Geophysical Research Abstracts
Vol. 14, EGU2012-11125, 2012
EGU General Assembly 2012

A Robust Satellite Technique (RST) for detection and monitoring of dust storms

C. Filizzola (1), F. Sannazzaro (2), P. Di Girolamo (2), F. Marchese (1), G. Mazzeo (1), D. Summa (2), R. Paciello (2), N. Pergola (1,2), V. Tramutoli (2,1)

(1) National Research Council, Institute of Methodologies for Environmental Analysis (IMAA), Tito Scalo (PZ), Italy (filizzola@imaa.cnr.it), (2) University of Basilicata, Department of Engineering and Physics of the Environment, Potenza, Italy

In recent years, concurrently with climate change and poorly managed human activity, there has been a significant increase in the number of dust storms, which commonly arise, by the action of wind, in the arid and semi-arid regions of the planet, particularly at subtropical latitudes. They represent a devastating meteorological phenomenon because dust clouds contain large amounts of particles, particularly silicates, which can have a direct impact on the increase in health problems such as respiratory diseases, as well the inconvenience and disruption to transport routes and communication. For such reasons, there is much interest from government agencies and the scientific community to examine and analyze the problem (nature, extent and causes) in order to implement mitigation strategies, prevention, prediction and control of the same. To this aim, several satellite techniques have been, up to now, proposed in order to detect and monitor dust storms. Satellite-based methods usually consider the reverse absorption behaviour shown by silicate particles, in comparison with ice crystals and water droplets, at 11 and 12μm (split windows) wavelengths. However, performances of split window methods depend on observational conditions (day/night, land/sea, etc.) as well as on specific aerosol properties (mainly size distribution and complex refractive index). Moreover, several satellite techniques are based on fixed thresholds and they often have difficulties in identifying sandstorms over daytime images as well as problems in discriminating meteorological from dust clouds. To overcome such limitations, a Robust Satellite data analysis Technique (RST), named RSTDUST (Robust Satellite Technique for DUST detection) has been proposed and applied both to polar and geostationary satellite data for detecting and monitoring recent dust storms in several World places (central Europe, Greece, Saudi Arabia, Australia, etc). Main results obtained by using RSTDUST, in comparison with results achieved by using traditional fixed threshold techniques as well as with ground based observations performed by lidar will be presented.