



Properties of the Extratropical Tropopause Layer

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It has been shown recently that there is a need to treat the transition between the troposphere and the stratosphere as a layer of finite thickness. In this region, mixing of air with the origin both in the stratosphere and the troposphere yields unique characteristics, which, in turn, can be used to define the region. One of the inherent features of the tropopause layer is a relationship between a tropospheric tracer and a stratospheric tracer.

Aircraft measurements of atmospheric species collected during the NASA CRYSTAL-FACE campaign in July 2002, are used in this work. The relationship between ozone, as a stratospheric tracer, and carbon monoxide, as a tropospheric tracer, in the extratropical regions in the Northern Hemisphere is used to investigate the properties of the tropopause layer. Two main properties are examined: the altitude at which the layer is centred and the thickness of the layer. In addition, thermal tropopause height, measured by remote temperature sounding on board the aircraft, is used to analyze the correlation between the centre of the layer and the thermal tropopause. The measurements in the tropopause layer are classed into two data sets depending on the corresponding thermal tropopause height (above and below 14 km). The analyses are performed separately for the two data sets.