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The Amazon rainforest in Brazil experiences an annual burning season in August-September during the dry season, including the city of Manaus located in central Brazil. After the launches of OCO-2 and OCO-3, the density of space-based observations of biomass burning events has increased, though these observations can be influenced by smoke, pyrocumulous, or other atmospheric phenomena the instrument sensors cannot penetrate. Such spatial coverage gaps can lead to bias when calculating climatological averages. We quantify the sampling biases of XCO2 satellite measurements by examining in-situ observations during the seasonal fire events from 2014-2020. We use observations of CO from Atmospheric Infrared Sounder (AIRS) on NASA's Aqua satellite as a tracer for biomass burning and utilize regional CO2 aircraft profile datasets from NOAA ObsPack and Gatti et al. (2021). We quantify the impact of the selection effects on XCO2 observations in the vicinity of large fires by separating the data into polluted (high CO [dry-air ppbv]) and clean (low CO [dry-air ppbv]) regions, using AIRS measurements. Finally, we compare our sampling bias estimates with gap-filled and assimilated XCO2 Level 3 NASA GMAO and JPL datasets.
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