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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Turbulent vertical diffusivity in the sub-tropical stratosphere" *by* I. Pisso and B. Legras

Anonymous Referee #1

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General Comments

Two key results are obtained in this article: an upper bound on the vertical diffusivity in the subtropical UTLS region and the result that the effects of turbulent diffusion do not appear to be higher where the straining flow is stronger.

Although the methods are not ground-breaking, since they have already been published by Legras et al [2005] and preceeding papers, the results found here are sound and important. They merit publication. The paper is well written and is therefore easy to read. The figures are well designed and readily digested.

I recommend publication and suggest a few technical corrections below.

Technical Corrections

1. p. 6606, l.21: What does SF stand for?

2. p. 6609: In this paper eqns 3-5 are not used. They could be omitted without loss of content.

3. p.6611, l.9: “each measureMENT point”

4. p.6613: I was not sure what conclusions we were supposed to draw from the lower, right panel of Fig.7. What is implied by the different slopes?

5. p.6616, l.19: Why is meridional exchange favoured at 400K? Is it the influence of the stratospheric polar vortex?

6. p.6616, l.24: Could cite CLAMS as a particular model where mixing is parameterised directly in terms of Lyapunov exponents. I cannot think of many others, since in Eulerian models the mixing is usually parameterised on the basis of Richardson number.

7. Fig.2: “measured BY DMI ozonesonde (black)”

8. Fig.3: Caption assigns the wrong colours to the lines (e.g., DMI sonde should be black).

9. Fig.8: The letters a-f on figure are too small and not very visible with black on blue shading. I suggest moving them upwards onto the white background and enlarging them. Should refer to them in the caption and relate them to Fig.9.

10. Fig.9: What do the red, green and blue lines represent?

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 6603, 2007.

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