IAGOS developments in the frame of IGAS for metadata standardisation and database interoperability

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IAGOS (In-service Aircraft for a Global Observing System, http://www.iagos.org and http://iagos.pole-ether.fr) aims at the provision of long-term, frequent, regular, accurate, and spatially resolved in-situ observations of atmospheric chemical composition. IAGOS observation systems are deployed on a fleet of in-service aircraft of internationally operating airlines. 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 and ECMWF, airline operators and aviation industry.

The IAGOS database forms an essential element of the global network of atmospheric composition observations. In the framework of the newly starting IGAS project (IGAS for GMES Atmospheric Service, http://www.igas-project.org), major developments are planned in order to interoperate with international portals and other databases enabling easy use of the IAGOS observations by operational and other environmental services. These include metadata and formats standardisation, QA/QC procedures and traceability, and the real-time data transmission.

The main goal of IGAS is to provide the different IAGOS data sets (Near Real Time and/or in delayed mode) to users in a standardized format including the necessary metadata and information on the data processing, data quality and uncertainties. Thereby the strong role of IAGOS data for the GMES/Copernicus atmosphere service will be further enhanced. With the developments in IGAS it will be possible not only to evaluate operational forecasts of the global atmospheric chemical composition, but also to apply IAGOS data in data assimilation, for the validation of satellite data products and studies by the scientific community. The subservices that provide the different IAGOS data sets will be made interoperable among each other.

We will redefine and standardise the IAGOS metadata for interoperable use within GMES/Copernicus. These metadata will comply with the ISO 19115, INSPIRE and CF conventions. IGAS will also contribute to the development of a community metadata profile in the framework of the GEO air quality community of practice. IAGOS data formats shall be netCDF and NASA AMES.

We will also define, implement and demonstrate interoperability between the involved IAGOS data services including the former MOZAIC and former CARIBIC data bases, ESA’s GENESI-DEC and the Jülich WCS web application JOIN (Jülich OWS Interface) which combines model outputs with in-situ data for intercomparision. We will implement the OGC-compliant GEO Air Quality Community WCS server software for the IAGOS database and design an optimal data archiving strategy for IAGOS data sets (vertical profiles, time series, resolution, etc.) to be retrieved in NRT and/or delayed mode.

To facilitate satellite and model validation, tools will be made available for collocation and comparison with IAGOS. For instance, we will enhance the JOIN application to properly display aircraft data as vertical profiles and along individual flight tracks and to allow for graphical comparison to model results that are accessible through interoperable web services, such as the daily products from the GMES/Copernicus atmospheric service. An intrinsic element of these developments will be the exploration of web-based techniques to manage data protection and privacy issues within INSPIRE compliant interoperable services.