



Project Summary

Historic Emissions of Volatile Organic Compounds in the United States from 1900 to 1985

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This report presents an estimate of historic emissions of volatile organic compounds (VOCs) for each state (and the District of Columbia) of the contiguous U.S. Annual emissions were estimated on the national level from 1900 to 1985. For 1940, 1950, and every fifth year from 1960 to 1985, the national estimates of the U.S. EPA were used. For the other years, national emissions were estimated from national activity data and estimated emission factors for individual source categories. Major source categories include transportation, external combustion, industrial processes, solid waste disposal, and miscellaneous others. State level emissions were estimated by applying allocation factors to the national emission estimates. The emissions from all source categories were aggregated to show the emission trend by state and Federal region and for the U.S. Seasonal emissions were estimated for each year. The uncertainty of the emission estimates was calculated based on the methodology developed previously by NAPAP. The data presented in Appendix B are available in Lotus 123 format on floppy disks.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

The National Acid Precipitation Assessment Program's (NAPAP's) Task Group on Emissions and Controls is responsible for compiling historic emissions estimates of acid deposition precursors. While SO₂ and NO_x have long been considered primary precursors of acid precipitation, research is showing that volatile organic compounds (VOCs) are also an important constituent in many atmospheric chemical reactions. The historic trend of VOC emissions is important to understanding the role of VOCs and other pollutants in the development of observed environmental damage. The historic trend is considered essential to putting current emissions in a long term perspective and studying rates of change.

This report presents annual estimates of emissions of VOCs for each of the contiguous 48 states and the District of Columbia. Emissions were estimated using a detailed methodology for every fifth year from 1900 to 1985. The total VOC emissions of all states are identical to the national emissions reported by the U.S. EPA for common years in the period from 1940 to 1985. Annual emissions were estimated by apportioning the national estimates for every fifth year according to yearly activity indicators representing the major source categories.

Major Sources

For each state, VOC emissions were estimated for five major source categories: transportation, external fuel combustion, industrial processes, solid

waste disposal, and miscellaneous others. Emissions were calculated by aggregating those estimated for smaller categories comprising each major category. These subcategories represent sources for which emission factors and activity indicators could be obtained directly from the U.S. EPA national trends estimates. Collectively, these source categories are considered to account for all anthropogenic emissions.

Conclusions

The trend in VOC emissions from 1900 to 1985 is presented in Figure 1. A peak, evident around 1930, is due to the occurrence of wildfires at that time. Emissions grew until the early 1970s, when emission controls were implemented for automobiles and industrial processes.

Figure 2 illustrates the shifting contributions of source categories over time. In early years, combustion sources (primarily wood) contributed most of the VOC emissions. Since about 1940, the transportation sector has dominated other VOC emission categories. Emissions from industrial sources have also risen considerably since 1940.

A seasonal analysis of the historic VOC data indicates that emissions in the early 1900s occurred primarily in the fall and winter, due to fuel combustion for home heating. The seasonal emissions in recent years are more evenly distributed.

The application of the NAPAP uncertainty methodology, in this example, suggests an uncertainty of 28% for 1985, increasing to over 500% for 1900. The increase is due to the generally poorer quality of the activity and emission factor data available for early years.

State-level activity and emissions data by source category are available in Appendix B to the report and in Lotus 123 format on floppy disks.

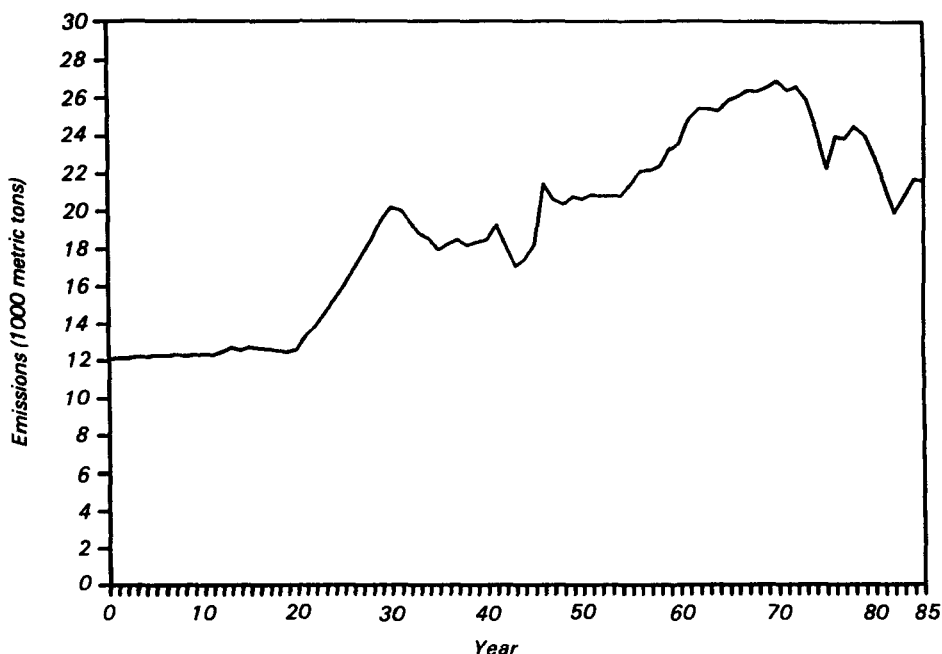


Figure 1. Total VOC emissions trend for the U.S. from 1900 to 1985.

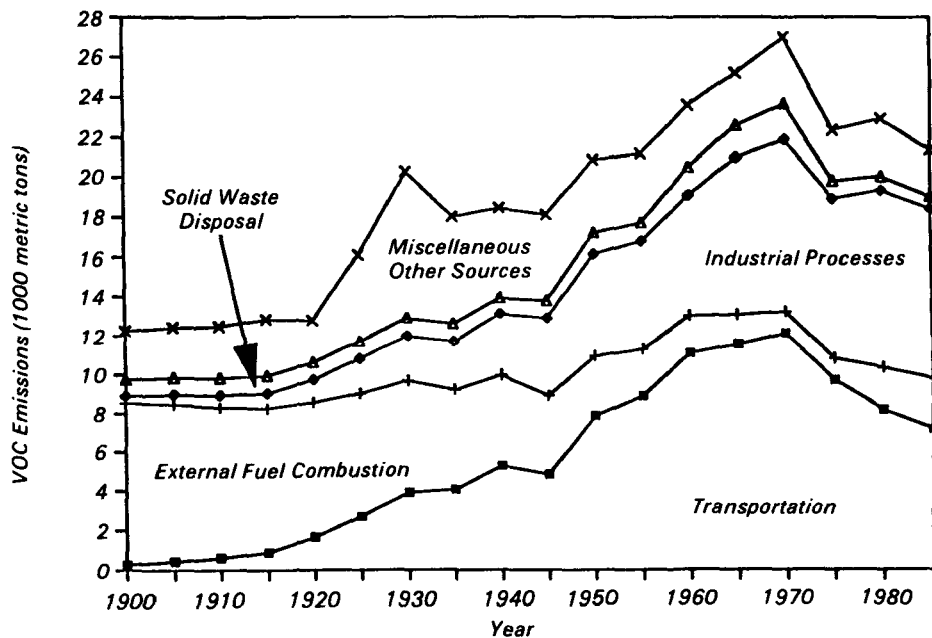


Figure 2. Overall trend in VOC emissions by source category.

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The complete report consists of paper copy and diskettes, entitled "Historic
Emissions of Volatile Organic Compounds in the United States from 1900
to 1985,"

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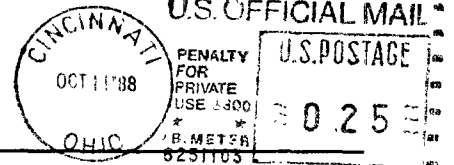
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