



First results of all year-round aerosol sampling campaigns (2004-05 and 2005-06) performed at Dome C, central East Antarctica.

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Due to the absence of local sources, atmospheric particles and gases over central Antarctica are only supplied by long-range transport processes. For this reason, Antarctic aerosol represents a real background global aerosol, able to give fundamental information about source intensity, transport efficiency and pathways (including stratosphere-to-troposphere interchanges), size- and chemical-fractionation effects during the transport and depositional and post-depositional processes on the snow cover. Unfortunately, aerosol data from central Antarctica are very scarce and mainly related to austral summer samplings. Here we report the first results of the all year-round 2004-05 and 2005-06 sampling campaigns carried out at Dome C (75° 06' S, 123° 23' E; about 1100 km from the sea and 3233 m a.s.l.).

Aerosol sampling site at Dome C is located about 1 km south of the Italian-French base “Concordia Station”. Aerosol collectors were placed upwind (with respect to the dominant wind direction) to people and buildings in order to minimise the contamination risks from human activity (especially emissions from electrical power plants). Aerosol particles were sampled or measured with different time resolution (5 min to 7 days) by several devices, including filter sandwiches, low-volume samplers with pre-selected cut-off (PM10, PM2.5 and PM1.0), multi-stage impactors (8- and 4-stages) and an optical particle counter (OPC) system.

Aerosol and snow samples collected during the sampling campaigns have been analysed by ion chromatography (IC) for major inorganic anions and cations, methane-sulphonate (MSA) and some short-chain carboxylic acids.

Preliminary results on IC analysis on summer and winter PM₁₀ and PM_{2.5} aerosol samples show that in winter ionic load is lower and the difference between PM₁₀ and PM_{2.5} load is higher than summer. The prevailing species are from primary sources in winter and from secondary sources in summer. In this season, H₂SO₄ from biogenic DMS oxidation dominates the ionic budget in summer even if it has to be considered that the actual contribution of HNO₃ is unknown due to the reemission into the atmosphere. The winter aerosol reflects sea water composition with high contributions of sea spray markers (Na, Cl and Mg) and the generally neutral character of collected aerosol allows a higher preservation of nitrate on the filter. The SO₄/Na ratio is quite similar to sea water in winter when biogenic activity is missing. No fractionation effect, leading to a reduction of SO₄/Na ratio with respect to sea water, was enlightened in Dome C winter aerosol.