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Characterization of the Aerosol Instrument Package for the In-service Aircraft Global Observing System IAGOS

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The atmospheric aerosol influences the climate twofold via the direct interaction with solar radiation and indirectly effecting microphysical properties of clouds. The latter has the largest uncertainty according to the last IPPC Report. A measured in situ climatology of the aerosol microphysical properties is needed to reduce the reported uncertainty of the aerosol climate impact.

The European Research Infrastructure IAGOS (In-service Aircraft for a Global Observing System; www.iagos.org) responds to the increasing requests for long-term, routine in situ observational data by using commercial passenger aircraft as measurement platform. However, scientific instrumentation for the measurement of atmospheric constituents requires major modifications before being deployable aboard in-service passenger aircraft.

The IAGOS Aerosol Package (IAGOS-P2C) consists of two modified Butanol based CPCs (Model Grimm 5.410) and one optical particle counter (Model Grimm Sky OPC 1.129). A thermodenuder at 250°C is placed upstream the second CPC, thus the number concentrations of the total aerosol and the non-volatile aerosol fraction is measured. The Sky OPC measures the size distribution in the rage theoretically up to 32 μm. Because of the inlet cut off diameter of $D_{50} = 3\mu m$ we are using the 16 channel mode in the range of 250 nm - 2.5 μm at 1 Hz resolution.

In this presentation the IAGOS Aerosol package is characterized for pressure levels relevant for the planned application, down to cruising level of 150 hPa including the inlet system. In our aerosol lab we have tested the system against standard instrumentation with different aerosol test substances in a long duration test. Particle losses are characterized for the inlet system. In addition first results for airborne measurements are shown from a first field campaign.