

3. CMAQ Features

Features of CMAQ for Application Users

The CMAQ modeling system provides a variety of important features to users who are interested in applying the model for investigating scientific research questions or for regulatory applications such as preparation of State Implementation Plans (SIPs).

- CMAQ is designed to address the complex interactions among multiple air quality issues simultaneously. Using a one-atmosphere approach to air quality modeling by applying multiscale and multipollutant modeling techniques, CMAQ can provide independent but dynamically consistent predictions of several different pollutants at varying spatial scales.
- The modularity of the CMAQ design provides flexibility in air quality model configuration for optimizing model performance for different applications and spatial resolutions.
- Close interactions among the development communities for CMAQ and for the meteorology and emissions models provide for a tight integration of the three main components of the air quality modeling system.
- Serial and multiprocessor execution options allow the application user to optimize the performance of CMAQ on various computer platforms.

- Community development expedites the expansion of CMAQ's capabilities through the pursuit of multiple research agendas by a variety of research groups. Application users thus avoid the limitations inherent in having to rely on a single, centralized development group.
- A comprehensive training program is available through the Community Modeling and Analysis System (CMAS) Center [website](#). The CMAS Center is a [support resource](#) for users of CMAQ and other modeling systems.
- Members of the large, international community of users connected through the CMAS Center help each other by sharing data and experiences and providing technical support.

Features of CMAQ for Air Quality Model Developers

Designed under a community-modeling paradigm, CMAQ is distributed as open-source software engineered with a modular code design to facilitate decentralized development. Built around a layered [I/O API](#) and [netCDF](#) code framework, CMAQ provides a flexible platform for testing new science algorithms, chemistry representations, and optimization techniques. CMAQ provides the following features to scientists interested in developing new algorithms or adding science to the model:

- All CMAQ source code is available through [GitHub](#).
- Developed and distributed following open-source software conventions, CMAQ source code is easily accessible and free to obtain.
- Designed for modularity, CCTM uses standardized input/output (I/O) routines to facilitate extensibility.

- The diverse and continually growing community of CMAQ developers provides an excellent forum for discussing development-related topics of all kinds.

New Features in CMAQ and MCIP

Each release version of CMAQ contains new features and improvements over the previous release of the model. Details of the new features in each release are available as release notes is provided below. Technical details about these features are contained in the [CMAQ Wiki](#). The following links provide details about the new features added to CMAQ since version 5.0.

New Features by CMAQ version

[Version 5.2](#)

[Version 5.1](#)

[Version 5.0.2](#)

[Version 5.0.1](#)

[Version 5.0](#)

New Features by MCIP version

[Version 4.3](#)

[Version 4.2](#)

[Version 4.1](#)

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