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## The role of snow-air exchange on altering the isotopic composition of the snow

### Content

Which processes are responsible for driving the climate signal in the ice core water stable isotope record? This is the fundamental question of the SNOWISO project. We explore this question through a combination of laboratory and field experiments, in-situ observations of the atmosphere and snow isotopic composition, and models of different complexity. Our results document that snow-air exchange processes during the summer period alters the initial precipitated isotopic composition. The observed modification occurs on time scales down to hours driven by synoptic variability and the diurnal cycle. With up to 50% of the precipitated snow being re-sublimated in summer, the vapor-snow exchange process has the potential to leave a significant imprint on the seasonal, and thereby annual isotopic composition. The result of this process is specifically dominant in the d-excess climate signal and henceforth with consequence for the interpretation of the d-excess signal.

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