

# Numerical Modelling of the Transport of Atmospheric Pollutant over Portugal and their Relationship with the Meteorological Conditions

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This work presents a study of the transport of gases and particles emitted by point source and fires in diverse meteorological conditions. The methodology is integrated through an atmospheric model RAMS (Regional Atmospheric Modeling System) for different emission sources. RAMS coupled with HYPACT (HYbrid Particle and Concentration Transport) was used to analyse the particulate matter (PM<sub>10</sub>) dispersion emitted by a continuous and high point source located in Barreiro (09°03'W; 38°40'38"N) relating its behaviour with the local circulations. The model CATT-BRAMS (Coupled Aerosol and Tracers Transport model to the Brazilian Regional Atmospheric Modeling System) was used to analyze the atmospheric transport and evolution of the carbon monoxide (CO) and particulate matter (PM<sub>2.5</sub>). This model was also used to verify the synoptical patterns associated to the maintenance and development of focuses of the fires during the August 2003 heat wave. The results obtained in this work show the importance of analysing the atmosphere pollutant transport via complex models that describe the interrelations biosphere-atmosphere characterizing an interdisciplinary study. The transports of smoke plumes were initiated from the vertical transport of burning products and of the active meteorological situation during the target period. The large scale circulation is responsible for dispersing the smoke plumes produced by in situ burning of biomass throughout the whole continent, covering thousands of square kilometres. In general, the pollutant transport emitted in Portugal by the fires was carried out to the Atlantic Ocean and the inner part of the Iberian Peninsula, considering the predominant circulation patterns. Nevertheless, the transport of pollutant emitted by a point source tends to displacement Barreiro's stack source displaced towards the Atlantic Ocean, keeping a significant concentration near the source.