

## ***Interactive comment on “The impact of solar radiation on polar mesospheric ice particle formation” by Mario Nachbar et al.***

**Anonymous Referee #3**

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This is well written and conclusive study on the effect of solar heating on ice particle formation in the mesopause region. The findings are clearly presented and seem to be sound, although I suggest to include more background information especially when introducing equation (1) to explain the water vapour equilibrium. Also, I suggest to include a little more discussion of the uncertainty in the assumed thermal accommodation coefficient, which is decreased here to 0.5 in comparison to previous studies, where a factor of 1 was used. Does this lead to the reduced solar heating or is the uptake of water molecules (see discussion on p. 9, l. 17-22) the driving factor?

In addition I have a few minor more specific comments:

p.2. l. 3. (e.g. Luebken, 1999 ...)

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p. 1. L. 12.: trends of temperature caused ...

p.3. l. 16 -27.: is the water measured in the chamber or is it calculated assuming equilibrium conditions. If measured, how are the measurements done?

P5. Top. This section is rather hard to read. I suggest to include an introduction to explain the background and the basic assumptions which went into the formulation of eq. (1).

p.5. l. 7: I'm not sure what is meant by the molar volume of a H<sub>2</sub>O molecule. Is it molar or per molecule?

p.5. l. 8: please explain what ASW means.

p. 7. L. 12: I suggest writing “the imaginary part k of the refractive index” for more clarity.

p.8. l. 25: Is this represented by the blue line in Fig 5? Please specify.

Fig. 4: I think that legend might help to improve the readability of the Figure.

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Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2018-1032, 2018.

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