Atmos. Chem. Phys. Discuss., 8, S4292–S4294, 2008 www.atmos-chem-phys-discuss.net/8/S4292/2008/ © Author(s) 2008. This work is distributed under the Creative Commons Attribute 3.0 License.



ACPD

8, S4292–S4294, 2008

Interactive Comment

Interactive comment on "Precipitation of salts in freezing seawater and ozone depletion events: a status report" by S. Morin et al.

R. Sander

sander@mpch-mainz.mpg.de

Received and published: 30 June 2008

Morin et al. present very interesting calculations, which should be published in ACP. I have a few comments, as listed below:

General Comments:

• page 9038, line 9: "small amounts of strong acids present in the atmosphere (such as NO₂, SO₂ and the associated nitric and sulfuric acids)"

 NO_2 and SO_2 are not strong acids. I suggest to rephrase to: "small amounts of



Printer-friendly Version

Interactive Discussion

Discussion Paper



acid precursors present in the atmosphere (such as NO_2 , SO_2) and their oxidation products nitric and sulfuric acid"

• page 9044, lines 16-20: "Taking into account liquid-phase equilibria and equilibrium with atmospheric CO₂ only, the pH of the brine [...] decreases [...] when temperature decreases from 273 to 253 K."

The pH will always change with temperature, simply because K_W is temperaturedependent. Thus it cannot be attributed directly to carbonate precipitation. It is necessary to compare the pH changes in simulations with and without carbonate precipitation.

• page 9047, 18-21: "However if a solution that is still in contact with the precipitate is being acidified, the carbonate equilibrium will shift, leading to the release of alkalinity and therefore the precipitate still acts as buffer for the pH of the solution."

Although this is in principle a valid caveat questioning the carbonate precipitation proposal, it should be noted that there is already experimental evidence showing that precipitated salts are not included when aerosol particles are formed: Observed negative non-seasalt sulfate concentrations can only be satisfactorily explained considering mirabilite (Na₂SO₄) precipitation before the aerosol formation.

- Table 1: The term "equivalents" can be confusing if it is not defined exactly. If you look at alkalinity or charge, then CO₃²⁻ must be counted twice. However, if you count the available carbon, the weighing factor would be one. Instead of using the term "equivalents", I suggest to simply write "HCO₃⁻ + 2 CO₃²⁻".
- Figure 1: The extrapolated values below 273 K can be very useful for further studies. However, it is quite inaccurate to read them from the figure. Thus, I suggest to list the vaules of these constants also in a Table. If this makes the paper too long, it could be published as supplementary material.

8, S4292–S4294, 2008

Interactive Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



Technical Comments:

- The symbols of physical and chemical quantities (e.g. *a*, *p*, *f*, *K*, *T*, ...) should be typeset in italics.
- page 9041, eq (1): The closing bracket should be after "aq".
- page 9042, line 15: I suggest to define "S" when it is first used, i.e. probably on page 9037, line18.
- page 9049, line 22: Is "hazardous" the right word here? Are the authors referring to dangerous field work? Or to the possibility of inconclusive results?

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 9035, 2008.

ACPD

8, S4292–S4294, 2008

Interactive Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

