Biogenic VOC emissions modeling: Implications for aerosol formation

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Biosphere-atmosphere interactions are known to influence the atmosphere via chemistry and climate. In particular, naturally emitted chemical compounds from the biosphere can influence gas and particle phase chemistry in the atmosphere. One class of naturally emitted species, biogenic volatile organic compounds (VOC), is emitted by vegetation and plays an important role in the troposphere. In regions of sufficient NOx, VOC emissions can undergo photochemical reactions and form tropospheric ozone, which can have an impact on human and ecosystem health. Additionally, these emissions can form secondary organic aerosol (SOA) in the atmosphere, affecting the incoming solar radiation, regional visibility and human health. Methods for estimating biogenic emissions in the context of chemistry and climate modeling will be detailed, with a specific focus on integrating the Model of Emissions of Gases and Aerosols from Nature (MEGAN; Guenther et al., 2006) into the CLM land surface model. Methods to estimate the SOA formation potential of these emissions on the regional scale will also be discussed.