

PRESENT-DAY DUST GEOCHEMISTRY BY ALL-YEAR-ROUND AEROSOL SAMPLING AT CONCORDIA STATION

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In the framework of the 2005-2006 all-year-round field campaign at Concordia Station (Dome C - Central East Antarctica - 75° 06' S; 123° 23' E; 3233 m a.s.l.), a continuous aerosol sampling over both summer and winter austral seasons is going to be performed. Geochemical features of atmospheric aerosol reaching the East Antarctic Plateau are still poorly known: to date, published results from ice cores mainly regarded dust deposited in glacial periods; for such periods, both isotopic and geochemical data point to a dominant role of Southern South America as polar dust supplier, and rule out major contribution of other Southern Hemisphere Possible Source Areas (SH-PSAs). Conversely, interglacial (and present day) dust characterization is far to be assessed; available data do not depict a clear scenario, indicating a possible mix of sources for dust, including other SH-PSAs (e.g. Australia), and a higher compositional variability, likely linked to different atmospheric transport regimes, but the question still remains open. Based on previous estimations of the mean aerosol load at Dome C, we planned to carry out a series of 30-days long, high-volume aerosol sampling (about 200 L min⁻¹) in order to likely collect about 1 mg of material on the filter. Experience matured on chemical characterization of ice-core dust and remote-area aerosol, drives us to consider this amount of material enough to carry out different kind of geochemical investigations on the soluble and insoluble aerosol fractions. This will be obtained by filters sub-sampling and analyzing each portion with different methodologies: 1. PIXE, for the insoluble fraction bulk geochemistry. 2. SEM-EDAX, for morphological and mineralogical characterization of single aerosol particles. 3. HR-ICP-MS, for trace metals and REEs determination. Therefore, after the phase of validation of sample handling and analytical methodologies here presented, the application of this multidisciplinary scheme of work on Antarctic winter-over aerosol samples will likely improve our knowledge of present-day dust characterization to help interpretation of ice-core based paleo-climatic reconstructions.