



Nonlinearities in the gas phase chemistry of simplified VOC-NO_x-HO_x-Ox mechanisms

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It is well known that simplified chemical mechanism of the tropospheric chemistry can lead to nonlinearities causing oscillations in the chemical concentrations on different time scales. Whereas Stewart (1995) investigates oscillations on a time scale of decades the mechanism by Poppe and Lustfeld (1996) shows oscillations in the order of months. Both publications discuss the influence of NO and CO emissions on the length of a period.

In this study, we use the CAABA/MECCA box model (Sander et al., 2011) to investigate the impact of the photolysis rates on the oscillations and discuss the differences between the mechanisms used by Stewart (1995) and Poppe and Lustfeld (1996), respectively.

In addition, the global atmospheric chemistry model ICON-ART with its coupling to MECCA (Schröter et al., 2018) is used in simplified simulations to investigate whether such oscillations can occur in a realistic 3-D meteorological environment.

References:

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