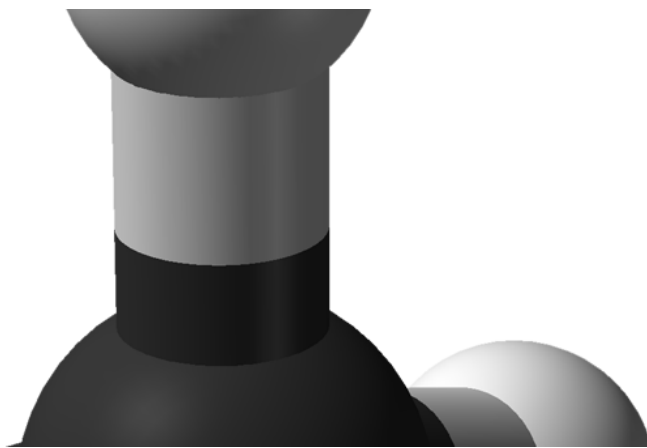


Satellite images reveal where large amounts of methane are being released in Permian Basin

July 1 2021, by Bob Yirka



Ball and stick model of methane. Credit: Ben Mills/Public Domain

An international team of researchers has found a way to isolate individual methane contributors in the Permian Basin. In their paper published in the journal *Science Advances*, the group describes using satellite images to isolate sites that are releasing large amounts of methane into the atmosphere in the Permian Basin.

The Permian Basin is a large sedimentary [basin](#) situated in the southwest United States. It includes parts of Texas and New Mexico, and has become a major source of shale oil and [natural gas extraction](#). Prior

research has shown that as part of shale oil and natural gas extraction, gases are released into the atmosphere. To prevent these releases, most extraction operations burn the gas as it is released. But, as the researchers with this new effort have found, these operations in the Permian Basin are missing a lot of the [methane emissions](#), which are winding up in the atmosphere as a greenhouse gas. Prior research has suggested that as much as 20% of all methane emissions in the U.S. come from the Permian Basin.

Prior efforts to measure and monitor gas emissions at individual shale oil and natural gas extraction and processing sites have involved the use of ground-based sensors. But these efforts have met with limited success due to the size of the areas being studied. In this new effort, the researchers turned to satellites equipped with hyperspectral capabilities, which image bands of the electromagnetic spectrum. Analysis of imagery from these sources allowed for measuring the amounts of gases emitted from relatively small sources on the ground.

In studying the imagery from China's Gaofen-5 and ZY1 satellites and Italy's PRISMA mission, the researchers were able to isolate individual sources of methane emissions in the Permian Basin. They pinpointed 37 methane plumes from individual sources that had emissions higher than 500 kilograms per hour. They estimate that the sources they found contribute between 31 and 53% of all emissions in the parts of the basin they studied. They also suggest that current methods to prevent methane emissions in the shale oil and natural gas extraction industry in the Permian Basin are not sufficient—the actual emissions represent a major contributor to global warming.

More information: Itziar Irakulis-Loitxate et al, Satellite-based survey of extreme methane emissions in the Permian basin, *Science Advances* (2021). [DOI: 10.1126/sciadv.abf4507](https://doi.org/10.1126/sciadv.abf4507)

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Citation: Satellite images reveal where large amounts of methane are being released in Permian Basin (2021, July 1) retrieved 22 June 2024 from <https://phys.org/news/2021-07-satellite-images-reveal-large-amounts.html>

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