

Interactive
Comment

Interactive comment on “Chemistry of the antarctic boundary layer and the interface with snow: an overview of the CHABLIS campaign” by A. E. Jones et al.

Anonymous Referee #1

Received and published: 30 April 2008

The paper presents a very comprehensive overview over the findings of the CHABLIS campaign that was conducted at the British Antarctic research station Halley from January 2004 to February 2005. After recognising the importance of the snow surface for boundary layer chemistry, CHABLIS was the first intensive campaign that was conducted in Antarctica focusing on i) seasonal studies of oxidant chemistry, ii) year-round studies of the NO_y budget and iii) air/snow transfer studies.

The goal of this paper is to introduce the campaign and to provide an overview over the most important findings. This is fully achieved. The paper is well written and clearly structured. Care was taken to present findings in the best possible way. I am very

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impressed and enjoyed reading the paper. All my comments are just minor, hopefully helping to improve an already remarkable paper. I strongly recommend publishing this paper in ACP.

The authors faced the problem of presenting research results comprehensively, but not in too much depth because dedicated papers have and will present results in more detail. The goal was to write an introductory paper, that refers the interested reader to these specialized papers. I liked the approach of two subsections, "supporting chemical measurements", and "broad conclusions from CHABLIS". The first provides background and details for some of the supporting measurements while the second contains the highlights. I would like to see this mirrored in the headline, maybe something like "key findings" or "highlights" would be better than "broad conclusions"?

In Figure 9 the CO measurements show some spikes that are associated with exhaust emissions from the station. This is described in the figure caption, but not in section 6.2. Were CO measurements used to determine pollution events at the CASlab which then led to the exclusion of data points or filter samples? Was the sampling stopped when the air came from the direction of the main station?

Section 6.3, Figure 10 a and b, since they have a similar time resolution could they be done in a similar style (lines and symbols)? Please can you highlight periods when daily samples were taken?

In section 6.4 a clearer distinction between surface samples from snow pits and surface snow samples could be made, maybe by dividing this section in 6.4.1 snow pits and 6.4.2 surface snow? It took me some time to understand that the snow concentrations in Table 3 come from the top of the snow pits while the nitrate values on page 5154, line 15 stem from the surface snow measurements. Maybe it would be possible to add which major anions and cations have been analysed in the surface snow (Page 5152, line 6). In Figure 12, why have the winter values been averaged for nitrate, but are presented as June and July values for nitrate? Why are there gaps in the profiles?

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Section 6.5 on albedo measurements is very detailed for an overview paper. Nevertheless I found the paragraph on the comparison of the upwelling and downwelling j -values not very clear (page 5156, line 1-5). Can that be clarified? Why would the upwelling j -values be in close agreement with the downwelling ones? What are trial factors? Page 5165, line 28, how was the value of 0.92 reached?

The summary section points out the achievements of CHABLIS with a "very limited number of researchers in the field". For me this is "funding agency talk" and not really a scientific result. I would prefer to delete it.

Technical comments:

Page 5144, line 5 and 11: use consistently L/min or l/min

Page 5144, line 11 and page 5145, line 7: use consistently L/min or m s^{-1} for ratios

Page 5150, line 27: remove full stop between 2.78 ng m^{-3}

Page 5153, line 7: One previous set of measurements WAS made

Page 5153, line 11, applied IT to field data

Page 5155, line 27: atmospheric chemistry MODELS

Page 5158, line 7: "absolutely" is very strong here, is that your intention?

Page 5160, line 20: Atmos. Environ.

Page 5162, line 5: update Neff paper, Atmos. Environ., 42(12), 2762-2779, 2008

Page 5162, line 28: available at

Page 5162, line 30: update Simpson paper, Atmos. Chem. Phys., 7, 4375-4418, 2007

Page 5163, line 16: Messungen

Table 1: Institutes could be highlighted by bold print

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Table 2: PRT = platinum resistance thermometer

Table 4: is there a better word for "end-point albedos"?

Figure 1: could add the year 2004, 2005 under January

Figure 5: writing next to chimney is very small

Figure 6: Shading behind the curves rather than in front of it would make it clearer

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 5137, 2008.

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