



Assessing nitrate dynamics in Svalbard from ice core multivariate analysis

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Svalbard archipelago is located at the crossroads of major oceanic and atmospheric currents from the Arctic. Despite its remoteness from major anthropogenic polluting sources as compared to most Arctic glaciated areas, Svalbard is also affected by long-range transport of contaminants from industrial areas, including Eastern and Western Europe and Canada. It has thereby shown growing interest those last decades from environmental scientists. Another reason for this particular interest, especially from glaciologists, is that Svalbard ice caps are affected by seasonal melt, which has long been thought to disturb enclosed climate proxies.

Multivariate statistical techniques have been applied here to ice core data from various sites in Svalbard in order to investigate the potential for differential trends in environmental proxies and solute relocation. Dating models were also built, based on both chemical peak recognition and wavelet analysis techniques. Multivariate analysis allowed us to identify interesting sea salt trends during 20th century, which can be considered for further ice core/snow pit studies. Various hypotheses are discussed to explain these trends, keeping emphasis on nitrate dynamics (which are still poorly known but paramount for the study of the oxidation chain of atmospheric reactive nitrogen).

This work is part of the interdisciplinary NSINK Marie Curie program, which is aimed at unravelling the enrichment of Arctic terrestrial and aquatic ecosystems by reactive atmospheric nitrogen from low latitude emission centres.