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Health Impacts of Air Quality Measures Across Sectors and Spatial Scales

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Abstract: Poor air quality and related health impacts are still an issue in cities and regions exceeding the guidelines set by the World Health Organisation. In order to reduce the impacts of air pollution, it is necessary to abate emissions of precursors through measures across sectors and spatial scales. The approach developed in this study aims at quantifying the variability of the health outcomes that can be obtained by applying emissions reductions with priority to specific sectors (e.g. transport) and/or in specific areas (e.g. in urban areas) in comparison to reductions applied per precursor at the national level. Emission reductions are evaluated in terms of the resulting PM_{2.5} concentrations (and related health impact) through the spatially flexible cell-to-cell source receptor relationships (SRR) integrated in the SHERPA tool - Screening for High Emission Reductions Potentials for Air quality (<http://aqm.jrc.ec.europa.eu/sherpa.aspx>). The application of a European directive is taken as a conceptual case study to show the variability of the impacts considering different implementation scenarios of emission reduction targets. Results show the importance of considering the areas and the sectors where emissions reductions are applied, taking into account the local specificities, in order to obtain the highest reduction in health risks and design the most effective pollution reduction strategies. The SRR used in this study can therefore be a useful support for national and local authorities to comply with national emissions reductions targets and, at the same time, address their local air quality issues.

Keywords: Air quality (AQ); Integrated assessment model; PM_{2.5} exposure; Source receptor relationships (SRR); Surrogate modelling;