Geophysical Research Abstracts,
Vol. 11, EGU2009-6100, 2009
EGU General Assembly 2009

Spatio-temporal distribution of absorbing and non-absorbing aerosols derived from Aura-OMI Aerosol Index over Greece

D.G. Kaskaoutis (1), P.T. Nastos (2), P.G. Kosmopoulos (2), H.D. Kambezidis (1), S.K. Kharol (3), and K.V.S. Badarinath (3)

(1) Atmospheric Research Team, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Lofos Nymphon, P.O. Box 20048, GR-11810 Athens, Greece, (2) Laboratory of Climatology and Atmospheric Environment, Faculty of Geology and Geoenvironment, University of Athens, Panepistimiopolis GR-15784 Athens, Greece, (3) Atmospheric Science Section, National Remote Sensing Agency (Dept. of Space-Govt. of India), Balanagar, Hyderabad-500 037, India

The Aerosol Index (AI) observations derived from the Ozone Monitoring Instrument (OMI) on board the Dutch-Finnish Aura satellite are analyzed over Greece covering the whole period of the OMI available data, from September 2004 to August 2008. The objective of this study was to analyze the spatial, seasonal and inter-annual variability of AI over Greece, detected by OMI during 2004-2008, with an evaluation of potential contributing factors, including precipitation and long-range transport (Sahara dust and European pollution). The AI data cover the whole Greek territory (34o-42oN, 20o-28oE) with a spatial resolution of 0.25o x 0.25o (13 km x 24 km at nadir). The results show significant spatial and temporal variability of the seasonal and monthly mean AI, with higher values at the southern parts and lower values over northern Greece. On the other hand, the AI values do not show significant differences between the western and eastern parts and, therefore, the longitude-averaged AI values can be utilized to reveal the strong south-to-north gradient. This gradient significantly changes from season to season being more intense in spring and summer, while it is minimized in winter. Another significant remark is the dominance of negative AI values over northern Greece in the summer months, indicating the presence of non-UV absorbing aerosols, such as sulfate and sea-salt particles. The great geographical extent of the negative AI values in the summer months is indicative of long-range transport of such aerosols. In contrast, the high positive AI values over south Greece, mainly in spring, clearly reveal the UV-absorbing nature of desert-dust particles affecting the area during Saharan dust events. Synoptically, the spatial distribution in OMI-AI values was related to the Saharan dust events mainly over southern Greece and to the trans-boundary-pollution transport, consisting mainly of sulfate particles, in northern Greece. The annual variation of spatial-averaged AI values shows a predominant spring maximum (0.424 ± 0.329, in April) and a summer minimum due to the negative AI values observed over northern Greece. In the cold period of the year (November to February) the AI values are higher over northern Greece compared to those in south, while in the rest of the year the opposite exists. This study is first of its kind utilizing OMI-AI data and its spatial and temporal distribution over Greece and can be the basis for other studies in the future.