

Gas-Phase Chemistry

Gas-phase chemistry is described in detail in the CAM6 Scientific guide https://ncar.github.io/CAM/doc/build/html/cam6_scientific_guide/extensions.html#chemistry.

All CAM-Chem compsets default to the TS1 chemical mechanism, which includes all chemistry relevant to the troposphere and stratosphere. All WACCM compsets default to TSMLT1 chemical mechanism, which includes all chemistry relevant to the troposphere, stratosphere, mesosphere, and lower thermosphere. The TS1 and TSMLT1 chemical mechanisms are described in Emmons et al., 2018 (in preparation). Both are updated versions of the MOZART-4 chemistry described in Emmons et al., 2010. These updates include speciated aromatics, updated isoprene and terpenes oxidation, new organic nitrates, and updated JPL rate constants (Evaluation No. 18, 2015).

Current gas-phase chemical mechanism development:

Tagged NO_x scheme (Louisa Emmons, NCAR)

A tagged NO_x scheme is under development, which will be useful for tracking NO_x emissions in CAM-chem. This scheme will allow the user to tag NO_x emissions from certain sectors or regions. The tagged NO_x will be chemically processed in the same manner as untagged NO_x and the O₃ production from the tagged NO_x will be tracked.

Improved isoprene and terpene oxidation (Rebecca Schwantes, NCAR)

The isoprene chemical mechanism is being updated to include the most recent advances in our theoretical/experimental understanding of isoprene OH, NO₃, and O₃ oxidation (e.g., Wennberg et al. 2018). The terpene (monoterpenes and sesquiterpenes) chemistry is being expanded to include 5 surrogate species (APIN, BPIN, LIMON, MYRC, and BCARY) rather than 2 (MTERP and BCARY) with terpenes grouped according to their chemical structure and oxidation products. These terpene chemistry updates are based on the most recent theoretical/experimental understanding of terpene OH, NO₃, and O₃ oxidation.

Speciated alkane oxidation (Rebecca Schwantes, NCAR)

The alkane chemical mechanism is expanded from one surrogate species (BIGALK) to 5 surrogate species (NBUTANE, ISOBUTANE, NPENTANE, IPENTANE, and C6ALKANES).

If you are working on updating certain aspects of the gas-phase chemistry in CAM-Chem, please complete the form on [Users and Projects](#) page. We will add your project to this list, and ensure your updates are contributed back to the main code.