4.083 Sources and processes driving pollution in the African upper troposphere between 2005 and 2013.

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Abstract:

We use IAGOS (http://www.iagos.org) aircraft measurements of ozone (O3), carbon monoxide (CO) and relative humidity (RH), IASI spacecraft observations of O3 and CO, to investigate the seasonal distribution variations and the inter-annual variability of the chemical species, over the African, the South Atlantic and the Indian Ocean upper troposphere. Between 2005 and 2013, daily Air Namibia flights equipped with onboard autonomous instruments, allowing sampling the atmosphere between Europe (London and Frankfurt) and Namibia (Windhoek) with high frequency (almost every day), while IASI observations provide additional measurements over the two adjacent Oceans. Using systematic Lagrangian simulations (FLEXPART) coupled with emission inventories (SOFT-IO module), we give a first quantification of the CO sources origin (anthropogenic, biomass burning, regions of the world) and of the transport processes (Hadley cells, tropical easterly jet, westerlies) driving the observed meridional gradients north and south of the Inter Tropical Convergence Zone over the three regions (South Atlantic, Africa, Indian Ocean) and zonal gradients East and West of the ITCZ. Thanks to the 7 years of regular measurements, a first assessment of the inter-annual variability of the

chemical species (O3, CO and RH) is also presented.