Investigation of the seasonality, intensity and inter-annual trends of Saharan dust exposure towards the tropical North Atlantic and Mediterranean Sea in the period 2004-2009.

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This study deals with the seasonality and inter-annual trends and variations of the Saharan dust exposure towards tropical north Atlantic and Mediterranean Sea covering a period of ~5 years (August 2004 – December 2009). The Aura OMI Aerosol Index (AI) on monthly basis has been used in the analysis with a spatial resolution of $0.25^{\circ}x0.25^{\circ}$. The study area includes the whole Sahara and Sahel desert and semi-arid regions, the tropical and sub-tropical Atlantic, and the whole Mediterranean Basin covering the area $-50^{\circ}W- 40^{\circ}E$, $0^{\circ}-40^{\circ}N$. The whole area is divided in 5 sub-regions (tropical Atlantic, sub-tropical Atlantic, western Mediterranean, eastern Mediterranean, and Bodélé depression).

The Bodélé depression in Chad is the world's greatest source region of mineral dust into the atmosphere emitting dust on 40% of the winter days, averaging more than 0.7 million tons of dust per day. The dust from Bodélé is an important contributor to dust crossing the African Savannah region towards the equatorial Atlantic and the Mediterranean Sea. The strong dust uptake is generally associated with northeasterly (Harmattan) circulation and the seasonality of the Bodélé dust explained by the regional atmospheric circulation. Large amounts of dust are transported towards tropical and sub-tropical Atlantic mainly in the summer season having a clear sign to the AI values. The dust exposure over Mediterranean Basin have a strong seasonality, with larger amounts in spring in the eastern part shifting towards summer and early autumn in the western one. On the other hand, winter season is not so favorable for the dust exposure towards Mediterranean. This work is among the first ever conducted using the Aura OMI AI values and aims also at verifying numerous previous studies using TOMS and more recently MODIS AODs.