



The transition from the tropical to the extra-tropical ozone-QBO signature in EMAC-ESCiMo, ERA interim and ozone CCI data

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The quasi-biennial oscillation (QBO) in the tropical zonal mean stratospheric winds is a major driver of interannual ozone variability in the tropics. The associated ozone variability is clearly seen in the tropics. In addition, it affects the interannual ozone variability in sub-tropical and mid-latitude regions.

The QBO influence on ozone in all latitudes can be diagnosed in climate model data (free running or nudged EMAC simulations from the ESCiMo project), reanalysis data (ERA-Interim) and satellite data (ozone CCI). We extract the ozone-QBO signature from the data by using a Fourier filtering technique so that the modelled and observed structures can be compared. Starting from the signal in total column ozone, we construct composite latitude height cross-sections of ozone to reveal the vertical structure of QBO related changes for different phases of the ozone-QBO. We discuss the differences between the modelled (EMAC) and observed (CCI) signatures and compare them to ERA-Interim (a data assimilation system).

With this diagnostic we improve our understanding of the physical mechanisms that contribute to ozone variability and how an 'ozone change signal' can migrate from the tropics to the extra-tropics. Understanding the main mechanisms involved in this signal transfer lays the foundation for an improved trend detection on decadal time scales.