

***Interactive comment on* “The direct inversion method for data assimilation using isentropic tracer advection” by M. N. Juckes**

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The fact that referee 2 wants less mathematical detail and referee 3 wants more is indicative of the spread in tastes in the scientific community. What is surprising is that both present their views as grounds for substantial revision. I believe the level is appropriate: new aspects are explained and less new aspects are sketched. Aspects of the method which are new but only of technical interest are in the appendices.

The most significant difference between this method and operational methods is that this method makes full use of post analysis observations.

Referee 3 suggests that ‘the influence of advection is small’. It is not entirely clear where this view comes from, but it may be prompted by figure 9: this figure shows

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that the effect of varying the weight given to the advection term is small. In fact, the advection is crucial. Figure 9 will be modified to show results from a wider range of weighting values to demonstrate this.

Referee 4 is concerned about the averaging kernels of the retrieval algorithms used to generate the level 2 data used in this study. These are central to any detailed study of instrument performance. Nevertheless, the data obtained for this study from various data centres consists of estimated profiles with error variances. This is what the user is provided with, and it is the accuracy of this data which is tested here. The value of this study is that it covers a wide range of instruments.

I have also become aware of an error in the pre-processing of the MIPAS data, which caused some good profiles to be omitted, and in the vertical interpolation of the OSIRIS data. These will be corrected.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 8879, 2005.

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