2.100 Chemical Mechanisms in the Forest Canopy: Understanding the HOx-NOx-BVOC Triad.

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Abstract:

The emissions of biogenic volatile organic compounds (BVOC) are known to exert significant control on tropospheric composition and the oxidation capacity of the atmosphere through (1) the formation of ozone in the presence of reactive nitrogen oxides (NO_x = NO + NO_2) and sunlight, (2) the formation of secondary organic aerosols (SOA) through the transformation of its oxidation products, and (3) the regulation of hydrogen oxide radicals (HO_x = OH + HO_2). Recently, new pathways of BVOC oxidation have been identified in low-NO_x regions that rectify discrepancies between observations and BVOC-NO_x-HO_x chemistry in regional and global transport models. However, these mechanisms do not show consistent improvement across a range of NO_x concentrations. Here, we discuss the use of different chemical mechanisms within the forest canopy to understand atmospheric chemistry across a range of HOx-NOx-BVOC concentrations. We highlight how different types of forest canopies under a range of anthropogenic influence behave in the HOx-NOx-BVOC triad, with the goal of elucidating how lumped chemical mechanisms can be improved to simulate this full parameter space.