

## ***Interactive comment on* “Distribution of VOCs between air and snow at the Jungfraujoch high alpine research station, Switzerland, during CLACE 5 (winter 2006)” by E. Starokozhev et al.**

### **Anonymous Referee #1**

Received and published: 31 July 2008

Review of Distribution of VOCs between air and snow at the Jungfraujoch high alpine research station, Switzerland, during CLACE 5 (winter 2006) by E. Starokozhev et al. submitted to ACPD, 2008.

The authors describe the analysis of volatile organic compounds (VOCs) in air and snow samples at the Jungfraujoch high alpine research station in Switzerland as part of CLACE 5 during February/March 2006. The fluxes of individual compounds in ambient air were calculated from gas phase concentrations and wind speed. The study indicates a more efficient scavenging of VOCs by snow than by using published theoretical data

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**General remarks** The paper describes in an accurate way the distribution of VOCs between air and snow. And can be an important contribution to the research in the field of distribution of VOCs between different compartments of the atmosphere. There are, however, many small errors, which should be eliminated. Afterwards it can be recommended to be published in ACP.

#### Specific remarks

**Abstract** The second sentence is misleading. Do authors mean the flux between the air and the snow instead of the flux in ambient air? Then please say so.

**Introduction** P. 14349, L. 2: tropospheric ozone; P. 14349, L. 5: there are newer publications from Atkinson: e.g. Evaluated kinetic and photochemical data for atmospheric chemistry: Volume II; gas phase reactions of organic species, R. Atkinson, D. L. Baulch, R. A. Cox, J. N. Crowley, R. F. Hampson, R. G. Hynes, M. E. Jenkin, M. J. Rossi, J. Troe, and IUPAC Subcommittee, Atmos. Chem. Phys., 6, 3625-4055, 2006, P. 14349, L. 7: Atkinson, same as above. P. 14349, L. 13: Groellert and Puxbaum have been published in 2000. They only make a vague indication that compounds which are scavenged by aerosols can be transported upwards. However, the same is true for not-scavenged VOCs. Li et al. do not say that VOCs are adsorbed to particles. Therefore, I would take out this statement. You possibly can use it for your own conclusion, if you think there is enough evidence. P. 14349, L. 29ff: Can you specify more precisely what will be the outline of the paper.

**Background Theory** P. 14350 L.11: May I propose 2 studies where VOCs have been measured at Jungfraujoch: Legreid, G., S. Reimann, D. Folini, J. Staehelin, J. Balzani, M. Steinbacher and K. M. Vollmer (2008). "Measurements of organic trace gases including OVOCs at the high alpine site Jungfraujoch (Switzerland): Seasonal variation and source allocations." Journal of Geophysical Research VOL. 113, D05307 (doi:10.1029/2007JD008653)

Whalley, L. K., A. C. Lewis, J. B. McQuaid, R. M. Purvis, J. D. Lee, K. Stemmler, C. Zell-

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weger and P. Ridgeon (2004). "Two high-speed, portable GC systems designed for the measurement of non-methane hydrocarbons and PAN: Results from the Jungfraujoch High Altitude Observatory." *Journal of Environmental Monitoring* 6(3): 234-241.

P. 14351: L. 5: In the Alps the transport... P. 14351: L. 15: Is horizontal transport a better description? P. 14352: L. 1: Here only the K air/snow is defined in the equation. Either make a more specific statement or use a more general equation.

Experimental section: P. 14352: L. 21: Is the station 40% in the clouds or just 40% in the free troposphere?

P. 14353: L. 7: The integration time was 60 min, but everything added up at the description of the temp. programme (L. 20-21) adds up to 71 min, not included the cooling time. What was the frequency of the measurements? One per 2 hours?

Results and discussion P. 14354: L. 25: Table 2, not Table 3 P. 14355: L. 14ff and Table 2: OH radicals of  $10E6$  red/cm<sup>3</sup> are normally believed to be yearly averages. Can you extract a text book annual distribution (considerably lower in winter) and correct your values? P. 14355: L. 28 Is the flux information included in the table 3? Where do authors show this? In Fig. 3 it is not shown in a straightforward way, as the labelling of the substances (x-axis) is not identical.

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 8, 14347, 2008.

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