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Estimation of the Road Traffic Emissions and Dispersion in the Developing Countries Conditions

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Abstract : We present in this work our model of road traffic emissions (line sources) and dispersion of these emissions, named DISPOLSPEM (Dispersion of Poly Sources and Pollutants Emission Model). In its emission part, this model was designed to keep the consistent bottom-up and top-down approaches. It also allows to generate emission inventories from reduced input parameters being adapted to existing conditions in Morocco and in the other developing countries. While several simplifications are made, all the performance of the model results are kept. A further important advantage of the model is that it allows the uncertainty calculation and emission rate uncertainty according to each of the input parameters. In the dispersion part of the model, an improved line source model has been developed, implemented and tested against a reference solution. It provides improvement in accuracy over previous formulas of line source Gaussian plume model, without being too demanding in terms of computational resources. In the case study presented here, the biggest errors were associated with the ends of line source sections; these errors will be canceled by adjacent sections of line sources during the simulation of a road network. In cases where the wind is parallel to the source line, the use of the combination discretized source and analytical line source formulas minimizes remarkably the error. Because this combination is applied only for a small number of wind directions, it should not excessively increase the calculation time.

Keywords : air pollution, dispersion, emissions, line sources, road traffic, urban transport
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