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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Radiosondes stratospheric temperatures from 1957 to 2008 at Dumont d'Urville (Antarctica): trends and link with Polar Stratospheric Clouds" *by* C. David et al.

Anonymous Referee #2

Received and published: 25 January 2010

Summary:

The paper presents and analyses a radiosonde data set of stratospheric temperature, measured at Dumont d'Urville, Antarctica. The authors investigate particularly temperature trends, which appear to be consistent with other published data, and the correlation with PSC detection by Lidar, which appears to be consistent with expectations.

General Comments:

a) Does the paper address relevant scientific questions within the scope of ACP?

The question of temperature trends in the antarctic stratosphere is relevant and within

ACP scope.

b) Does the paper present novel concepts, ideas, tools, or data?

Concepts, ideas, and tools used are well known. The data are partly known. Radiosonde data from this station have been used for trend studies before. The difference to previous work is that early data prior to 1963 are considered (but subsequently excluded from the analysis), and that a higher vertical resolution version of the data are used, which allows detection of T<T-NAT events.

c) Are substantial conclusions reached?

The overall conclusion is that the radiosonde temperature data are consistent with results that were published earlier and with general expectations.

d) Are the scientific methods and assumptions valid and clearly outlined?

Yes, with exception of the issue discussed under (e).

e) Are the results sufficient to support the interpretations and conclusions?

No. The fit of a linear trend line to the complete data shown in Figure 1 is not justified and misleading. Basically, there are two different data sets, separated by a large gap. (The pre-1963 data and the post 1978 data.)

The authors are aware of this themselves, since they later on focus exclusively on the post-1978 data. But why then first present the combined trend? It is quoted prominently also in abstract and conclusions.

The authors should either defend the scientific significance of the 2-3K/decade trend, or remove it. (Remove it particularly from title, abstract, and conclusions.)

f) Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

Yes, except for minor details which I list under Specific Comments.

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

Earlier work is correctly cited, as far as I can tell. There is relatively little new information. No attempt is made to highlight what is really new, compared to what has been already known.

h) Does the title clearly reflect the contents of the paper?

No. The title mentions trends between 1957 and 2008, while the actual analysis uses only data after 1978. See comment (e) above.

i) Does the abstract provide a concise and complete summary?

Yes, except what I wrote in (e).

j) Is the overall presentation well structured and clear?

Yes.

k) Is the language fluent and precise?

Yes.

l) Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

Yes, except for minor details listed below.

m) Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

See (e).

n) Are the number and quality of references appropriate?

Yes.

o) Is the amount and quality of supplementary material appropriate?

Not applicable.

Specific comments:

p25689, first paragraph: The authors mix terms indicating altitude regions in a confusing way. (Middle-atmosphere, stratosphere, lower stratosphere.) The discussion leaps from one region to the other without obvious structure. Not clear if the nuances in altitude are intentional or unintentional.

Table 1: The table (and the entire article) contains no information on sensor type and other relevant information for the pre-1963 data. The presentation of these data should be extended significantly, and their validity analyzed. Or they should be removed.

p25691: Define acronym PTU.

p25692, first paragraph: "A global cooling trend clearly appears on this picture of about 2.3 K/decade between 1957 and 2008."

It does not clearly appear, at least not for my eyes. See my comment (e) above. All the figure shows is that pre-1963 and post-1978 data are systematically different.

p25692, second paragraph: How are the 1-sigma uncertainties derived? In particular, why are they so much smaller in summer? Further text and values suggest that these are just the standard deviations of the data around the mean values. But here it sounds as if it was a measurement uncertainty.

Figure 3: The figure is too small too read.

Equation 1: Define and explain variables z and t.

Figure 5 and text p25696, l16-17: It is not clear, what the figure displays exactly. The text seems to indicate that there should be one data point per year, but there are three.

p25698, l22: Delete "evolution of the".

Figure 7: Use different line styles or different colors.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 25687, 2009.