

The Spanish Network on Environmental DMAs: Introduction and main activities

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Size distribution is one of the most important properties of the atmospheric particles as it determines their behavior and gives information about their origin and history. The particle size distribution measurements are a key factor to understand the radiation-aerosol interaction and the health effects as both depend on the size distribution.

In the last ten years, there has been an important increase in the number of studies related with the particle size distribution measurement. Kulmala et al. (2004) reviewed the new particle formation in more than 120 different locations and ambient conditions. Additionally, studies on the particle size distribution evolution have been performed in many European and American cities, rural and urban background stations (Pey et al., 2008, Sorribas et al., 2008).

There are currently five groups in Spain involved in the measurement of atmospheric particle size distributions by means of Differential Mobility Analyzers (DMAs). These groups are: University of A Coruña, IDAEA-CSIC, INTA, IARC-AEMET and CIEMAT. All the groups have to solve many common problems related with the instrumentation required for this type of measurements. For this reason, the Spanish Environmental DMA network (Red Española de DMAs Ambientales, REDMAAS) has been launched in January 2010. The REDMAAS has as main objective the cooperation between the groups, which will lead to solve common problems and to optimize their facilities and protocols.

The activities planned for the first year of this network are:

- DMA calibration: the network members will check their DMA calibration. Firstly, it is necessary to check the DMA flow rates and then, a monodisperse aerosol, latex, is introduced into the DMA to calibrate the electrical mobility.

- DMA intercomparison: one of the main objectives of the REDMAAS is to make all the instruments comparable. With this objective an intercomparison exercise with all of them is scheduled during April 2010 in the INTA facilities (El Arenosillo, Huelva). The instruments will measure simultaneously the same atmospheric

particles and the results will be compared and assessed.

- Measurement quality control program: under this activity the network is preparing those protocols required for the correct operation of the systems. Protocols for flow calibrations and checks, zero checks, dry procedures for ambient relative humidity above 30% and others are currently under development. Losses in sampling lines are under estimation using simple deposition models.

- Support for the radioactive facility license: this activity is thought for new possible network members. For the correct DMA working, it is necessary to have a radioactive source at the aerosol inlet to assure a known particle charge distribution. This source requires the approval of the national nuclear regulatory commission (CSN) by means of a radioactive facility license.

- Webpage: all the network information and activities are included in a webpage, whose first version is already available.

- New DMA applications: DMAs are very flexible and useful instruments and have several different applications in environmental studies. This activity is based on the experience with this kind of instruments and the objective is to support the members interested in using DMAs in new applications. The construction of a Hygroscopy Tandem DMA (HTDMA) by the CIEMAT group is the first of these activities. The expected results may be very useful in climatic studies.

The REDMAAS is open to any other Spanish group which could be interested in measuring atmospheric particle size distributions with DMAs.

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