Name of research institute or organization:

## Department of Geosciences, University of Fribourg

Title of project:

Single particle analysis of aerosols from Saharan dust events

Project leader and team:

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Project description:

Saharan mineral dust is influencing strongly the Single Scattering Albedo (SSA). During Saharan Dust Events (SDE) the wavelength dependence of the SSA is inversed (Collaud Coen et al., 2004). Such a behavior of the SSA can be modelled assuming a change in the particle size distribution (PSD) and/or the presence of a strong absorber like hematite (Sokolik and Toon, 1999).

So far no detailed particle by particle analysis of Saharan dust including an inversion of the wavelength dependence of the SSA have been made to corroborate the causes for the inversion put forward. Sampling campaigns for such studies were made in 2008 and 2009.

The samples of these campaigns were analyzed by computer controlled scanning electron microscopy (CCSEM) and transmission electron microscopy (TEM) both couple with energy dispersiv X-ray spectroscopy (EDX). The results could confirm the model of Sokolik and Toon (1999). A clear increase of coarse (> 0.5µm) particles during SDE's can be observed. Most of the mineral particles during a SDE are clay minerals, which contain attached or included hematite (Fe2O3) and rutile (TiO2) particles with diameters between 40 -200nm.

For SDE several source regions and transport paths to the Jungfraujoch are possible. The analyzed events might not be representativ for all SDE. Therefore, an automated sampling device was tested during CLACE 2010. The pump of this sampler was triggered by a signal from the computer of the global atmosphere network and turns on when an inversion of the wavelength dependence of the SSA is detected. The tests were successful but there were still things to improve, which was mainly done in 2011. So a new version of automated Saharan Dust sampler is available for campaigns in 2012.

**References:**

Collaud Coen, M., E. Weingartner, D. Schaub, C. Hüglin, C. Corrigan, S. Henning, M. Schwikowski and U. Baltensperger, Saharan dust events at the Jungfraujoch: detection by wavelength dependence of the single scattering albedo and first climatology analysis, Atmos. *Chem. Phys.*, 4, 2465-2480, 2004.
Sokolik I.N. and O.B. Toon, Incorporation of mineralogical composition into models of the radiative properties of mineral aerosol from UV to IR wavelengths. *J. Geophys. Res*., 104, 9423-9444, 1999.

Key words:

Aerosol particle, SEM, TEM

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