Geophysical Research Abstracts
Vol. 21, EGU2019-8217, 2019
EGU General Assembly 2019

Origins and characterization of O_3 and CO as seen by IAGOS in the African upper troposphere between 2005 and 2013

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IAGOS (http://www.iagos.org) aircraft measurements of ozone (O_3) and carbon monoxide (CO) are used to explore the seasonal distribution variations and the inter-annual variability of the chemical species, over the African upper troposphere.Between 2005 and 2013, daily Air Namibia flights equipped with onboard autonomous instruments, allowing sampling the atmosphere between Namibia (Windhoek) and Europe (London and Frankfurt) with high frequency (almost every day). These high frequency measurements allow us to investigate the variation of meridional profiles of upper tropospheric O_3 and CO in the African tropical region.
We use the IAGOS measurements combined with meteorological data giving by the standard aircraft instruments to investigate the variation of the O_3 and CO meridional profiles with the seasonal variability of the Inter Tropical Convergence Zone (ITCZ). We also give a first assessment of the inter-annual variability of the chemical species concentrations.
Using the SOFT-IO module (Sauvage et al., 2017) which couples, for each IAGOS flight, Lagrangian simulations run with FLEXPART model (Stohl et al., 2005) with emission inventories (GFAS or MACcity), we characterize African upper tropospheric CO, giving quantifications of its sources origins (anthropogenic and fire emissions, world regions of emissions) and of the transport processes (Hadley cells, tropical easterly jet, etc) that drive its concentrations.

References:
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