



COMPARISON OF THE AIR-VEGETATION PROFILES OF BENZO[α]PYRENE IN PORTUGAL, SPAIN AND GREECE USING FIELD AND MODEL MEASUREMENTS

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Vegetation has a considerable impact on the cycles of the different semi-volatile organic pollutants (SVOCs), and some phenomena have been described, such as the “forest filter effect”. This means that forests play an important role in the transport, life cycle and removal of some chemicals from a given environmental system. Profiting from the ability of pine needles to act as biomonitors of atmospheric contaminants like heavy metals or polycyclic aromatic hydrocarbons (PAHs) their worldwide presence allows the set-up of local, regional and large-scale trans-boundary studies. The interest in studying PAHs relies on their natural and anthropogenic origin, their ubiquity in the environment and high toxicity at trace levels. Benzo[α]pyrene (BaP) was chosen in this case since it is the only PAH with air quality guidelines set by the European Commission.

The combination of field and model measurements is necessary to establish of strategies for the definition and validation of the spatial, temporal and chemical transport patterns of atmospheric contaminants, and carries important feedbacks for such fields as meteorology, atmospheric chemistry and even climate change.

The modelling system WRF+CHIMERE was implemented with high spatial and temporal resolution to the Mediterranean area, using BaP atmospheric levels estimated from concentrations in pine needles (*Pinus pinea*) assessed in 27 sampling sites in Portugal, Spain and Greece (9 per country in urban and non-urban areas). The gaps in the knowledge of the life cycles of SVOCs, particularly the partition processes between air and vegetation at a regional scale fuelled the motivation for this study. Model climatology of air levels and transport patterns of BaP and the estimated values in vegetation were validated with the concentrations in pine needles, comparing the tree countries and urban and non-urban sites in each country.