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Development of a New Spatial and Temporal resizing Tool of Natural and Anthropogenic Emissions for use in WRF/Chem Regional Modeling

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Atmospheric physical and chemical processes can be simulated with different degrees of complexity using global (CAM-Chem) and regional (WRF-Chem) chemical transport models. The proper representation of such processes strongly depends on the quality and temporal resolution of the initial and boundary conditions (IC/BC), as well as on the spatial resolution of the static fields used to represent the land/ocean – atmosphere interaction (e.g., emission sources). This work presents the development on a new spatial and temporal resizing tool of natural and anthropogenic emissions oriented to adapt the global emission inventories used in CAM-Chem to the technical requirements of the regional WRF/Chem model. The new resizing tool, which is based on the anthro_emiss NCAR pre-processor, allows to i) spatially interpolate and extrapolate any local or global emissions inventory to a given user-defined WRF/Chem domain (including nested domains); while at the same time it ii) imposes an hourly variation of the surface emission flux based on the superposition of the time-dependent Solar Zenith Angle (SZA) with high-resolution political maps (for anthropogenic sources) or geophysical land/ocean fields (for natural sources). Here we present results for the adaptation of two different emission inventories into a three-nested regional domain located in South America (with 36 x 36, 12 x 12 and 4 x 4 km2 spatial resolution, respectively): the global halogenated Very Short-Lived (VSLs) emissions inventory used in CAM-Chem (Ordoñez et al., 2012; with a spatial resolution of 100 x 250 km2 and a monthly seasonality); and a local vehicular emissions inventory of GHG for Argentina (Puliafito et al., 2015; which posses national annual means with a local resolution of 2.5 x 2.5 km2). Different diurnal profiles are analyzed for both natural and anthropogenic sources, assuring an identical total surface flux independently of the spatial resolution and temporal variation imposed to each source. The resizing tool is freely available upon request to the corresponding author.

Ordóñez, C., Lamarque, J.-F., Tilmes, S., Kinnison, D. E., Atlas, E. L., Blake, D. R., Sousa Santos, G., Brasseur, G. and Saiz-Lopez, A.: Bromine and iodine chemistry in a global chemistry-climate model: description and evaluation of very short-lived oceanic sources, Atmos. Chem. Phys., 12(3), 1423–1447, doi:10.5194/acp-12-1423-2012, 2012.

Puliafito, S. E., Allende, D. G., Pinto, S., Castesana, P.: High-Resolution Inventory of GHG Emissions of the Road Transport Sector in Argentina, Atmos. Environ., 101, 303-311, 2015.