

# Estimation of fire radiative power for crop residue burning regions in northern India using India's geostationary satellite INSAT-3DS

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This study presents the retrieval of the key fire variable, fire radiative power (FRP), from crop residue burning (CRB) by coupling observations from India's new geostationary satellite INSAT-3DS with rigorous radiative transfer simulations in the transboundary Punjab region of northern India, a major location of CRB situated in the Indo-Gangetic Plain. Unlike polar-orbiting satellite, which typically provides one or two observations at a location per day and therefore fail to capture the full temporal evolution of CRB events, we utilised geostationary observations to overcome the temporal constraints of polar-orbiting satellites, for the detection of these combustion events and the retrieval of FRP from the observations in the midwave-infrared spectral band. The retrieved FRP data offer crucial insights into biomass consumption rates and fire intensity, supporting policymakers and environmental agencies in developing more effective strategies for air quality management and mitigation of illegal agricultural burning.

**Keywords:** Air quality, biomass combustion, crop residue burning, fire radiative power, INSAT-3DS.