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SHORT ABSTRACT

Abstract title: FUME 2.0 - Flexible Universal processor for Modeling Emissions

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Abstract text

Air quality chemistry transport models (CTMs) need different input data, where emissions are among the most important ones. The preparation of emissions may be a challenging task. The input files can have various formats, units, geometries, and resolutions, the emissions need to be spatially disaggregated to the model grid, some of the basic pollutants need to be chemically speciated and annual emission totals need to be split to hourly data. Some of this processing is very likely region- or country-specific, which complicates the task even more. This is why software for emission processing is useful and to cover this need we developed emission processor FUME. FUME facilitates air quality modeling from continental to regional and urban scales by enabling effective processing of diverse inventory datasets. It provides a customizable framework for emission preparation tailored to user needs. It is designed to work with heterogeneous emission inventory data, unify it into a common structure, and generate model-ready emissions for various CTMs. Key features include flexibility in input and output data formats, easy expandability and integration of external models (like biogenic emission model MEGAN). The workflow comprises data import, geographical transformation, chemical and temporal disaggregation, and output generation steps. Outputs for mesoscale CTMs CMAQ, CAMx, WRF-Chem, and large-eddy simulation model PALM are implemented along with a generic NetCDF format.