

Interactive comment on “On the accuracy of analysed low temperatures in the stratosphere” by B. M. Knudsen

Anonymous Referee #1

Received and published: 8 September 2003

General comments:

The author compares temperatures analysed by the ECMWF (perhaps ECMWF should appear in the title) and measured by radiosondes in the critical range of possible PSC formation. This is a valuable contribution to the subject of ozone depletion because most polar processing studies require large-scale analyses. It is most important to point to the role of small-scale temperature variations although I am not sure about the method of defining the lee-wave effect. My major concern are some inconsistencies in the paper which make it difficult to follow the intention of the author. However, I would recommend the publication of the paper after some revisions.

Specific comments:

page 4412: The last sentences of the abstract are misleading. If ECMWF do not catch

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

small scale temperature variations close to the frost point, which increase the extent of low temperatures, why do the analyses of 2002/03 overestimate the extent? One has to read the paper to understand the abstract.

page 4413, lines 17-21: It becomes not clear why the winter 1995/96 has been included in this study of three other winters. Just to show that the accuracy is not so different from that of the next winter?

pages 4413/4414: Radiosondes between 140W and 140E are used without Russian sondes. Doesn't that mean that the considered sector is much smaller, i.e. between 140W and about 30E? Moreover, it would be interesting to know how many sondes have been available for each winter.

page 4414, line 2: A definition of inside the vortex should be given.

pages 4414/4415: When describing the method of filtering out atmospheric waves, the author should more extensively explain the position of the lee-waves. Are they included in the enhanced activity part? It might be my ignorance but I don't get the connection to the appendix.

page 4416, line 3: The first guess field is introduced here, but the explanations (what it is and why it is used) follow much later.

page 4417, line 15 and following: Disregarding the fact that Fig. 2 is not very readable, it becomes not clear why the Russian sondes are included here. They are not used for the comparison in the paper and therefore are misleading concerning the geographical area under consideration.

page 4418, line 20 and following: As said above, I don't see the reason for including the winter 1995/96 in Fig. 4. Although it was a fascinating, cold winter, it is not the subject of this study. The author might have some more explanations.

page 4419: The discussion on the paper of Doernbrack and Leutbecher (2001) needs some clarification. They have used 20 instead of 4 years and they have focussed

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

on two Scandinavian regions favorable for mountain waves while the present study includes the entire region between longitudes 140W and 140E (the latter is not quite clear, see my comment above). And Scandinavia is the place where temperatures below TNAT most frequently occur - as explicitly said in the paper of Pawson et al. (1995)! The use of cold winters is not really an explanation for the differences between the two results because different meteorological conditions (i.e. the location of the cold air in relation to the vortex) in comparably cold winters have a large impact on the expectations for PSC formation (Manney et al., 2003).

page 4421, Appendix: It is a bit confusing that the temperature extents are denoted with E - the same capital has been used for the potential energy density in section 2.3.

Typos/Technical corrections:

page 4413, line 6 : Rabier et al., 1999 - or 2000 as in the reference list?

page 4420, line 11: is due or may be due to ?

page 4421, line 5 : 6-2 should be replaced by 6-12 hourly forecasts

Fig. 1: the winter 1999/2000 should be noted in the caption

Fig. 2: the size of the plusses in the figures do not correspond to the notation on the lower left sides.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 4411, 2003.

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)