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Interactive comment on “Large mixing ratios of atmospheric nitrous acid (HONO) at Concordia (East Antarctic plateau) in summer: a strong source from surface snow?” by M. Legrand et al.

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Received and published: 12 June 2014

Legrand et al report measurements HONO at the Concordia field site in Antarctica, a model calculation of HONO concentrations in surface air with gas phase production from the reaction of NO with OH. They also performed experiments in the laboratory to demonstrate the potential for HONO to be generated in the snowpack. Measured HONO concentrations were found to be substantially than those inferred from their estimated flux from the snow pack and gas phase production. They performed tests in the lab to determine the potential interference caused by HNO₄ in measurements of HONO made using LOPAP. However, since they did not measure HNO₄ during this field

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campaign they could not quantify the extent of this interference. Because of thermal decomposition, HNO₄ might not be as important as a potential source of interference at lower latitudes, but this begs the issue of what other atmospheric components behave in a manner similar to HONO in the sampling solution in the LOPAP instruments.

This is a very nice study integrating information obtained in the field and the laboratory.

I only have few minor comments and requests for clarification:

What HNO₄ levels are supported by atmospheric modeling?

HONO might be produced by heterogeneous reactions on soot surfaces. Could the reaction of NO₂ with soot (either airborne or in the snow pack) perhaps emitted by the station or by vehicles be a source of HONO?

If there was substantial interference by HNO₄, what effect would it have on the diel (24-h) variability of HONO shown in Fig.3? Would interference be uniform throughout the day?

p. 11767 l. 29 – please use a few words to describe “E-e” scheme.

Some mention of the extent of interference by NO_x or other species in the PC/ chemiluminescence method for NO₂ would be nice. I know they were mentioned in other publications but to save the reader time it might be better to say something here.

...and a few line edits.

p. 11752, l. 2 –“recycling of HOX into OH”, sounds a little odd as OH is a member of the HOX family. Maybe, “HO₂” instead of HOX?

p. 11758, l. 5 – “too weak”

p. 11760, l.7 – “thermal decomposition”

p.11761, l. 9-11 – sentence is not clear as written, please reword. Did you mean to say there is strong static stability, inhibiting vertical mixing? ———, l. 17 – collapse,

rather than abrupt thinning?

p. 11764, l. 24 – “doped”

———, l. 27 – “act”

p. 11769, l. 9 – “sole”

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 11749, 2014.

ACPD

14, C3520–C3522, 2014

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C3522