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Satellite-based characterization of methane point sources in the Permian Basin

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The Permian Basin is known for its extensive oil and gas production, which has increased rapidly in recent years becoming the largest producing basin in the United States. It is also responsible for almost half of the methane emissions from all oil and gas producing regions in the country. Given the urgent need to reduce greenhouse gas emissions, it is crucial to identify and characterize the point sources of emissions. To this end, we have combined three new high-resolution hyperspectral sensors data onboard the GF-5, ZY1 and PRIMA satellites to create the first regional study to identify methane sources and measure the emitted quantities from each source. With data collected over several days in 2019 and 2020, we have identified a total of 37 point source emissions with flux rates >500kg/h, that is, a high concentration of extreme emission point sources that account for nearly 40% of the Permian annual emissions. Also, we have found that new infrastructure (post-2018) is responsible for almost 60% of the detected emissions, in many cases (21% of the cases) due to inefficient use of flaring of the gas that they cannot store. With this study, we demonstrate that hyperspectral satellite data are a powerful tool for the detection and quantification of strong methane point emissions.

