after having signed a data protocol. Access to real-time data will also be free of charge and is foreseen to be achieved in the framework of Global Monitoring for Environment and Security (GMES) via the European meteorological network.

The presentation will introduce the research infrastructure and its role in the emerging integrated global atmospheric observing system. Data management, quality assurance tools and links between IAGOS and other research infrastructures in the domain of atmospheric observation will be discussed.