

Modelling the fine and coarse fraction of heavy metals in high resolution Spanish domains

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Heavy metals are present in the atmosphere in particulate form. These particles, emitted by natural and anthropogenic sources, can cause damages in ecosystems and human health, via inhalation and ingestion. Size particle is an important factor to take into account since the fine fraction can be easily incorporated in organisms, affecting lungs and alveolus. Although metals are generally considered to be present in the fine fraction, some studies based on PM₁₀, PM_{2.5} and PM₁ measurements recorded in Spain (Fernández-Camacho *et al*, 2012; Querol *et al*, 2008) indicate the presence of some metals also in the coarse fraction, as it is the case of Cu and Zn. Monitoring heavy metals is important because they are legislated by European Directives 2008/50/CE and 2004/107/CE. These Directives sets an annual limit value of 500 ng/m³ for Pb, and annual target levels for As (6 ng/m³), Cd (5 ng/m³) and Ni (20 ng/m³). For the other metals (Cr, Cu, Zn and Se), no Directive regulating annual limit or target values is currently established.

Air quality modelling is an important tool for simulating air pollutants. The CHIMERE is a eulerian air quality model extensively used for different air quality management activities. Metals, such as Cd, Pb, As, Ni, Cu, Cr, Zn and Se, have been recently included in this model in a special version, developed by the CIEMAT modelling group. Some studies have been recently published, showing the model performance for these metals in Spain and Europe (Vivanco *et al*, 2011; González *et al*, 2012). In those studies all the metals were considered to be emitted in the fine fraction, and were treated as fine inert particles during all the processes. A new step in CHIMERE metal modelling has been given, taking into account a fine (<2.5 micrometres) and a coarse (2.5-10 micrometres) fraction. This preliminary version was applied to simulated two high-resolution domains, centered in conflictive areas in

Spain, with high levels of heavy metals pollution (Barcelona and Huelva). These areas were selected by taking into account one previous modelling study (Vivanco *et al*, 2011). Some results and the evaluation of the model performance will be presented

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