

Rabi-crop CO₂ uptake inferred from CONTRAIL measurements over Delhi, India

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Recent studies propose that growing agriculture has altered atmospheric CO₂ variations and the global carbon cycle. In this study, we show a clear evidence of significant impact of Indian wintertime (*rabi*) agriculture (mainly wheat) on the regional carbon budget based on high-frequency atmospheric CO₂ measurements onboard commercial airliners over Delhi, India. While a general increasing gradient toward the ground was observed throughout December–April, we have frequently observed sharp decreases near the ground during January–March. In this period, CO₂ concentration at altitudes below 2 km was at seasonal stagnation. Meteorology in the season infers influence from neighboring croplands with patchy urban areas located upwind. We conclude that the observed CO₂ decrease is attributable to active uptake by *rabi*-crop growing in the season and that the uptake is comparable in magnitude to urban CO₂ emissions from the Delhi metropolitan area.

Keywords: CO₂, *rabi* crop, aircraft measurements