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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Observation of Polar Stratospheric Clouds down to the Mediterranean coast" *by* P. Keckhut et al.

Anonymous Referee #2

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The manuscript describe the observation of a polar stratospheric cloud (PSC) by a lidar at the Observatory Haute Provence in the south of France which was the southernmost observation of a PSC ever. Beside the lidar observation itself the authors provide a detailed study of the event based on radiosonde measurements and model output (MIMOSA-CHIM). It is demonstrated (based on the model alone) that the cloud occurrence was accompanied by ozone destruction. The authors conclude that the unusual observation was caused by an extraordinarily strong distortion of the polar vortex which in turn is an event that terminates ozone destruction on the large scale. I think this is a well conducted case study of a very unusual, interesting phenomenon that should be published.

Some general comments:

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Interactive Discussion
Discussion Paper

I wonder if the case could be useful to study some aspects of ozone destruction. There are still open questions concerning some details of ozone depletion like some reaction rates and the role of different PSC particle types. Little effort is made to explore the observation in this respect.

In the discussion section the authors are pondering potential implication of climate change on the stratospheric ozone layer their observation could be an indication for. Obviously, a detailed discussion of this complicated matter goes beyond the scope of this publication. However, the way it is presented here left me with a number of unanswered questions. I understood that there are two competing effects: Stratospheric cooling which will enhance ozone destruction (i.e. delay the recovery of the ozone layer) and increased planetary wave activity which are causing stratospheric warmings and therefore limit ozone depletion. Obviously, the observation reported here is an indication for the importance of both, however no information is provided on trends of the latter and correlations with the ozone layer. What could be the implications of increased wave activity on the ozone layer in the global view and in particular on the strongly populated mid-latitudes?

Minor comments

p.6561 l.5: ... Type 2 PSCs ... instead of 'Type II PSCs' for consistency. p.6561 l.10 -11 .. the probably southern-most NH-PSC was observed ... p.6562 l.4 and p.6563 l.23 ... the north-western part ... p.6562 l.7 ... over central Europe ... p6563 l.16 Any idea on how this ozone loss could have occurred and observational evidence that this is not only a feature of the model? p.6563 l.25 15.10^9 cm^2/cm^3: something is wrong with this number!

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 6557, 2007.

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Interactive Comment