

## Simulated impacts of agricultural residue burning on autumn air quality in northwestern India

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Japan Meteorological Agency's regional meteorology-chemistry model (NHM-Chem) was used to simulate the impacts of agricultural residue burning on air quality, such as CO, O<sub>3</sub>, and PM<sub>2.5</sub> in northwestern India. The study period is in October and November of 2019, when the surface PM<sub>2.5</sub> concentration in Delhi reached almost 1000 micrograms per cubic meter. During the period, rice residues were burned intensively mainly in Punjab state, located upwind (northwest) of Delhi. The rice residue burning probably affected air quality in Delhi, but anthropogenic emissions in Delhi should also affect air quality. Simulation using satellite-derived daily fire emissions failed to reproduce the significant enhancement of PM<sub>2.5</sub> concentration observed in November 2 and 3. It is probably because due to the presence of cloud or smoke, fire emission was significantly underestimated by satellites. Accurate estimation of the impacts of rice residue burning on air quality requires development of bottom-up fire emission inventory to validate the satellite-derived emissions and additional installation of intensive monitoring network of surface air pollutants concentrations to validate the simulated spatio-temporal distributions.

Keywords: Air quality modeling, Ground based observation, Source term uncertainty