



What is the extratropical tropopause and how might it change in the future?

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The extratropical tropopause is an 'air-mass' boundary between the moist, low-ozone air of the troposphere and the relatively dry, relatively high-ozone air of the extratropical stratosphere. This boundary has an 'almost-vertical part' associated with the subtropical jet and then a part that slopes more gently downwards towards the poles.

The extratropical tropopause can be characterised in various ways in terms of transport, as an upper limit of the mean meridional mass circulation, as the upper limit of a region of strong quasi-horizontal eddy mixing, or as a region that is in rapid communication with the surface. All of these have clear implications for chemical distributions and relate closely to particular views of the dynamics of the troposphere. There is still no clear consensus about the latter. 'Dry' dynamics is clearly an imperfect model, but can it be replaced by a 'modified dry dynamics' in which moist effects simply modify the large-scale static stability, or is the moist asymmetry between upward and downward motion a vital aspect, or indeed is the extratropical troposphere neutral on the large-scale to moist slantwise convection?

This talk will review recent results relevant to various of the above. A major motivation for improved understanding of the extratropical tropopause and its relation to tropospheric dynamics is the need for reliable prediction of future change. Here two important points are that future change in the tropopause height depends to some extent on what definition is adopted – so it is best to adopt a meaningful definition – and that the subtropical jet is a major part of the extratropical tropopause – so changes in the position of the subtropical jet, or to put it another way, changes in the 'width of the tropics', need to be understood as well as changes in the vertical profile of static

stability.