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Poster
Top-down estimates of CO2 emissions over China, the biggest contributor to global emissions, by global or regional inverse model show large differences from the known bottom-up inventories. Limited observation coverage either by surface networks or satellites due to filtering for cloud conditions are a limiting factor for such top-down estimates. Here, we investigate the CO2 emissions over China using a global inverse model simulating tracer transport at 0.05° resolution that can optimize terrestrial biosphere, ocean-atmosphere exchanges as well as fossil fuel fluxes separately. The model utilizes the observations from regional and global background surface networks along with the GOSAT XCO2 data (NIES V03.05) for the period 2010-2019. A detailed analysis of the regional fossil fuel fluxes was carried out to estimate emissions at a regional scale over China. The 10-year inversion gives higher fossil flux corrections over eastern China during the winter season than the other seasons. As the major contributions of the country's fossil emissions are from eastern provinces, the CO2 enhancements as anomalies from large point sources from surrounding background are also analyzed. The observed enhancements and the modeled enhancements were found to be correlated. The observed enhancements were higher than the prior enhancements which suggested the bottom-up inventory to be potentially underestimated over China. Our optimized enhancements are also higher than the prior enhancements indicating that the model captures the fossil fuel emission signals from the provinces of eastern China better, with the inclusion of regional observations.
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