Preliminar characterization of columnar aerosols properties (AOD-AE) at the Saharan Tamanrasset (Algeria) station

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At the end of September 2006 a Cimel sunphotometer was set up at Tamanrasset (Algeria) by the Izaña Atmospheric Research Center (AEMET) in collaboration with l'Office Nationale de la Météorologie (Algeria). This station was integrated in the AERONET network as a strategic site within the Global Atmospheric Watch (GAW) programme for its situation in the hearth of the Sahara, and, a priori, representative of pure desert dust, free of industrial activities. More than two years of aerosol measurements have been analyzed from October 2006 to January 2009. The mean aerosol optical depth (AOD) is 0.26±0.15 and the mean Ångström Exponent (AE) is 0.45±0.20, evaluated from AERONET level 2 daily and monthly mean values. Both time series data show a clear seasonal cycle. A dry-cool season (fall and winter time) is characterized by low AOD and high AE values, and a wet-hot season (in spring-summer), with strong and frequent mineral dust storms, giving high AOD and low AE values, are observed at Tamanrasset. The spring-summer season is driven by a strong and thick continental boundary layer over Tamanrasset which has been analysed using the rawinsonde dataset. Both, AOD and AE values shows the behaviour of a station where desert mineral dust is the prevailing aerosol defining the characteristic of the site. However it is worthy to pointing out that a significant number of episodes with Ångström exponent values around 1 together with AOD greater than 0.2 have been found, what suggests the presence of pollution derived aerosols. The Gobbi's graphical-frameworks help us to discriminate this different aerosol types through the year and the HYSPLIT back trajectories are used to analyse the origin of the air masses arriving to Tamanrasset. Several problems have been found during this two year record of continuous measurements because of the difficulties regarding the instrument maintenance and the poor time-calibration process. On the one hand, the cloud screening became an extremely difficult task because the presence of heavy dust plumes, preferentially during the summertime, which were confused many times with clouds (resulting in underestimation of the AOD), and by the quasi permanent presence of cirrus clouds, associated to the subtropical jet stream, in wintertime, resulting in an overestimation of the AOD. On the other hand, around six months of data in 2008 did not achieve the level 2.0 in the AERONET database. A detailed and analysis of data shows a strong fictitious diurnal cycle within this six months dataset. The KCICLO method appears as a tool to be used to correct the calibration factor and recover this dataset.