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Methane is a powerful greenhouse gas with significantly greater global warming potential but much shorter atmospheric lifetime than carbon dioxide. Rapid reduction of methane emissions can therefore quickly slow the rate of global warming. Oil and natural gas activities have been found to be the largest industrial sources of methane in the U.S. The outbreak of COVID have resulted in significant reductions in economic activities including oil and gas industry, providing an unprecedented opportunity to assess changes in methane emissions from oil and gas activities and subsequent impacts on atmospheric methane concentrations. The Fuel-based Oil and Gas (FOG) inventory has been developed previously to estimate oil and gas emissions in the US for nitrogen oxides, methane, and non-methane volatile organic compounds. In this work, the FOG inventory is updated to account for the COVID impacts on the oil and gas operations based on the Enverus DrillingInfo and other publicly available energy datasets. We evaluate COVID-induced US oil and gas emission changes for methane in the Weather Research and Forecasting model coupled with Chemistry (WRF-Chem) along with satellite observations from TROPOspheric Monitoring Instrument (TROPOMI) on board the Copernicus Sentinel-5 Precursor (S5P) satellite and Thermal And Near infrared Sensor for carbon Observations - Fourier Transform Spectrometer (TANSO-FTS) on board the Greenhouse Gases Observing Satellite (GOSAT). Preliminary results suggest there is about 17?9% decrease in the US methane emissions from oil and gas activities in 2020 compared to 2019, with an average of decrease by 26% during the lockdown period. This leads to about 0-10 ppb decrease in column averaged methane concentrations across different oil and gas basins. Our results will provide insights into the potential climate benefits of future emission control strategies on methane.
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