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A 3-Year climatology of Aerosol Physical, Optical and Chemical properties from puy de Dôme

G. Aymoz(1), V. Michaux (1), S.Fontanella (1), M. Parazols (1,2), G. Mailhot (2), L. Bourcier (1), H. Venzac (1), K Sellegri (1), S. Zappoli (3), Paolo Laj (1)

(1) OPGC-LaMP, CNRS-University of Clermont-Ferrand, France, (2) LPMM, CNRS-University of Clermont-Ferrand, France, (3) Department of physical and inorganic chemistry, university of Bologna, Italy, (g.aymoz@opgc.univ-bpclermont.fr / Fax: +33 473 405136 / Phone: +33 473 407678)

Atmospheric aerosol impact on climate is one of the most uncertain aspects of the climate change. The need for a better knowledge of its physical, chemical and optical properties, as well as there seasonal and inter-annual variations, was clearly expressed by the scientific community. In particular, long term measurements series available for the free troposphere are scarce, although it is crucial to better understand the origin, the different properties, and the role of aerosol particles on climate processes in the Troposphere.

The site of the puy de Dôme (Central France, 1465 m.a.s.l.) lies in the free troposphere most of the time. Continuous measurements of aerosols properties (number size distribution, optical properties and chemical composition), combined with in-situ meteorological instrumentation and continuous measurements of reactive gaseous species (O3, NOx, NOy, HCHO, CO and SO2) have been performed over the past years. We will present the evolution over a 3-year period of aerosol chemical, optical and physical properties at this site. The puy de Dôme site is dominantly under the influence of westerly winds although advection of air masses from Northern and Eastern Europe as well as episodes of Saharan dust occurs frequently.

Weekly filter samples have been collected and analyzed for their inorganic and organic contents. The variations of both carbonaceous matter (Elemental and Organic Carbon, (EC and OC), divided into water soluble and insoluble organic carbon (WSOC and WISOC and organic acids)) and inorganic species show significant seasonal variabil-

ity.

The variations of the chemical properties are analyzed as a function of the air mass trajectory and linked to the optical (black carbon concentrations and diffusion coefficient) and physical (Number concentration and, for some periods, size distribution) properties. This analysis permits a classification of aerosol properties associated to the different air masses encountered at the puy de Dôme. This data set will be of interest model validation in an area (free troposphere, Western Europe) that is still poorly documented.