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Quantifying Methane Emissions from Super-emitter Coal Mines using TROPOMI Observations

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In the context of the Paris Agreement goal of limiting global warming to below 2 degrees Celsius, the Representative Concentration Pathways (RCP) 2.6 of the Intergovernmental Panel on Climate Change (IPCC) have framed greenhouse gas emission scenarios emphasizing a sharp reduction in methane (CH_4) emissions with the current increasing trend. Recent studies have shown that satellite observations of atmospheric methane can be used to detect and quantify localized methane sources on a facility-level for the oil and gas industry. We use satellite observations from TROPOMI to understand the high and persistent methane signals from ventilation shafts in the coal mining industry. Even the bottom-up and top-down global estimates infer coal mine methane responsible for ~12% of the anthropogenic methane emissions. TROPOMI onboard Sentinel-5P has a ground pixel resolution of 5 × 7 km^2 at nadir, which allows detection of large local to point sources. With its daily global coverage, we identify high methane emission sources over coal mine regions in Australia during 2018 and 2019 and quantify methane emissions using the fast data-driven cross-sectional flux method. Our initial results show that TROPOMI estimates are higher than bottom-up global emission inventories. We will present emission estimates using satellite-based quantification for super-emitter coal mines and evaluate its implication on national greenhouse gas reporting.