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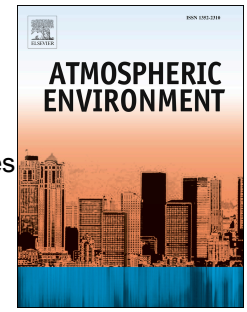

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A Comprehensive Approach for the Evaluation and Comparison of Emission Inventories in Madrid

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Abstract

Emission inventories provide a description of the polluting activities that occur across a specific geographic domain, and are widely used as input for air quality modelling for the assessment of compliance with environmental legislation. The spatial scale to which these inventories are referred has an influence in the representativeness of the emission estimates, as these are underpinned by a number of considerations and data with different levels of granularity. This study proposes a comprehensive framework for the evaluation of emission inventories that allows identifying methodological issues by examining differences in performance to a chemical transport model (CTM) when such inventories are used as input. To demonstrate the approach, a comparison between the national and regional emissions inventories for the Autonomous Community of Madrid (ACM) was carried out (NEI and REI respectively). The analysis revealed discrepancies in compilation methodologies for the domestic sector (SNAP 02), industrial combustion (SNAP 03), road traffic (SNAP 07) and other mobile sources (SNAP 08); most of the differences were originally caused by taking into account different activity variables, fuel mixes, and spatial disaggregation and allocation proxies. The granularity of the base data (statistics, fuel consumption, facilities, etc.) proved to be an essential limiting factor, which means that whenever bottom-up approaches were followed, the description of emission sectors tended to be more accurate.

Keywords: Air quality modelling; Urban emission inventory; Scale interaction; Harmonisation; Uncertainties; Madrid.