Emission Inventory for a Photochemical Modelling Exercise over the South-west of Spain

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The complex ozone chemistry, its interactions with the atmosphere and the effects on air quality can be advantageously explored using Chemical Transport Models (CTM). As well, CTM are useful tools for Air Quality Authorities trying to evaluate the adequacy of emission control strategies. As a part of the system, Emission Models are key components, providing tridimensional input emission data to the CTM, describing main features of current air pollution sources and/or those of possible alternative scenarios.

In this study, a high-resolution emission inventory has been developed in a region located in the south-western of the Iberian peninsula, the Huelva area, where is located one of the biggest industrial complexes in Spain. As a part of a more complete work, the meteorology and photochemical model results are presented in separated papers. Emission calculations have been performed to account for primary pollutants released from sources located in two different domains, the first covering the whole Iberian Peninsula, while the second focused over the Huelva region. Sources corresponding to the biggest domain have been estimated based on EMEP/CORINAIR emissions inventory. Simultaneously, a high-resolution emission inventory was developed specifically for the area of interest, including the estimation of biogenic, road-traffic and main industrial emissions. These emission sources were calculated with a 1-h temporal and 1 km2 horizontal resolution using a bottom-up approach for primary pollutants (NOx, NMVOCs, CO, SO2, NH3), and were built into a Geographical Information System (GIS).

The NMVOCs emission model from vegetation (isoprene, monoterpenes and other NMVOCs) uses the algorithm by Guenther et al. (1993), suited and adapted for describing the particular emitter behavior of some Spanish species. The on-road traffic emission model considered the hot and cold exhaust, and evaporative emissions, calculated from digital map of the highways, roads and main streets. Industrial emissions included the estimated emissions from area sources (cement factories, alimentary industries, etc.) as well as point sources (power stations).