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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Multiphase modeling of nitrate photochemistry in the quasi-liquid layer (QLL): implications for NO_x release from the Arctic and coastal Antarctic snowpack" *by* C. S. Boxe and A. Saiz-Lopez

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Author Response to Anonymous Referee #1 comments to “Multiphase Modeling of nitrate photochemistry in the quasi-liquid layer (QLL): implications for NOx release from the Arctic and coastal Antarctic snowpack,” by C. S. Boxe and A. Saiz-Lopez.

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1.We appreciate Anonymous Referee #1’s comments on our paper.

2.As shown on pages 6016-6017 of the manuscript, using recently obtained laboratory

data {Grannas et al. (2007); Takenaka et al. (1996)}, we reformulated the model parameterizations, which do not affect the model output simulations since photochemistry at the top-most layers (top 14 μm) governs the release of NO and NO2. Therefore, calculation of kmix depends on the enhanced rate constants recently obtained from the lab, the boundary layer height, and an estimated first-order rate constant (equation 11, page 6017).

3.As suggested by Anonymous Referee #1, the minor comments will be corrected in the revised manuscript.

References Grannas, A. M., Bausch, A. R., and Mahanna, K. M.: Enahnced aqueous photochemical reaction rates after freezing, J. Phys. Chem. A, 111, 11043-111049, 2007. Takenaka, N., Ueda, A., Daimon, T., Bandow, H., Dohmaru, T., and Maeda, Y.: Acceleration mechanism of chemical reaction by freezing: the reaction of nitrous acid with dissolved oxygen, J. Phys. Che., 100, 13874-13884, 1996.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 6009, 2008.