California’s methane super-emitters

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Methane is a much more potent greenhouse gas than carbon dioxide, trapping much more heat. Point-source methane emitters are typically small—usually less than 10 meters in diameter—but they emit plumes of highly concentrated methane. So if we want to reduce the amount of methane we’re spouting into the air (which we obviously should, although we’re not), they’d be great potential targets. If only we could identify them.

To map such point emissions, scientists in California flew over the state with an airborne imaging spectrometer, using it to measure methane emissions. They focused on a long list of potential sources: oil and gas production, processing, transmission, storage, and distribution equipment; refineries; dairy-manure management sites; landfills and composting facilities; wastewater-treatment plants; gas-fired power plants; and liquified and compressed natural gas facilities.

Most facilities, especially the dairies and the oil fields, were in the San Joaquin Valley. The researchers ended up measuring emissions from 564 distinct sources at 250 different facilities. These point emitters had not really been examined before, because they often only belch out their methane intermittently or in a somewhat sporadic manner. To catch them

in the act, the researchers repeated the flyovers five times between August 2016 and October 2018.

They conclude that roughly 40% of California's methane emissions come from these point-source emitters rather than larger, more diffuse sources, like rice fields. Over half of point-source emissions come from only 10% of the sites.

Landfills were the worst, followed by dairies and the oil and gas sector. A previous analysis that used atmospheric measurements rather than airborne imaging spectrometry reversed the relative contributions of landfills and dairies, leading the authors of this more recent work to suggest that other emission sectors may have also been improperly estimated in that earlier assessment. The authors also highlight that, perhaps not shockingly, "Large discrepancies are observed between many of the self-reported emissions from participating facilities and [this airborne imaging study] and independent airborne estimates."

The good news is that when the scientists simply told the facilities operators that they possessed methane super-emitters, they were often able to reduce the emissions. Four such cases were due to leaking liquefied natural gas storage tanks; this study found the leaks and told the operators, who then repaired them. Further flyovers confirmed that the repairs halted the emissions. This constant monitoring of both point emitters and more widely distributed low-level emitters could definitely help mitigate methane emissions. As could feeding seaweed to cows.

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