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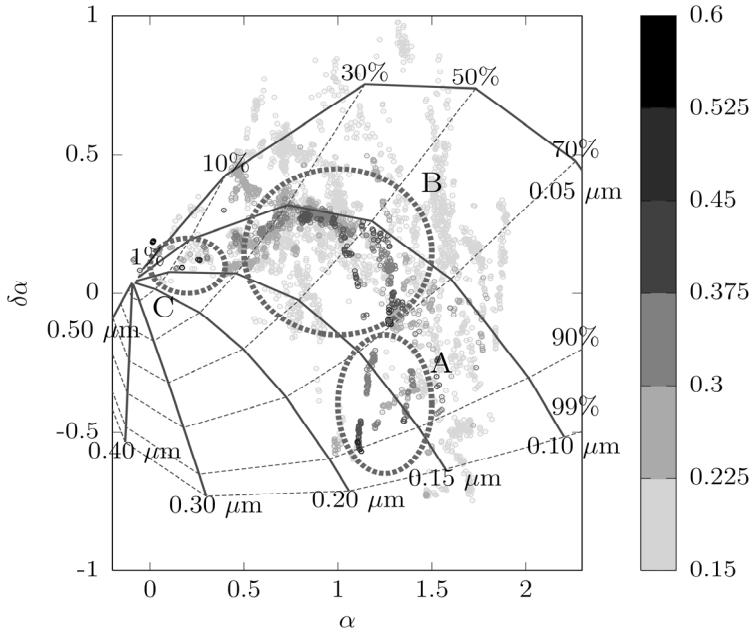

Figure 1. Classification of the aerosol properties as a function of the Ångström exponent α and its spectral variation δα. Each solid line represents a fixed radius of the fine mode (0.05, 0.1, 0.15, 0.2, 0.3, 0.4, and 0.5 μm); the dashed lines represent a fixed contribution of the fine mode to the total AOD (1%, 10%, 30%, 50%, 70%, 90%, and 99%). The color scale refers to AOD measured at a wavelength of 675 nm, for coherency with Gobbi's paper. Areas A, B, and C represent smoke episodes, Saharan dust events, and cloud contamination, respectively.

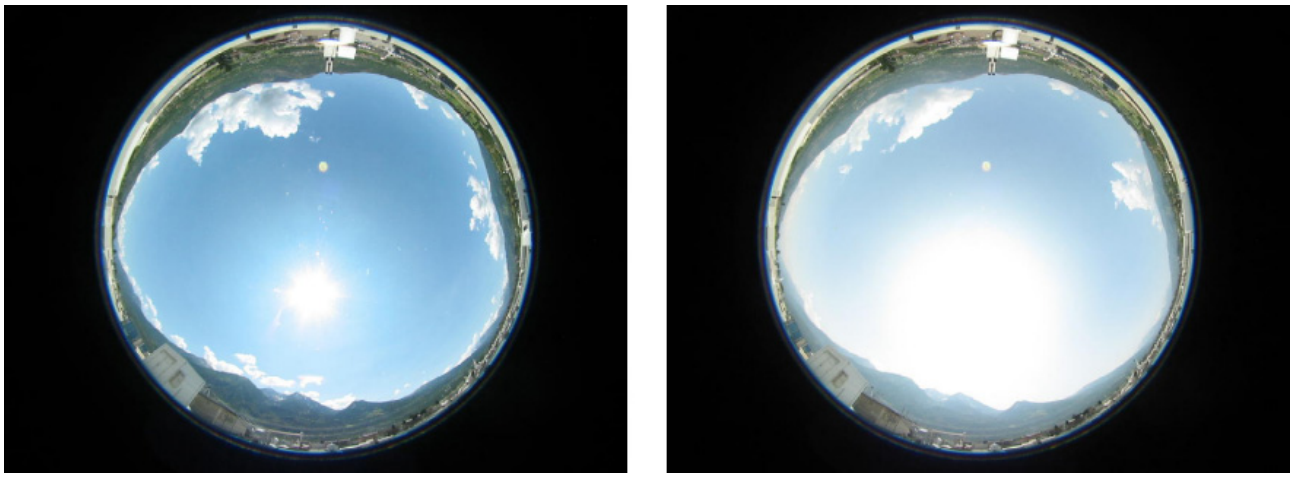

Figure 2. Solar aureole pictures few days before (left) and during (right) a large-scale smoke advection event from Canada (July 13, 2013).

- Characterization of aerosol properties is performed for the first time at the Alpine site of Saint-Christophe, Aosta (Italy). The AOD at the station is generally very low (0.10 at 500 nm), however spikes (up to 0.75) can occur due to the transport of Saharan dust and smoke clouds moving on an intercontinental scale.
- SKYRAD and SUNRAD aerosol optical depths and Ångström exponents are compared, providing consistent results. Spectral variation of the Ångström exponent is also employed to discriminate between different types of particles.
- Influence by local meteorology and anthropogenic emissions is investigated, providing useful information to understand the pollution dynamics in mountainous regions.