

International Master 2 Atmospheric Environment: Research Training 2018-2019

Laboratory: LOA

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CaPPA Work Package: WP-2 Aerosol cycle

Tracking of dust deposition for solar applications

Deposition of aerosols, in particular dust, is an important process that has local and global influences on the ecological environment and on climatic processes. Deposition of aerosols may for example modify surface albedo and affect biogeochemical cycles. For some applications, it represents a drawback as soiling on solar modules decreases the transmittance of the module's protective glass and degrades their photovoltaic efficiency. Soiling is a very significant process for regions where large potential in renewable solar energy is available for exploitation, regions that are meanwhile subject to aerosol natural (desert) and anthropogenic (pollution) emission and deposition. Ways to account for soiling in the context of solar energy's exploitation are to anticipate deposition's events, forecast the soiling and the decrease with time of panel's performance, before eventually cleaning the modules or finding technical solution to minimize the persistence of deposition.

This trainee will participate in a research project whose objective is to characterize aerosol deposition variability as a function of environmental conditions as well as the aerosol type of particles present within the atmosphere. Our case studies will be events of dust deposition in Morocco as measured by moroccan colleagues. We will analyze backward trajectories in order to identify the origin and transport of the air masses present with the deposition. We will exploit measurements from satellite (CALIOP) and from the surface (AERONET stations) to get informations about the vertical profiles of aerosol in these air masses. Meteorological data reanalysis and eventually the result of modelling simulation will also be used.

Key words: dust deposition, soiling, solar modules