

Single scattering albedo observed at a high altitude location in the Mediterranean coast

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Scattering and absorption coefficients have been continuously measured since March 2014 up to August 2015 at the high altitude site Mt. Aitana (38°38'56.8"N 0°15'55.2"W; 1558 m a.s.l.). In this study, particle scattering (σ_{sp} : 10–171°) and hemispheric backscattering (σ_{bsp} : 90–171°) coefficients at three wavelengths (450 nm, 525 nm, 635 nm) were measured every 5 min with a LED-based integrating nephelometer (model Aurora 3000, ECOTECH Pty Ltd, Knoxfield, Australia). In addition, equivalent black carbon measurements were obtained every 5 min at seven different wavelengths (370, 470, 520, 590, 660, 880 and 950 nm) using an Aethalometer (model AE31, Magee Scientific, USA). In this work, we present the single scattering albedo (SSA) and its wavelength dependence single scattering albedo Ångström exponents (SSA-AE) for the whole study period.

The scattering coefficients measured by the nephelometer at its three wavelengths were fitted with a power law to evaluate the scattering coefficients at the AE31 seven absorption wavelengths.

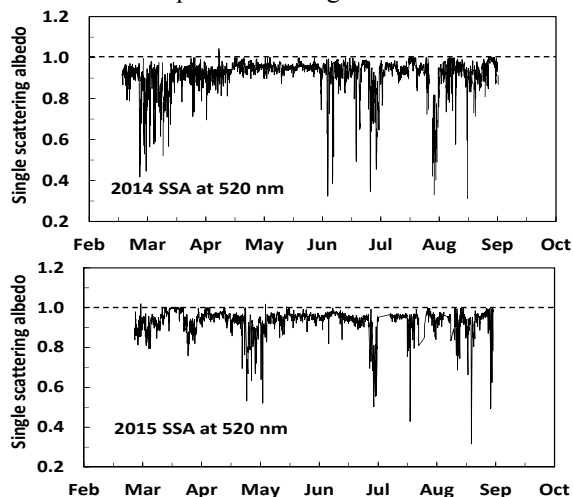


Figure 1. Time variation of SSA on hourly base during 2014 (above) and 2015 (below).

The hourly SSA at 520 nm for 2014 and 2015 is plotted in Figure 1. Average values of SSA at 520 nm were obtained 0.92 and 0.94 for 2014 and 2015, respectively. These values are quite high compared with similar measurements at other mountain sites (i.e. Andrews *et al.*, 2011) and suggest less absorbing (e.g., BC) and more scattering material (e.g., dust, biogenic contribution) fractions in aerosols in this area.

Wavelength dependence of SSA has been used as a method to identify Saharan dust events (SDE) when

SSA-AE turns into negative values in presence of mineral dust Collaud Coen *et al.* (2004). In Figure 2 the SSA-AE are plotted for 2014 and 2015 seasons.

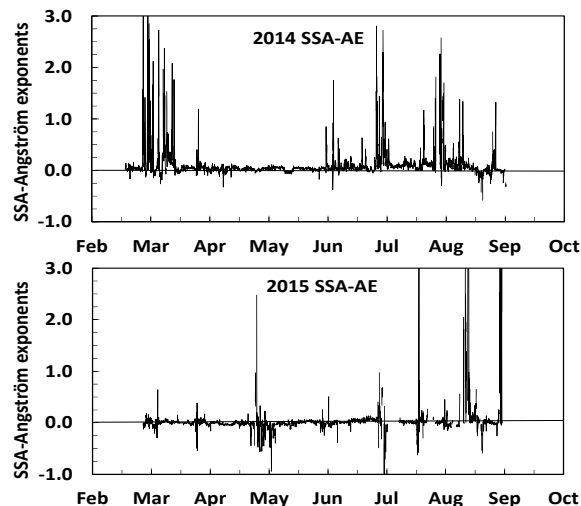


Figure 2. Time variations of single scattering albedo Ångström exponents in 2014 (above) and 2015 (below).

In Mt. Aitana there were much more SDE in 2015 than in 2014 which is reflected in a greater number of negative SSA-AE peaks. However not all the SDE were detected maybe because some local pollution could be masking the effect of mineral dust Ealo *et al.* (2016).

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