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Detection of air pollution events over Évora-Portugal during 2009

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All over the world pollutant industries, traffic and other natural and anthropogenic sources are responsible for air pollution affecting health and also the climate. At the moment the monitoring of air quality in urban and country regions become an urgent concern in the atmospheric studies due to the impact of global air pollution on climate and on the environment. One of the evidences of the global character of air pollution is that it not only affects industrialized countries but also reaches less developed countries with pollution gases and particles generated for elsewhere. The development and the employment of instruments and techniques for measure the variation of atmospheric trace gases and perform their monitoring are crucial for the improvement of the air quality and the control of pollutants emissions.
One of the instruments able to perform the air quality monitoring is the Spectrometer for Atmospheric TRacers Measurements (SPATRAM) and it is installed at the CGE´s Observatory in Évora (38.5º N, 7.9º W, 300 m asl). This UV-VIS Spectrometer is used to carry out measurements of the zenith scattered radiation (290- 900 nm) to retrieve the vertical content of some atmospheric trace gases such as O3 and NO2 in stratosphere, using Differential Optical Absorption Spectroscopy (DOAS) methodology. Although SPATRAM, in its actual geometric and operational configuration – zenith sky looking and passive mode measurements, is not able to detect small variations of tracers in the troposphere it is possible to identify enhancements in the pollution loads due to air masses movements from polluted sites. In spite of the fact that Evora is a quite unpolluted city the deep analysis of the DOAS output, namely the quantity of gas (in this case NO2) present along the optical path of measurements (SCD – Slant Column Density) allows for the detection of unpredicted variations in the diurnal NO2 cycle.
The SPATRAM´s data allows the identification of polluting events which sources are known, like power plant sites. The association of the SPATRAM data, namely the SCDs and HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) maps showing the air masses course, allows for the identification of the sources responsible for the pollution events recorded at the Evora Station.
The preliminary results of some case studies occurred during 2009 are presented and discussed. The main sources are identified in power plant sites and industrialized cities in Portugal and Spain.