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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term trends in the middle atmosphere dynamics at northern middle latitudes – one regime or two different regimes?" *by* J. Lastovicka et al.

Anonymous Referee #2

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This is an interesting start on a paper, and probably would make a good conference presentation – it explores some interesting notions, and raises some questions, but doesn't come to any robust conclusions. It therefore doesn't, in my opinion, come even close to being acceptable for publication in ACP.

The authors note that "various quantities in the middle atmosphere reveal long-term changes and trends". They then suggest that "mesopause region wind-like trends" show a trend reversal around 1990, while "total ozone-like trends" reverse in the mid-1990s. They state (page 2637, lines 13-14) that the trends they consider are "mostly strong enough and evident to allow such a simple approach". Unfortunately, I don't

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agree. The only plot that shows an unambiguous change (other than Figures 5 and 7, which are not trend plots) is Figure 12, and that shows a reversal around 1989, but the authors suggest that it may be tainted by a change of sonde type, and in any case it ought really to be related to the total ozone or stratospheric changes. Of the others: Figure 3 shows an apparent change of trend in MLT wind speed, but the interannual variability is large and the change (if it is statistically significant, which the authors do not say) could as easily be in 1994 as 1990; Figure 4 shows no evident change of trend; Figure 5 is not apparently relevant to the question; Figure 6 shows no significant changes with time; Figure 8 shows no really evident change of trend; the most likely points for trend reversal are 1970, 1986, 1987 and 1990, but the interannual variability makes none of these statistically verifiable; Figure 9 shows an apparent change of trend, but the interannual variability is so large it is not clear whether the change happened in 1990, as suggested, or in 1986, or 1994. If the last three years of data were removed, then no change at all would be inferred. Figure 10 shows no evidence of a change of trend in 1990, or any other year. Figure 11 shows data at 10 hPa that the authors think are unreliable.

That leaves us with the well-known change of trend in lower stratospheric ozone trends in the mid-1990s as the only unambiguous change of trend (evident in Figures 2 and 12).

The original conclusions based on this uncertain analysis are that there appear to be changes in trends in some things around 1990, and the reasons are “of rather unclear dynamical origin”. No attempt is made to investigate what these reasons might be. No rationale is given for the variables chosen for analysis, either.

The authors describe this as a “skeleton of scenario of change of trends in the dynamics of the middle atmosphere in the 1990s that needs to be completed by other results.” I would agree with that description — this is a skeleton of a paper that needs to have some flesh put on it by other results. At numerous other points (p. 2643, lines 6-7; p. 2645, line 29; p. 2646, lines 7-8, p. 2649, lines 3-5; p. 2651, lines 18-19; lines

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21-22; lines 26-29; p. 2651, lines 1-4) the authors describe further work that needs to be done. I would encourage them to continue with these investigations, as they may uncover some interesting and robust results.

My sincere apologies to the authors for the delay in completing my review.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 2633, 2010.