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Linking year-round NOy budget measurements to surface snow and hence ice core data: results from the CHABLIS campaign in coastal Antarctica

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The family of oxidised nitrogen (NOy) is made up of a variety of components whose concentrations vary throughout the year. The deep ice cores drilled in polar regions yield a record of changing nitrate going back through time. Nitrate in ice tells us something about oxidised nitrogen in the atmosphere with the potential to reconstruct past levels of NOx. Reconstruction of past NOx, however, is heavily limited by our understanding and knowledge of i) the polar NOy budget and ii) post-depositional processes. Here we present the most comprehensive polar NOy budget study to date with an extensive measurement period of roughly a year and including the majority of the important NOy components. The evolution of the NOy budget throughout the year is investigated and linked to changes in surface snow nitrate concentrations. We discuss the relative importance of NOy components as sources to ice core nitrate and what this might mean for ice core interpretation.