Multi-satellite imaging of a gas well blowout provides new insights for methane monitoring

- A blowout was recorded in the Eagle Ford Shale in November 2019.
- During the 20 day event, we quantified CH4 emissions 10 times using different satellites.
- We were able to capture emission dynamics of this event.
- PRISMA satellite allows for high resolution CH4 and CO2 plume mapping, allowing for combustion efficiency estimation.

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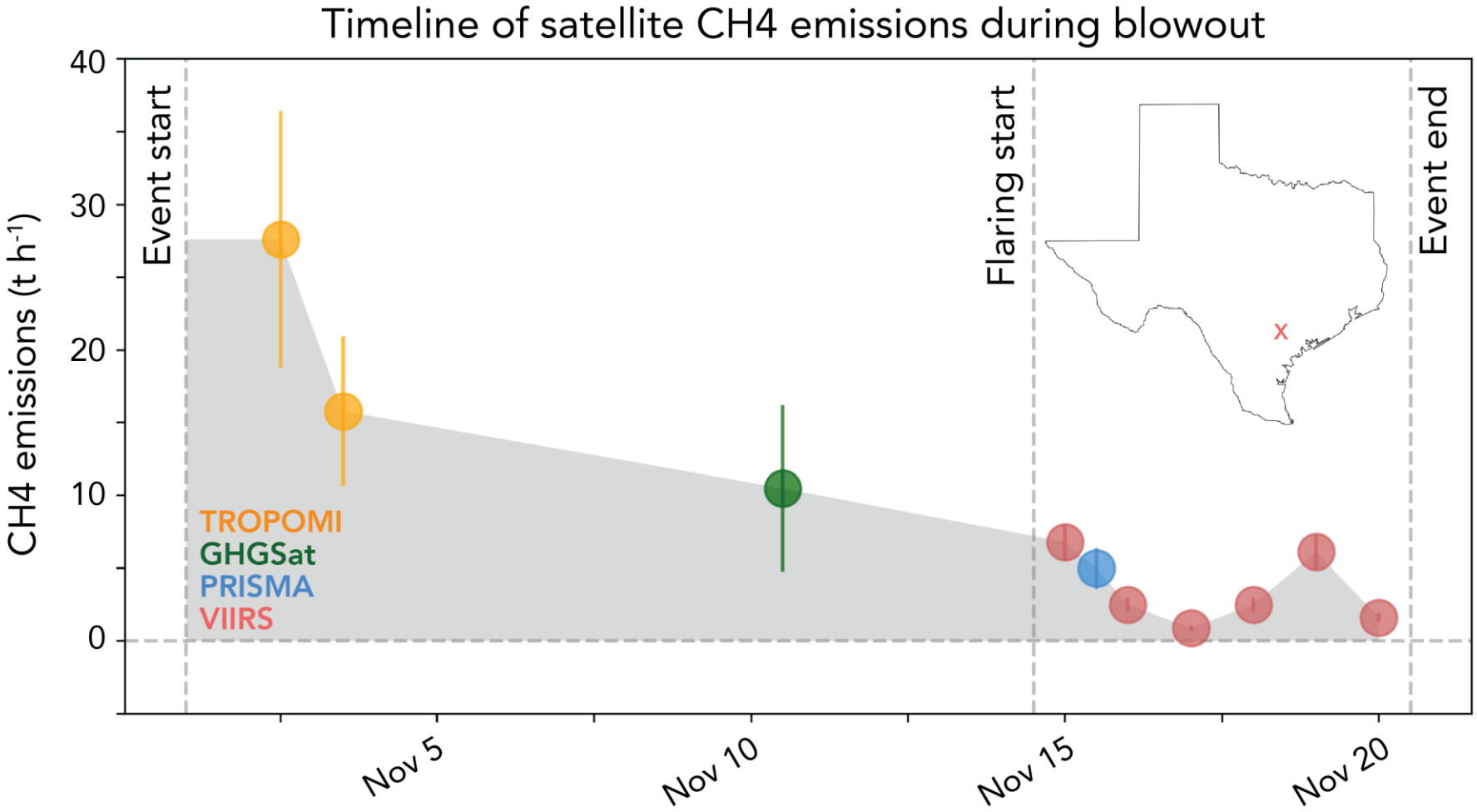
Quantification with multiple satellite instruments allows for better understanding of emission dynamics and total methane accounting.

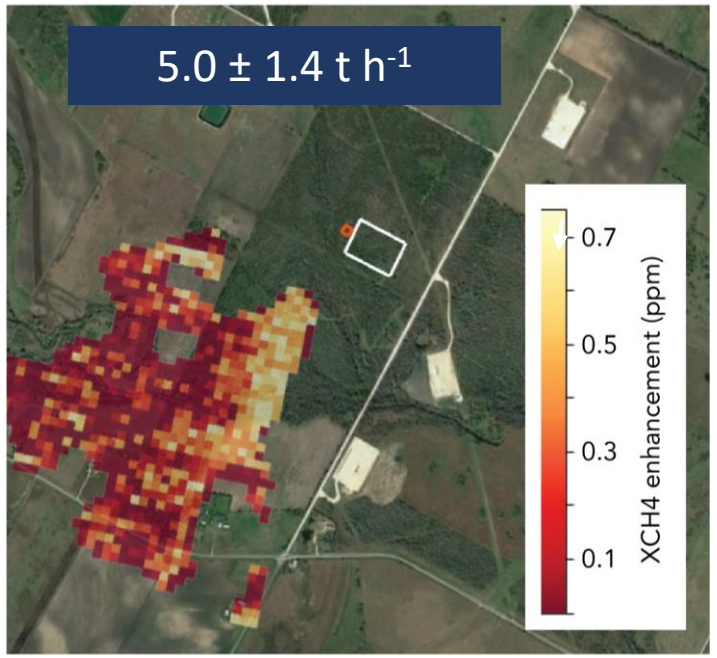


Total of 4830 ± 980 metric tons of CH4 lost to atmosphere during event.
Emission estimate validated with bottom-up modeling and *in situ* VOC measurements.

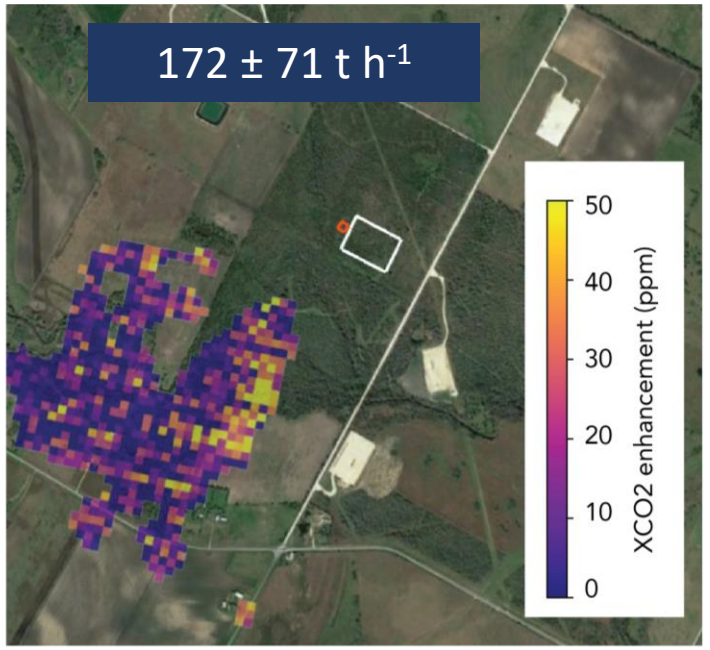
PRISMA can resolve both CH4 and CO2 plumes with high (30-m) spatial resolution, allowing for more precise source attribution.

True Color

CH4 Plume

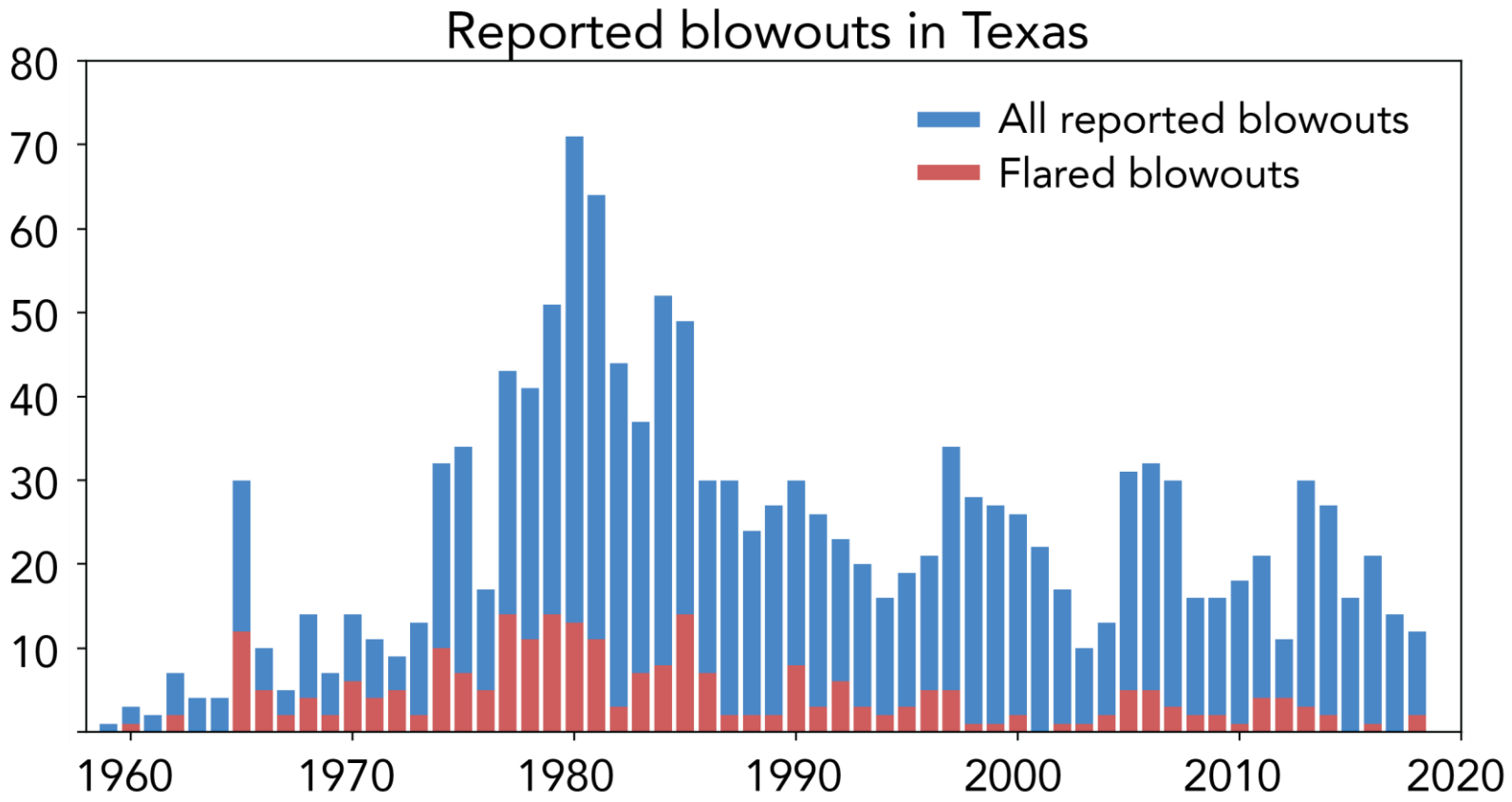


CO2 Plume



Flaring started 14 days after event. Quantification of CO2 and CH4 emissions allowed for an estimate of combustion efficiency (87%)

Blowouts in aggregate could represent a significant source of methane.



About 20 well blowouts per year reported in Texas. Many more outside Texas where reporting requirements may vary.

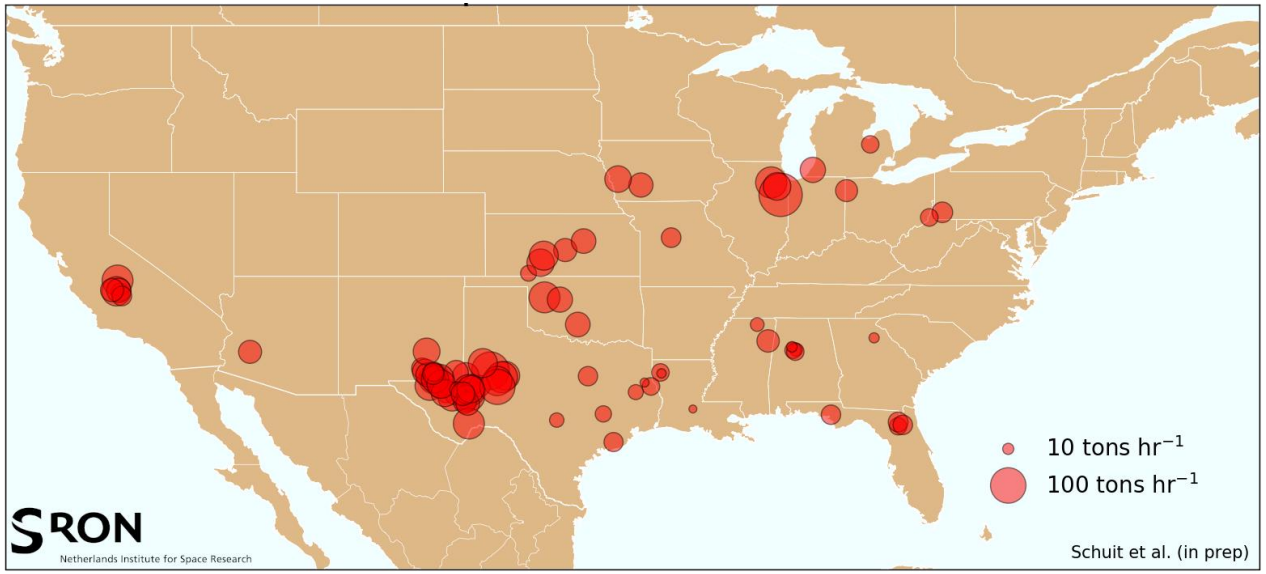
Leveraging multiple instruments could be transformative for accurately representing this sector.

Scraped from the Texas Railroad commission

Remote sensing can be applied to quantify more blowouts or other high emission events.

Large emission events detected using TROPOMI

Schuit et al.



Lauvaux et al.

These ”ultra-emissions” may represent 8-12% of the global O&G production methane emissions (Lauvaux et al.)

More satellites with improved sensitivity, spatial coverage and resolution planned to launch in next 2-5 years.

Conclusions

- Coordinated remote sensing of special events, e.g., blowouts, constrains the evolution of anomalous emission events.

- We show the first GHG and fire temperature results from the newly launched PRISMA instrument.

- In one pass, PRISMA can provide estimates of CO2 emissions, CH4 emissions, combustion efficiency, and flare temperature (and qualitative aerosols)

- Gas blowouts with flaring are not uncommon. Coordinated sensing of these types of events will help constrain carbon budgets.