



## **Diagnosing and modelling of the transition from the tropical to the extra-tropical QBO signature in ozone**

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The quasi-biennial oscillation (QBO) is a major driver of interannual ozone variability in the tropics. Even though the QBO in zonal-mean zonal wind is well defined to the tropical region, the interannual ozone variability in sub- and extra-tropical regions is significantly impacted by the QBO as well. We use Ozone\_CCI data and simulations with a nudged setup of the EMAC chemistry-climate model to investigate how the tropical QBO induced variability is transferred to extra-tropical regions. By using a Fourier filtering approach we extract the QBO-ozone signature and compare observational and modelled structures. Having characterised the model performance, we use the model simulation to trace the spread of the QBO induced ozone signal from the tropics to the extra-tropics. To highlight the general dynamical drivers of ozone change, we create composites of observed and model derived diagnostics. This generalisation is used to reveal the physical mechanisms that contribute to ozone variability and how an 'ozone change signal' migrates from the tropics to the extra-tropics. Understanding the main mechanism involved in the signal transfer lays the foundation for improved trend detection. In addition, it enables a better attribution of variability on longer time-scales, e.g. either ENSO induced or even slower decadal changes linked to climate change.