

Development of a GIS-based Area Source Emission Inventory in the Paso del Norte Air Quality Basin.

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Abstract

Area source emissions in the El Paso/Ciudad Juarez (PdN) air quality basin are estimated as countywide or region-wide totals. Previously, the totals were spatially allocated into smaller gridded cells for use in air quality modeling by redistributing the totals according to proportional factors developed from surrogate information. This paper presents a procedure, which simplifies the redistributing process and increases the spatial resolution of the allocated area source emissions, using geographic information systems (GIS).

The 1996 CO, NO_x, and VOCs emission inventory of the PdN region was used in this study. GIS was used to spatially allocate area source emissions into U.S. census tracts for El Paso and Mexican AGEBS for Ciudad Juarez, which contain geographically accurate information on population and human activities. Demographic and land use information was used to categorize the region into six areas by emission activity. The six major emission activity areas in the PdN air quality basin are: commerce, residence, country, mountain, military, and industry. Three of these six categories were selected to match with the definitions of emission activities in the Area and Mobile Source (AMS) codes (commerce, residential, industrial). Area source emissions were estimated using the U.S. Environmental Protection Agency's National Emissions Trends database. Specific emissions were identified and further categorized into the remaining three activity area categories. This resulted in individual emission estimates for each AMS code category. Emission estimates for each activity were grouped and distributed through their corresponding activity areas. The distribution was made using an activity factor defined for each activity area. Finally, the allocated emissions were transposed to an overlaid grid by spatial proportionality.

Our GIS-based redistributed area source emissions were compared favorably to that used in previous CAMx ozone modeling. Application of the redistributed area source emissions in air quality model is expected to yield more reliable ozone predictions in the PdN air quality basin.

