



## **Structure of the zonal mean northern hemispheric tropopause height variability**

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We present an analysis of the temporal variability of the latitude-height structure of the northern hemispheric upper troposphere / lower stratosphere region, with emphasis on the height of the tropopause. We use daily mean data from the European Centre for Medium-range Weather Forecast 40-year reanalysis project ERA-40 to establish the climatological mean annual cycle and interannual variability. An EOF analysis of the interannual anomalies of the zonal mean temperature field during the northern hemispheric winter months shows that troposphere and stratosphere are to first order independent, with stratospheric variability having a larger bearing on tropopause height. The stratospheric interannual variability is dominated by a tropical - extratropical see-saw. The troposphere shows a pattern with several nodes in the extratropics, but results are sensitive to the vertical domain chosen for the EOF. Our analysis shows that the latitude-time structure of the tropopause may be a useful indicator of dynamical processes, but that its relation to dynamical phenomena such as sudden stratospheric warmings or patterns of climate variability such as the Arctic Oscillation / Northern Annular Mode is highly complex.