

Soutenance de thèse de Fahrhad ABDI VISHKAEE

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Characterization of atmospheric aerosols and their transport from arid and desert regions to megacities in Iran

Le 25-02-2011 à 10h30

Membres du jury:

Ulla WANDINGER - Rapporteur

Jean-Pierre CHABOUREAU ? Rapporteur

Michel CABANNE - Examineur

Alain DABAS - Examineur

Martin TODD ? Examineur

Béatrice MARTICORENA - Examineur

Cyrille FLAMANT ? Invité

Farhad SOBOUTI ? Invité

Hamidreza KHALESIFARD ? co-directeur de these

Pierre H. FLAMANT ? co-direceur de thèse

Résumé :

My thesis is presenting a research work conducted in *co-tutelle* jointly at IASBS (Iran) and LMD/IPSL (France) on the application of optical remote sensing techniques to study dust sources and their transport over Iran in the recent years. Iran is located in the "Dust belt" in the vicinity of persistent dust sources such as Tigris and Euphrates basin in Iraq, Turkmenistan basin and Arabian Peninsula. Also Iran is naturally arid with internal dust sources i.e. two deserts and numerous extended dry lakes. Populated cities such as Tehran suffer from persistent low visibility and poor air quality conditions in many circumstances. Until now, these events were not well documented for the lack of information mostly provided by sparse surface synoptic meteorological stations. In this respect, even if already freely available, the current satellite observations were not efficiently taken into account until now.

The present work is aimed at using remote sensing techniques and especially lidar that is new in Iran. To this end, a lidar station has been developed in Zanzan at IASBS since 2005. The lidar datasets collected in Zanzan and by the NASA-CNES lidar mission CALIPSO are used for a 3D description of dust and aerosol layers. These data sets are complemented by data sets provided

by a sun photometer in Zanjan and MODIS. For completeness, these suites of ground-based and space-borne remote sensors are combined with NWP model and back trajectories analyses. In order to demonstrate the effectiveness of the analyses several case studies in summer and wintertime will be presented. The studies show that external and internal dust sources are effective to affect visibility and air quality in Northwest Iran.

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