

Improving ozone simulation and understanding its adverse effects in India

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In India, large anthropogenic emissions and relatively high solar intensity provide the most favorable conditions for the formation of ozone (O₃), which has significant adverse effects to human health and ecosystems. However, there are very limited sites with O₃, and assessments of O₃ effects are hindered. This study aims to simulate regional O₃ concentrations in India from 2012 to 2015 using the Community Multi-scale Air Quality (CMAQ) model at the resolution of 36 × 36 km². The meteorological fields are generated by the Weather Research and Forecasting (WRF) model. The anthropogenic emissions are generated from Emissions Database for Global Atmospheric Research (EDGAR) and the MIX Asian emission inventory. Emissions are adjusted to simulation years with different adjustment coefficients for different sectors and states. Biogenic and wildfire emissions are also provided to CMAQ. After the model results are validation, the levels, health and ecosystem effects are analyzed. The study reveals the importance of controlling O₃ in India and indicates more studies are needed for designing effective control strategies.

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