



Width of the tropics: analysis of MOZAIC aircraft observations over Africa from 1994 to 2008

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The width of the tropical belt in the upper troposphere is being suspected of latitudinal expansion (e.g. Hu et al., 2007 ; Seidel et al. 2008), with implications in changing the tropical surface climate and the transport of trace gases to the stratosphere. This paper tackles the topic by analysing in-situ data from the airborne programme MOZAIC (Measurements of Ozone, Water Vapour, Nitrogen Oxides and Carbon Monoxide by Airbus In-service Aircraft). From 1994 to 2008, hundreds of flights have sampled meteorological and atmospheric composition parameters of the African tropical upper troposphere. First, a climatology of meteorological parameters, ozone and carbon monoxide is presented. Then, changes with time of the width of the tropical belt defined by different metrics in MOZAIC observations and in ECMWF potential vorticity fields along the flights are investigated. Finally, changes with times of upper tropospheric ozone concentrations are also discussed. Results bring a bunch of indications that confirm important changes of the tropical belt.

References:

Hu, Y., and Fu, Q. Observed poleward expansion of the Hadley circulation since 1979. *Atmos. Chem. Phys.* 7, 5229–5236 (2007).

Seidel D. J., Fu Q., Randel W.J., Reichler T.J., Widening of the tropical belt in a changing climate, *Nature Geoscience*, 1, 21-24, 2008.