A METHOD FOR RETRIEVING WATER VAPOR COLUMNAR CONTENT AND AEROSOL OPTICAL THICKNESS FROM FIELDSPEC PRO FR SOLAR DIRECT IRRADIANCE MEASUREMENTS

C. Bassani 1, R. M. Cavalli 2, V. Estellés 3, J. L. Gómez-Amo 3, J. A. Martínez-Lozano 3, S. Pignatti 1, M. P. Utrillas 3

1. National Research Centre, CNR – Institute of Methodologies for Environmental Analysis, IMAA-LARA
2. National Research Centre, CNR – Institute for Atmospheric Pollution, IIA - LARA

Key-words: Fieldspec Pro Fr, split window method, Aerosol Optical Thickness, columnar water vapor, SPARC field campaign

Objective of the study
The capability to monitor and predict the physical characteristics of the atmosphere has been largely improved last decades. Aerosol optical thickness (AOT) and precipitable water vapor amount (W) are crucial atmospheric parameters in the understanding of atmospheric dynamics, as well as for the atmospheric correction of optical remote sensing images to be employed for land and water management.

The objective of this work has been to adopt a methodology for measuring the water vapor and aerosol optical thickness in the atmospheric column by means of a Fieldspec Pro FR spectroradiometer. These measurements will be later useful for improving accuracy and helping to interpret remote sensing data, not only in the SPARC 2004 field campaign but for other future field campaigns aimed at land management.

Materials and Methods
The methodology is based on two well-known techniques of sunphotometry: the inversion of sun direct irradiance for AOT and split window, for precipitable water vapor. The direct solar irradiance were acquired simultaneously to Cimel CE318 NE and Microtops II measurements, working collocated during the SPARC 2004 campaign held at Barrax (Spain) in 2004 July. The obtained measurements have been compared to simultaneous retrievals from these collocated sunphotometers.

Results
The results so far obtained showed the feasibility of this instrument to be employed for columnar water vapor and aerosol optical thickness retrieval. For water vapor, the deviation were found to be well within the estimated Cimel and Microtops uncertainty, stated as 10%. We also plan to take advantage of the spectroradiometer resolution in order to derive other gases content.