



## **Impact of Portugal fires on 2003 European pollution**

**M. Tressol, J. Brioude, C. Mari, V. Thouret, R. Zbinden, J-P. Cammas**

Laboratoire d'Aérodologie, UMR5560, Observatoire Midi-Pyrénées

In 2003, an exceptional heatwave affected Western Europe leading to maximum record temperature breaks in some countries. Stagnant anticyclonic conditions and long sunny periods allowed pollution to reach very high levels. Furthermore devastating forest fires occurred because of hot temperature and drought. For example, in Portugal more than 390000 ha burned which represents 5.6% of the forest surface. The objective of this study is to analyse the impact of long range transport atmospheric pollution during the hot summer 2003 period. We use MOZAIC data from aircraft taking off or landing at Frankfurt, Paris and Vienna. This data set shows pollution which struck Europe in the first half of August 2003. For Frankfurt, between 0 and 2 km height, ozone concentration reach 90 ppbv all the 13 days long and the difference with climatology is near + 40 ppbv. This difference rise to an altitude of 6 km the 10 and 11 August. We also see high concentration for carbon monoxide (mean 250 ppbv). Maximas occurred the 8, 9 and 10 August in the first kilometre of atmosphere and peaks are visible at high altitude the 4, 5 and 6 August. In order to analyse ozone and precursors evolution we work with the Lagrangian particle dispersion model Flexpart which calculate, forward or backward in time, air particle dispersion by winds. Flexpart allows us to determine air mass origin by identifying ozone precursors emitting region at surface and by analysing particle resident time of retro-plume. The analysis of the 4 August CO peak indicate that the air mass came from Portugal in 4 days and passed some time near the ground. For boundary layer high concentrations, we concentrate our study on air mass contribution from Portugal. About 15% of air crossed by aircraft over Frankfurt under 2 km came from Portugal in 6 to 10 days. It seems that Portugal fires played an important role in the second week of the heat wave when pollution was maximum. This is true for Paris and Vienna even if Paris is nearest the anticyclone center. The heatwave has contributed to create high levels in pollutants by its meteorological properties but its consequences like fires played an important role for rising pollutants concentration moreover.