

## **Ozone trends (1995-2013) in the UTLS as seen by MOZAIC-IAGOS over northern mid-latitudes**

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Since 1994, the MOZAIC program has been performing in-situ measurements of ozone and water vapor concentrations from commercial aircraft, thus leading to a wide observing system for the UTLS over northern mid-latitudes. In order to complete the understanding of ozone distribution, CO analysers were added among on board measuring instruments at the end of 2001. From 2011, a new set of instruments combining ozone and CO have been installed in the frame of IAGOS (In-service Aircraft for Global Observing System) to keep going on a long term observing system. Historical MOZAIC data have been recorded until 2014 and are still available in the IAGOS central database ([www.iagos.fr](http://www.iagos.fr)). Consistency has been demonstrated (Nedelec et al., 2015). Consequently, a 20-year dataset now allows deriving interannual variability and (multi-)decadal trends. We present ozone time series from 1994 to 2013 over six regions representing northern mid-latitudes, excluding Pacific area. CO times series start in 2002.

We define three pressure ranges relative to the tropopause altitude, dynamically defined as the 2 pvu-isosurface : the Upper Troposphere, the tropopause and the Lower Stratosphere.

We globally observe positive trends of ozone in the UT, more pronounced from 1995 to 2000 (e.g.  $1.71 \pm 0.57$  ppbv.year-1 over Western Europe) than from 2000 to 2013 (e.g.  $0.3 \pm 0.15$  ppbv.year-1 over the same region). CO time series show a decreasing tendency (e.g.  $-1.36 \pm 0.31$  ppbv.year-1 over Western Europe) since 2002. However, the latter period shows significant interannual variabilities and anomalies over most regions, in ozone and CO : positive in 2003, negative in 2008-2009 for example. This may suggest a possible impact of the summer heat wave (2003) and an influence of the large-scale CO decrease, likely due to the global financial crisis (2008). We will discuss potential leading processes of such observed variabilities (troposphere-stratosphere coupling, boreal fires, large-scale climate oscillations, ...).