



## **Aerosol distribution over the western Mediterranean basin during a Tramontane/Mistral event**

**T. Salameh**(1), P. Drobinski(2), L. Menut(1), B. Bessagnet(3), C. Flamant(2), A. Hodzic(4) and R. Vautard(5)

(1) IPSL/LMD, (2) IPSL/SA, (3) INERIS, (4) NCAR, (5) IPSL/LSCE

This study investigates experimentally and numerically the time evolution of the spatial distribution of aerosols over the Western Mediterranean basin during March, 24 1998 Mistral event documented during the FETCH experiment. Mistral and Tramontane are very frequent northerly winds (5-15 days per month) accelerated along the Rhône and Aude valley (France) that can transport natural and anthropogenic aerosols offshore as far as a few hundreds of kilometers which can in turn have an impact on the radiation budget over the Mediterranean Sea and on precipitation.

The spatial distribution of aerosols was documented by means of the airborne lidar LEANDRE-2 and spaceborne radiometer SeaWiFS, and a validated mesoscale chemical simulation using the chemistry-transport model CHIMERE with an aerosol module, forced by the non-hydrostatic model MM5.

This study shows that: (1) the Mistral contributes to the offshore exportation of a large amount of aerosols originally emitted over continental Europe (in particular ammonium nitrate in the particulate phase and sulfates) and along the shore from the industrialized and urban areas of Fos-Berre/Marseille. The Genoa surface low contributes to advect the aerosols along a cyclonic trajectory that skirts the North African coast and reaches Italy; (2) the aerosol concentration pattern is very unsteady as a result of the time evolution of the two winds (or Genoa cyclone position): The Tramontane wind prevails in the morning hours of March 24, leaving room for the Mistral wind and an unusually strong Ligurian outflow in the afternoon. The wakes trailing downstream the Massif Central and the Alps prevent any horizontal diffusion of the aerosols and can, at times, contribute to aerosol stagnation.