



Model simulation of global terrestrial isoprene and monoterpenes emissions in 1700 – 2000

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Emissions of volatile organic compounds (VOC) from vegetation are considered to be a major source of secondary organic aerosol (SOA), which can act as cloud condensation nuclei and impact on radiation balance. Trees and shrubs have been replaced with crop lands worldwide over the past centuries. The land use changes may influence VOC emissions and the subsequent production of SOA. We estimated temporal and spatial distributions of isoprene and monoterpenes emissions, which are the largest amounts of VOC emissions, with numerical simulations, to clarify the impact of land use changes on these emissions. Here, we used historical changes in land cover, solar radiation, and air temperature in 1700 – 2000 for the estimation. Both solar radiation and air temperature were reconstructed by an atmosphere-ocean general circulation model (AGCM). The land use changes from trees and shrubs into cropland reduced the emissions, and global warming increased them within the simulation. The spatial distributions of these emissions were largely influenced by spatial pattern of global warming as well as land use changes.