

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

Anonymous Referee #1

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The paper describes with many details a special PSC event observed at unusually low latitudes. The observation is based on two backscatter LIDAR profiles alone (without depolarization). The paper includes some modeling of the dynamics of the stratosphere for the special event, and also some results of the modeling of ozone chemistry. The paper is well organized and written, but some points should be clarified. Some validation of the chemical model with ozone measurements would give strength to the conclusions concerning the ozone depletion.

More specifically

- 1) the paper address relevant scientific questions within the scope of ACP? Yes
- 2) Does the paper present novel concepts, ideas, tools, or data? Yes, new data

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3) Are substantial conclusions reached? Partially: the experimental data only show the presence of a PSC, no experimental data for validating some of the chemical model assumptions (phase of the PSC) and outputs (ozone depletion) are shown. The ozone reduction associated with the PSC was not observed, it was just modeled, and this should be better evidenced in the conclusions.

4) Are the scientific methods and assumptions valid and clearly outlined? YES, but with some ambiguities: specifically, there is some ambiguity concerning the PSC nature: at page 6560, line 29, the author honestly state that the phase of the PSC is unknown because of the lack of depolarization data, but at page 6563 line 18 the presence of frozen particles is excluded. The scattering ratio magnitude alone cannot be used to support this choice. The authors should clarify this point. Perhaps the ozone depletion rate would change if the particles were frozen? Could the model run with frozen PSCs?

5) Are the results sufficient to support the interpretations and conclusions? Partially: The presence of a PSC is convincing, (even if only two profiles are shown), but the results of ozone modeling shown in the paper are not supported by local measurements. OHP is equipped with good DIAL, photometric, etc. ozone-sounding capabilities, and probably (I'm not expert) also satellite ozone data for the measurement days could be available. Why are ozone measurement data missing? Perhaps the depletion was not evident in the data?

6) Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes, but please explicitate the wavelength used for the LIDAR (I guess it's 532 nm), as the scattering ratio is wavelength-dependent.

7) Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES

8) Does the title clearly reflect the contents of the paper? YES

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- 9) Does the abstract provide a concise and complete summary? YES
- 10) Is the overall presentation well structured and clear? YES
- 11) Is the language fluent and precise? YES
- 12) Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES
- 13) Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? YES, see comments above
- 14) Are the number and quality of references appropriate? YES
- 15) Is the amount and quality of supplementary material appropriate? Partially, see the comments for points 3..5

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

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