



## **Observations of column aerosol optical properties at the ENEA remote Station for Climate Observations at Lampedusa: influence of transport and classification of distinct aerosol types**

**G. Pace**(1), A. di Sarra (1), D. Meloni (1), S. Piacentino (2), P. Chamard (1)

(1) ENEA, Climate Laboratory, Rome, Italy, (2) ENEA, Climate Laboratory, Lampedusa, Italy  
(giandomenico.pace@casaccia.enea.it / Fax: +390630486678 / Phone: +390630486127)

Measurements of aerosol optical depth and Ångström exponent obtained with a multi filter rotating shadowband radiometer (MFRSR) at the Station for Climate Observations, maintained by ENEA on the island of Lampedusa (35.5°N, 12.6°E) are presented and discussed.

The average values of the aerosol optical depth at 500 nm, AOD, and of the Ångström exponent,  $\alpha$ , over the period July 2001-September 2003 are  $0.24 \pm 0.14$  and  $0.86 \pm 0.63$  respectively. Large differences in minimum and maximum values of AOD, from 0.03 to 1.13, and  $\alpha$ , from -0.32 to 2.05, indicate a large variability of amounts and aerosol size.

In cloud-free condition 36%, 25% and 19% of the analysed cases correspond to airmasses originating from Africa, Central-Eastern Europe, and Western-Europe-Northern Atlantic, respectively.

The African airmasses carry particles displaying average AOD and  $\alpha$  of 0.36 and 0.42 respectively, typical of desert dust. Particles originating from Central-Eastern Europe are characterized by relatively high average values of AOD and  $\alpha$  (0.23 and 1.5 respectively). Particles from Western Europe-Northern Atlantic show the lowest average values of AOD (0.15), and relatively small values of  $\alpha$  (0.92).

The seasonal distribution of the meteorological patterns over the Mediterranean, as well as the efficiency of the aerosol production mechanisms and the variability of

the atmospheric residence time of the particles, produce a distinct seasonal cycle of aerosol optical depth and Ångström exponent. A summer maximum of AOD is evident for particles originating from all sectors.

The observations were classified according to the aerosol optical properties. Two distinct classes may be separated from the whole dataset on the basis of the observed values of AOD and  $\alpha$ : desert dust and biomass burning/urban-industrial aerosols. The average values of AOD and  $\alpha$  over the whole period are 0.37 and 0.15 for desert dust and 0.27 and 1.77 for urban-industrial/biomass burning aerosols.