



Interactive comment on “Observation of the exhaust plume from the space shuttle main engine using the Microwave Limb Sounder” by H. C. Pumphrey et al.

H. C. Pumphrey et al.

h.c.pumphrey@ed.ac.uk

Received and published: 6 December 2010

This reviewer's first main concern is the discussion on the transport and dispersion of the plume. Our velocity is in the direction from the source to the measurement, whatever direction that is. So it includes both meridional and zonal velocities. It is straightforward to calculate the meridional component, though, and we add a sentence giving the range. In re-writing the paper we have re-done the calculation of velocities, lumping together all of the detections that are on consecutive limb scans along an orbit. This was a by-product of being requested to provide table 1, but is probably a better

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



way to do the calculation. The resulting velocities are a little less large and a little less scattered. We have stated explicitly our assumed starting point from which the plume disperses (31.5°N, 74°E). We have marked this point on Fig. 4 and shown its latitude on Fig. 5.

The referee suggests that we discuss at which time of year the transport is most rapid. If one attempts to calculate the meridional velocity then one finds that it has hints of a seasonal dependence. But it is only a hint: not enough to form the basis of a detailed discussion.

The referee's second main concern, shared with RC C1366, is that we should provide a table summarising the results. We have added such a table to the paper.

The reviewer notes that the shuttle has three main engines, not one, and so the word should be plural in the title of the paper. We have made this change.

The reviewer requests that we provide a reference on the annual cycle of water vapour in the mesosphere. We felt that we had done this by referencing Pumphrey and Harwood (1997) (which describes the UARS MLS data) but we have added a reference to Chandra et al. (1997), which describes the HALOE data.

The reviewer requests that we state, in the first paragraph of section 4, what altitude we average over. One can estimate this from Figure 1, but it is not exactly a fixed quantity because the tangent height of any one minor frame drifts up and down slightly during the course of an orbit. We add a sentence giving the range of altitudes covered.

References

Chandra, S., Jackman, C. H., Fleming, E. L., and Russell III, J. M.: The seasonal and long term changes in mesospheric water vapor, *Geophys. Res. Lett.*, *24*, 639–642, (1997).

Pumphrey, H. C. and Harwood, R. S.: Water vapour and ozone in the mesosphere as measured by UARS MLS, *Geophys. Res. Lett.*, *24*, 1399–1402, (1997).

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



Interactive comment on Atmos. Meas. Tech. Discuss., 3, 3971, 2010.

AMTD

3, C2166–C2168, 2010

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

C2168

