North American Commercial Marine Vessel Emissions Inventory

North American Inventory Domain

We produced a set of emissions estimates conforming to a consensus domain and resolution appropriate for most of the atmospheric modeling that will use our North American ship emissions inventory. This consensus resulted from several meetings with the SECA team, combined domain extents provided by ARB and the U.S. EPA. Originally, we proposed conforming to the most resolved geographic grid size used by ICOADS, which is 0.1 x 0.1 degrees. However, finer resolutions became possible with the application of STEEM routing analyses, and atmospheric modelers requested a resolution as fine as 4 km x 4 km (16 km^2). The limitation on resolution for raster images was the computational time to resolve route segments into the final grid sizes.

Our inventory deliverables, therefore, required a projection that gridded cells in kilometers, and we delivered the North American inventory estimates for each pollutant with the following projection parameters from ESRI's ArcGIS software.

Projection: Equidistant_Cylindrical
Parameters:
  False_Easting: 0.0 – *default ESRI parameter*
  False_Northing: 0.0 – *default ESRI parameter*
  Central_Meridian: 180.0 degrees – *UD defined*
  Standard_Parallel_1: 0.0 – *default ESRI parameter*
Linear Unit: User_Defined_Unit (1000 m) – *UD defined*

Upon discussions with atmospheric modelers at Environment Canada and Levelton Engineering Ltd., we observed that the eastern extent of the inventory needed to be extended to include Nova Scotia and Newfoundland. We updated the inventory files for the following expanded domain:

left -1000 km, right 18000 km, top 8000 km, bottom 0 km.

File Naming Convention and Units

The name of annual data has three parts: NA (North America) + Name of Pollutants + Y (year) + 02 (year). The name of monthly data has four parts: NA (North America) + Name of Pollutants + 02 (year) + M (month) + month. Files are submitted in both GIS raster and ASCII formats.

Annual gridded inventories for the following pollutants: Sulfur (SOx as SO_2), Nitrogen (NOx), Carbon dioxide (CO_2), Particulate Matter (PM), Hydrocarbons (HC), and Carbon monoxide (CO). Monthly gridded inventories for each pollutant. Units are kg per 4 km x 4 km (16 km^2).

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