



Modelled zonal asymmetries in age-of-air: To what extent are they real?

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Age-of-air diagnostics help our understanding of large-scale transport processes and their characteristic timescales in the upper troposphere and lower stratosphere. In models, age-of-air can easily be calculated using a timed tracer. Observational evidence for age-of-air can be derived using inert tracers with a distinct temporal trend. One such tracer is SF₆ as measured by the MIPAS instrument on board ENVISAT. We simulate age-of-air using the Met Offices Unified Model (UM) at a horizontal resolution of N48 with 60 vertical levels from the surface up to around 83 km and validate the model performance with MIPAS derived estimates. Zonal means show good agreement in the lower stratosphere; some deviations are apparent at high altitudes over the Polar Regions. In the northern sub-tropical lower stratosphere modelled age-of-air displays pronounced zonal asymmetries overlaid with a seasonal cycle. The measured variability of SF₆ derived age-of-air is used to rationalise the consistency of model results with observations. Good agreement is found in the seasonality of variability in measured and modelled age-of-air between observations and model. Possible links between the Indian monsoon and the described seasonality will be explored.