

# Continuous geostationary observation of methane super-emitters

Watine-Guiu, M., D.J. Varon, I. Irakulis-Loitxate, N. Balasus, and D.J. Jacob,  
Geostationary satellite observations of extreme and transient methane emissions from oil and gas infrastructure,  
PNAS, 120 (52) e2310797120, <https://doi.org/10.1073/pnas.2310797120>, 2023.



## Science Question

Low-Earth orbit satellite instruments observe large methane point sources from super-emitting oil/gas facilities but cannot determine their persistence and often have difficulty with attribution.

## Analysis

We showed that GOES-R SWIR channels can be used to detect large methane point sources and track the plumes.

## Results

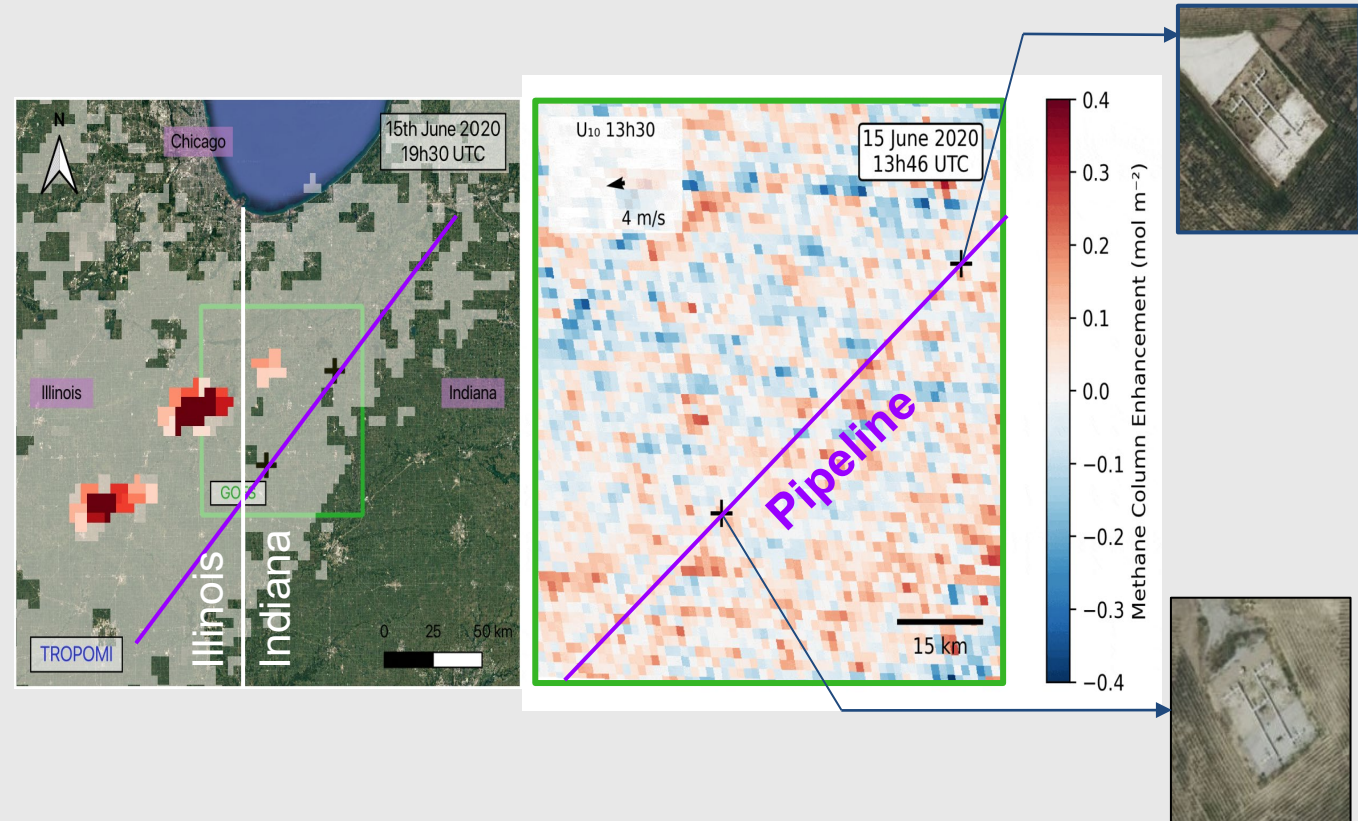
Super-emitters are highly transient and often instantaneous (puffs), indicating deliberate venting rather than equipment failure.

## Significance

Attribution and quantification of methane point sources from LEO can be ambiguous. Continuous monitoring of super-emitters from geostationary orbit would powerfully enable climate action. A slight shift in SWIR bands would make GOES much more effective for this.

## Acknowledgements

This research was supported by the NASA Carbon Monitoring System (ROSES2020) under NASA Award number 80NSSC21K1057.



**Methane emissions from an Indiana pipeline observed by GOES-R (right). The emissions are synchronized puff releases from pipeline blocking valves (pictures). TROPOMI (left) observes the plumes five hours downwind over agricultural land.**