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Climatic Impact Of Desert Dust

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In the context of the climatic change of the planet, those research works that throw light on global warming are of great interest. That is the case of the studies on atmospheric aerosol, a suspension of solid or liquid particles on a gaseous environment that can contribute to the warming or cooling of the atmosphere.

Juan Luis Guerrero Rascado developed his doctoral thesis "Lidar Technique for atmospheric characterization by elastic and Raman dispersion" precisely in this research line, supervised by the Professor of the University of Granada, Lucas Alados Arboledas, director of the Group of Atmospheric Physics of the Andalusian Centre for Environmental Studies, CEAMA.

"The interest of studying the atmospheric aerosol resides in the fact that these particles influence enormously the radioactive balance of Earth, so that they can modify it and, according to the effects, there can be an atmospheric warming or cooling", says Guerrero Rascado.

Use and fine tuning of the LIDAR technique

According to Professor Alados, "the implementation of the Lidar technique is much more useful than the traditional techniques used in similar studies, as it permits us to get to know the vertical distribution of atmospheric aerosol, in which levels, in which quantity and the characteristics of such aerosol in every moment".

This technique is very similar to a radar, says the researcher, "as it consists in emitting an electromagnetic radiation, in this case laser light, which propagates in the atmosphere, interacts with the particles in suspension and afterwards, collects the radiation returned to the instrument to study from that received sign the features and the position of particles".

The research work, which has required a four-year effort, was organized in three main lines: the fine tuning of the equipment; the development of algorithms for profile inversion of aerosol optical properties by active tele-detection, using the Lidar technique; and the taking of measures (from the CEAMA, in Granada) both routine and intensive campaigns of phenomenon as mineral dust intrusions from the desert of Sahara, and in the framework of programs of validation of satellites of the NASA.

The Lidar technique has been used in different countries all over the world. The station of the Andalusian Centre for Environmental Studies, in Granada, belongs to the European network EARLINET, which also interacts with a global network of solar photometry, Aeronet, coordinated by the Nasa. At present, the EARLINET network is centered on the validation of the data of the satellite Calipso, so that a monitoring of the atmospheric aerosol with vertical resolution at a global scale global can be carried out, for a better understanding of the climatic system of Earth.

The results of this research work have been published in the Journal/Book Atmospheric Environment, vol 42, 2668-2681, ISSN-1352-2310, (2008), under the title "Multi-spectral Lidar characterization of the vertical structure of Saharan dust aerosol over Southern Spain". The authors of the article are Professor Lucas Alados-Arboledas and researchers Luis Guerrero-Rascado and Borja Ruiz Reverter.

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