

## ***Interactive comment on “Isotopic effects of nitrate photochemistry in snow: a field study at Dome C, Antarctica” by T. A. Berhanu et al.***

### **Anonymous Referee #4**

Received and published: 3 February 2015

Nitrate is massively lost from the snowpack to the atmosphere making an interpretation of nitrate concentrations measured in the ice in terms of atmospheric NO<sub>x</sub> difficult if not impossible. The reason for the loss may be desorption or photolysis. This manuscript reports about a field experiment in East Antarctica (Dome C station). The carefully designed experiment compares the evolution of nitrate concentration and its isotopes from homogenized snow with and without UV exposure. The results are consistent with previous experiments and laboratory experiments for the deeper part of the snow mixture. The top layer seems to be affected by various effects. However, the argumentation to exclude this part involves a lot of hand waving. Those results are inconclusive and the experiment needs to be repeated attempting to exclude some of the processes brought up in explaining the inconsistent results of the top layer. This,

however, is for another manuscript.

Minor comments:

p. 33047, line 2: It is not true that most deep ice cores are drilled in low accumulation sites. Replace “most” by “many”

p. 33047, line 14 and in references: Rothlisberger is spelled Röthlisberger

p. 33047, line 25: “relative to reference” should be “relative to a reference”

p. 33047, line 27: delete “in”

p. 22048, line 25: add “and the measurement of Dome C snow from Blunier et al.

p. 33060, lines 20-24: This seems rather unlikely. It would require completely still air.

Section 4.1.1: The method to exclude samples seems rather ambiguous. Please illustrate which samples were excluded and be more specific about the criterion. That they do not fit the pattern that you wish to see is not an argument.

Figure caption 5 does not fit to the orientation of the profiles in the figure.

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 33045, 2014.

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Interactive Discussion

Discussion Paper