We thank Thorsten Bartels-Rauch for carrying out further calculations on our data, and for pointing out some additional factors we should consider. We will provide a full author response to his comments in due course. However, as his comment indicates, in the course of investigating his calculations we discovered an error in our own calculation of the proportion of molecules absorbed on the ice surface. This will be corrected in the next version of the paper.

Firstly, the density of snow should be 0.3 g cm^{-3}, not 0.7.
The SSA of snow from Domine should be in the range 100-1000 cm^2 g^{-1}, which translates as 10-100 m^2 kg^{-1} (not 100-1000 m^3 kg^{-1}).
Combining these values, in 1 litre of snow there is 670 cm^3 of air (less than 700 because density of ice is 0.9), and 3E4 to 3E5 cm^2 of surface (300 g at 100-1000 cm^2 g^{-1}). The ratio of surface to volume is therefore approximately 50-500 cm^{-1}.

With this much higher surface to volume ratio than we stated, the ratio of number of molecules on surface/number in air is:
1000-10000 for HNO_4
4E5 to 4E6 for HNO_3
which implies that temperature changes leading to large changes in air concentration have negligible effect on the surface concentration.