

***Interactive comment on***  
**“Stratosphere-troposphere exchange in a  
summertime extratropical low: analysis” by  
J. Brioude et al.**

**Anonymous Referee #3**

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In this paper trace gas measurements collected during two flights of the MOZAIC program are analysed according to their potential for irreversible stratosphere-troposphere-transport in a summertime extratropical low pressure system. Multifaceted auxiliary information based on satellite pictures, as well as detailed back-trajectory and RDF calculations are used for the interpretation of the O<sub>3</sub> and CO time series. The paper itself is well written, the analysis sound and it contains sufficient novelty with regard to STE so that I recommend publication after some modifications:

Major points:

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The paper could be significantly improved by a more quantitative comparison between the in-situ trace gas measurements (in particular O<sub>3</sub>) and the RPV signal from the RDF calculation. While figure 7 includes a trace of the analysed PV along the flight track, a similar trace of RPV is missing. Adding the RPV signal could provide additional - quantitative - information to what extent small scale structures in O<sub>3</sub> are correlated with a stratospheric origin of the airmasses, since O<sub>3</sub> and PV are generally well correlated in the stratosphere.

A critical parameter for the RPV calculation is the chosen backward-trajectory length, since it determines the degree of fine scale structure. This point should be discussed in more detail, e.g. by a sensitivity study using different trajectory length.

Minor points:

A similar study of an extratropical summertime tropopause fold has been published by Beuermann et al. (GRL, 29, NO. 12, 1577, 10.1029GL014162, 2002) based on STREAM data over Canada in July 1998. Since the analysis tools are very similar to those used in the present paper (in-situ airborne observations, trajectory analysis, and RDF calculations) a reference to the Beuermann et al. paper should be made.

Technical comments:

Typo on page 12467, line 7: recent study of individual CTMs

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