Contribution of dust transport to the local pollution during biomass burning season over Nile Delta

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The Delta region suffers from intense natural (dust storms) and anthropogenic aerosols during different seasons. The major seasons can be classified as spring (March-April-May), summer (June-July-August), fall (September-October-November), and winter (December-January-February) seasons. The spring season is known for intense dust events locally known as “khamasin” where as the fall season is very well known for bio-mass burning causing permanent smog locally known as “black cloud”. We have analyzed multiple satellite and model datasets such as Moderate Resolution Imaging Spectroradiometer (MODIS), Multiangle Imaging SpectroRadiometer (MISR) aerosol parameters, vertical profiles from Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO), Atmospheric Infrared Sounder (AIRS) (meteorological and other parameters), Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT), and NCEP-NCAR reanalysis data. We show that the major episodes of pollution, even during fall season, are attributed to the transport of dust from Western Sahara. The back-trajectories from HYSPLIT model, vertical profiles (AIRS, CALIPSO, and NCEP-NCAR reanalysis) and satellite data clearly show the contribution of the transported dust to the local pollution. The pathways and multi-parameter evidences will be discussed in detail. The transport of dust from the Sahara to the snow covered regions in Himalayas will also be discussed.

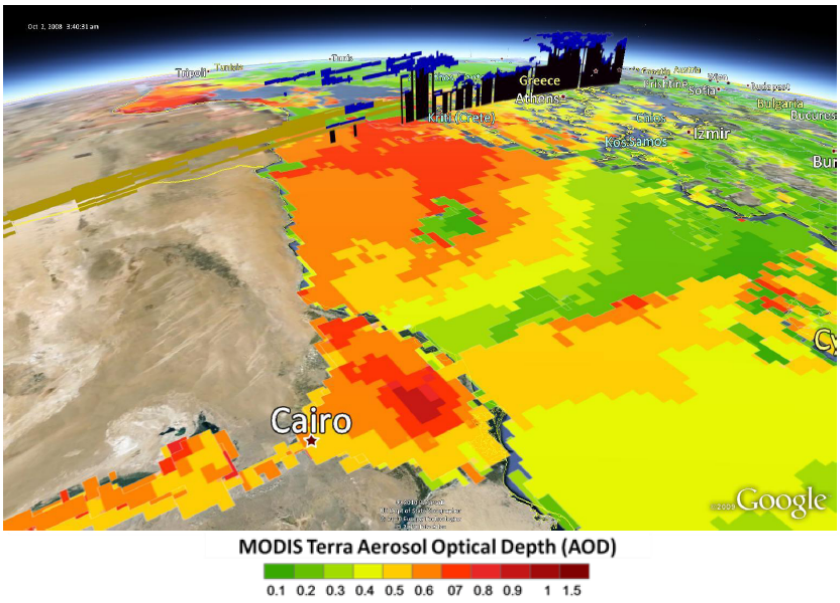

Figure 1. The transport of dust over the northern Africa region (Nile River Delta) as visible in MODIS AOD and CALIPSO vertical profile during fall season 2008.