

## ***Interactive comment on “Evidences of thin cirrus clouds in the stratosphere at mid-latitudes” by P. Keckhut et al.***

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I think this is a very good and informative study. There are, however, two points in the discussion which I would like to see further justification for: (1) is the air really of tropical origin and (2) does it enter the stratosphere isentropically.

Firstly, since air motion in the troposphere is highly chaotic the parcels which have been shown to enter the stratosphere over France could have come from a variety of places, including the mid-latitude boundary layer (e.g. Stohl et al., JGR,108,D12, 8516, doi:10.1029/2002JD002490, 2003). The air can be expected to be moist no matter which part of the troposphere it comes from.

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Secondly, is the transport really quasi-isentropic? It would be very useful if an additional panel could be added to Figure 6 showing how the envelope of potential temperature values varies as the parcels enter the stratosphere. Is the cooling shown in the temperature trace due to forced ascent or to diabatic effects? My own theoretical work has suggested that there should be significant troposphere to stratosphere transport associated with diabatic cooling of dynamically induced temperature anomalies (Juckes, 2000, Quart. J. Roy Met. Soc., 126, 1065-1098).

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