

Dust deposition in snow from northeast Antarctica: Mineralogical, morphological and chemical characterization

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Mineral dust is a major source of micronutrients (e.g. Fe) in open oceans and HNLC zones. In the Southern Ocean in particular, the properties and impacts of current dust deposition are not well constrained.

Here, several dust-bearing snow samples collected in the NE Antarctica coast are investigated in order to : (i) characterize the mineralogy, size, and morphology of dust by single particle analyses (automated-FEG-SEM-EDS and TEM-SAED), (ii) trace the origin and the relative contribution of natural and anthropogenic particles in dusts through elemental and multi-isotopic analyses (HR-ICP-MS and MC-ICP-MS) and (iii) quantify the Fe bioavailability in dusts (via extractions).

Our first results show a fine size distribution (98% of particles < 5 μm , n=1550). A large fraction exhibits a Fe contribution, either from mineralogy or coating. While the mineralogy suggest a substantial contribution of proximal rocks, a high Pb enrichment factor (x7 relative to upper continental crust - UCC) indicates an anthropogenic contribution to the dust deposition.

Overall, this study will improve our understanding of dust reaching the coast of NE-Antarctica, which may represent a proxy for the dust material supplied to the Southern Ocean, by far the largest HNLC.