The HORUS model—inventory of atmospheric pollutant emissions from industrial combustion in Sao Paulo, Brazil

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Abstract

This paper explains a methodology for a low-cost air pollution emissions inventory, focusing on fuel combustion processes in industries and based on the identification and refinement of connections among existing databases. The first bottom-up approach allowed by the HORUS model is especially suitable for developing countries, where there are limited resources for air emission monitoring. It starts from adapting and connecting databases and statistics, providing a top-down inventory that establishes the boundaries for the bottom-up assessment. The latter is based on a proxy distribution of the numbers of employees in each industry for each sector. Some results are presented for the case of the State of Sao Paulo, Brazil, with three different fuels submitted to three main combustion processes, producing three pollutants under two scenarios (plus carbon dioxide). From a universe of 157,304 industries, the model covered 46,283 (up to 54% of total fuel consumption). With a high spatial and temporal resolution, the model is extremely flexible and transparent, an approach that can be adapted to other regions in the world. This is particularly important in developing countries, with energy intensive industries and severe episodes of urban air pollution. Further developments can refine the model, by substituting the calculated outputs by real scale measurements or by providing upgrades in the available statistical databases, demonstrating the value of such a tool for an integrated energy and environmental planning.
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