Reducing Methane Emissions
Data and Satellites are Critical

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EDF ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

We have tools to cut global methane emissions in half within 10 years.

Do we have the necessary data?

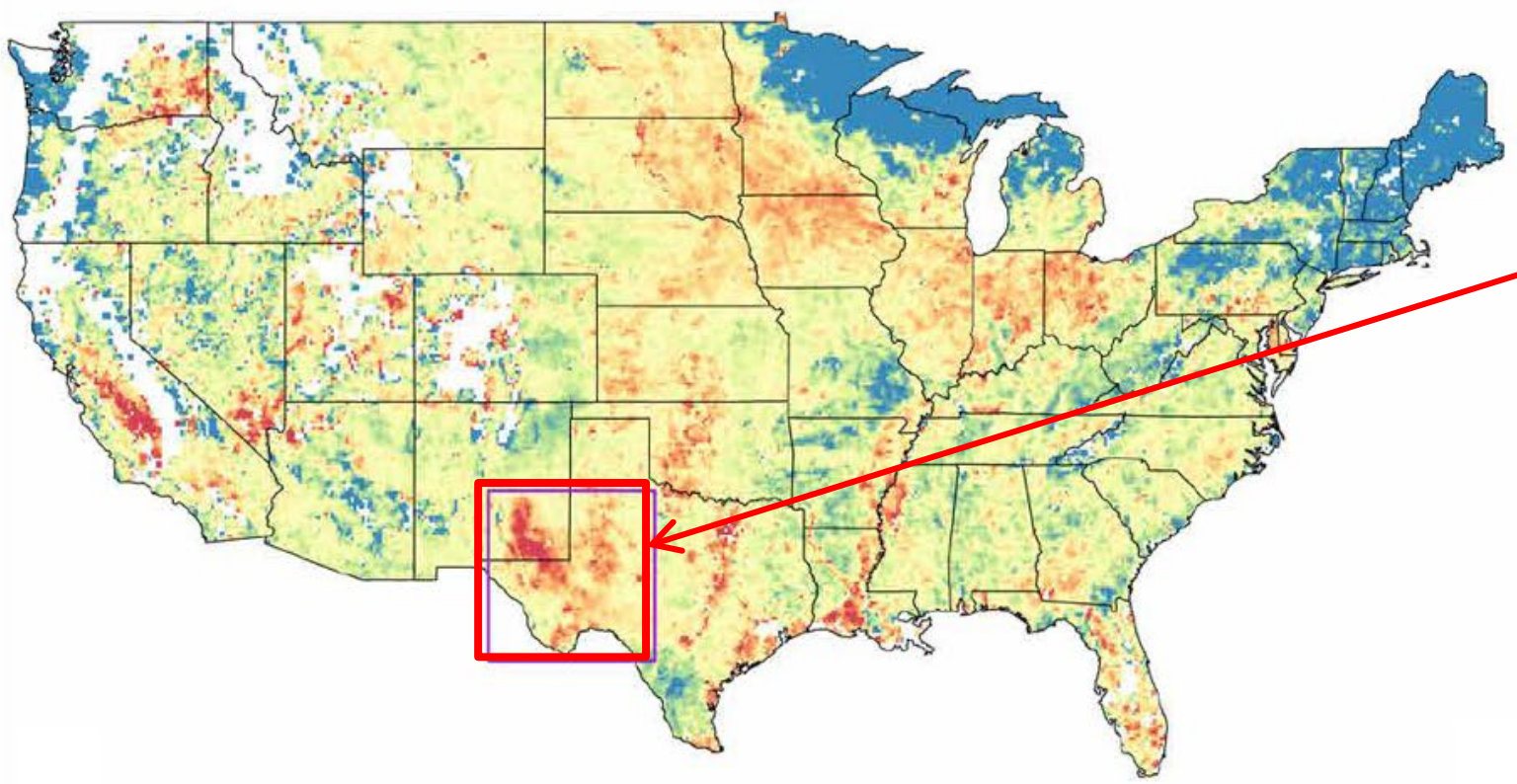
Source: Ocko et al. ERL 2021

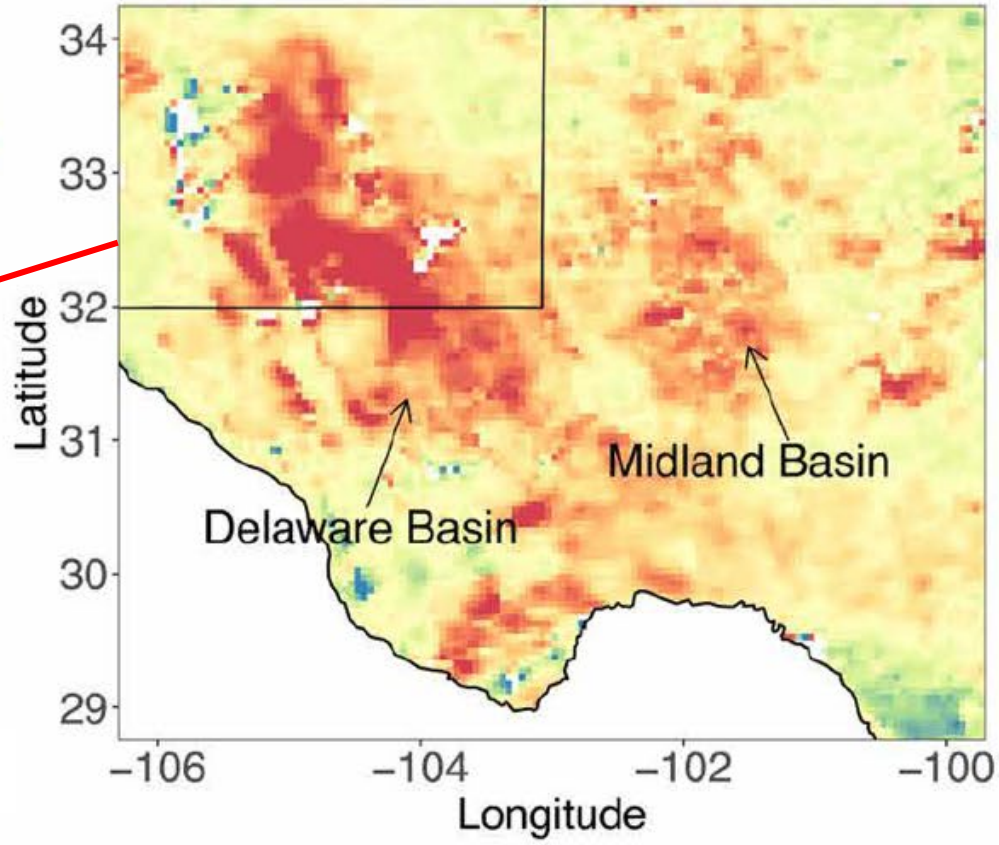
Accelerating emissions reductions requires knowing:

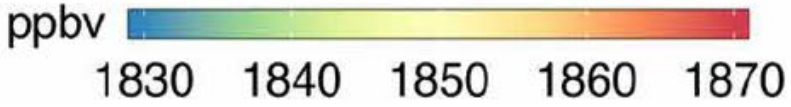
- **What** is being emitted?
- **Where** are the emissions, what are the sources?
- **How much** is being emitted?
- Are emissions **changing** over time?

Thus, we need fine spatial and temporal scale satellite remote sensing data.

Satellite observations reveal high Permian methane emissions TROPOMI (Sentinel 5-P)methane data averaged from May 2018 – March 2019

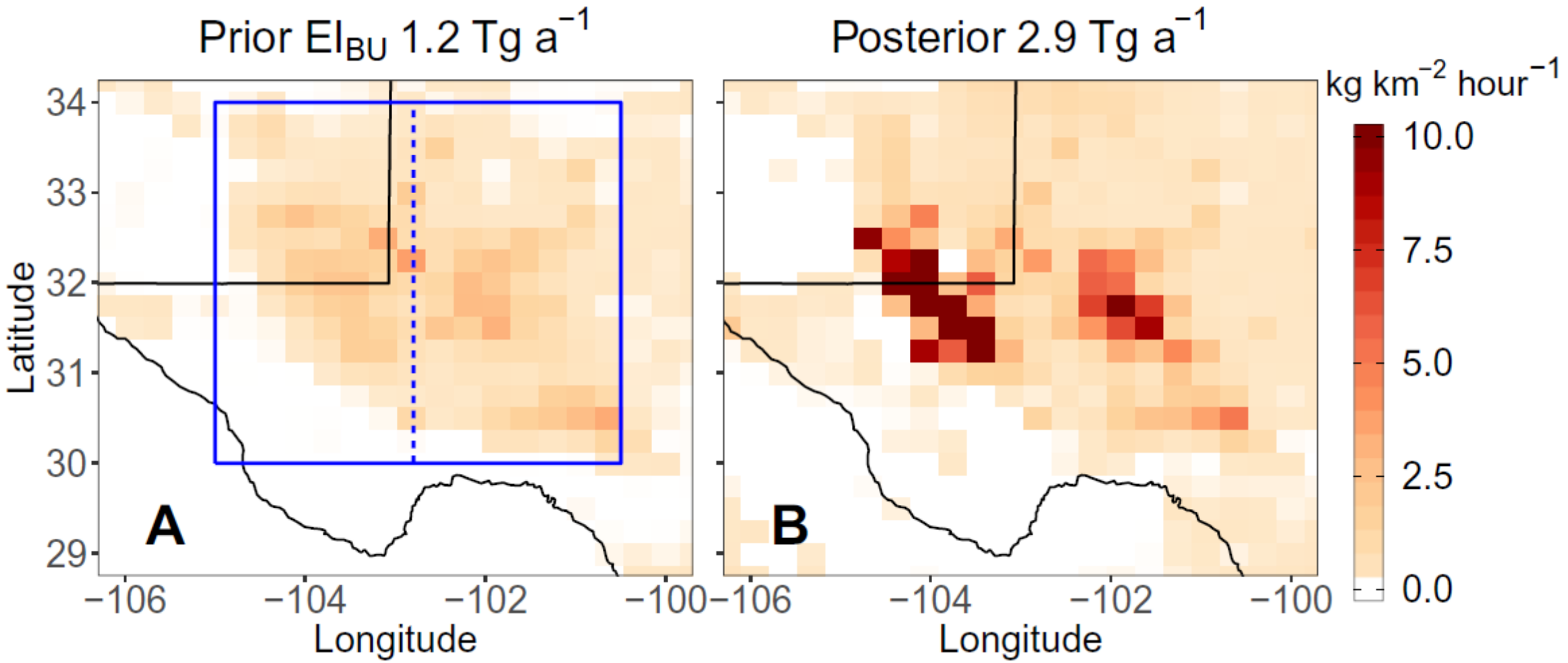






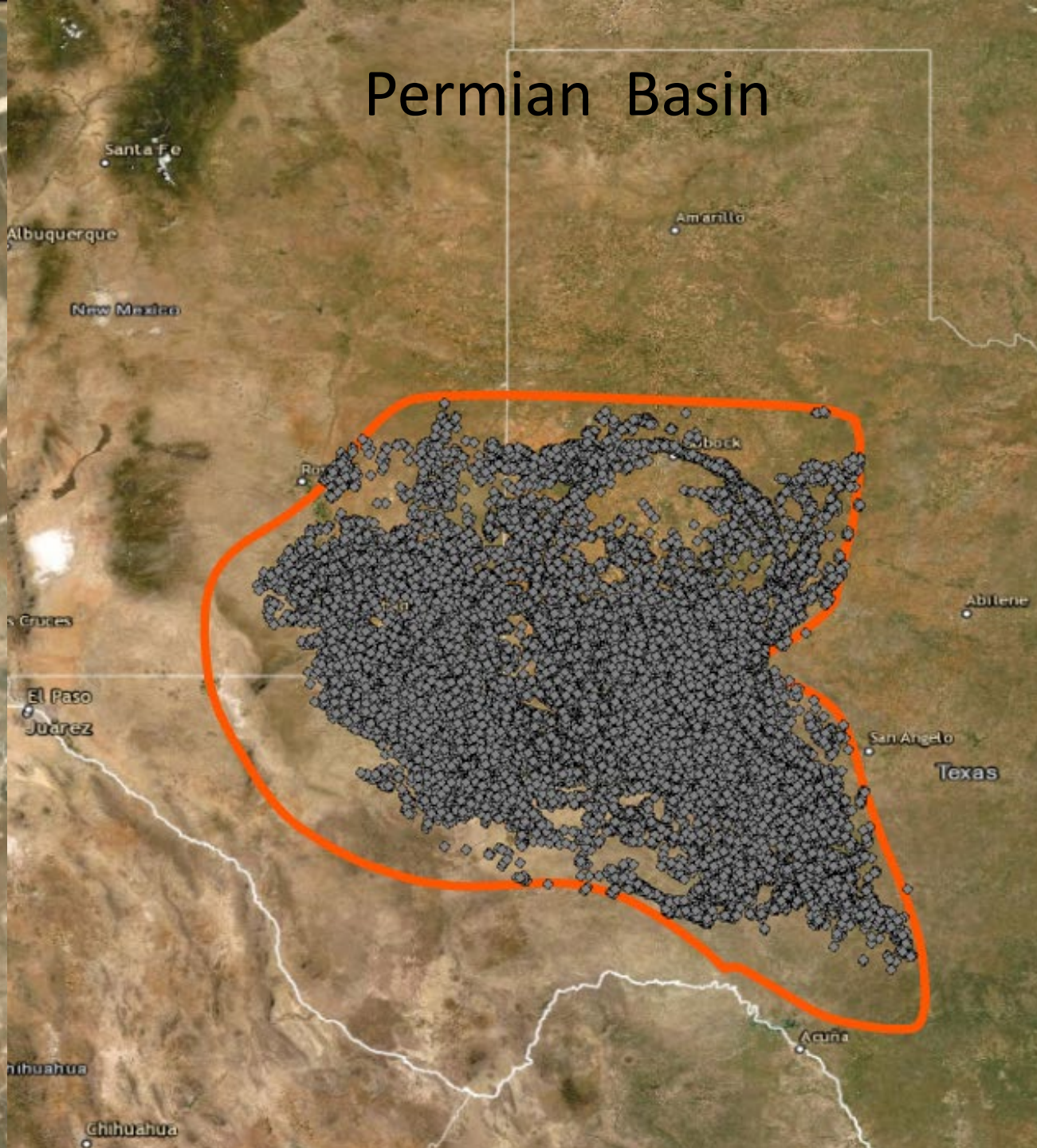
Zhang et al. (2020) Science Advances. **6**: eaaz5120

TROPOMI data reveal highest methane emissions from the Permian Basin ever measured from any U.S. oil and gas basin

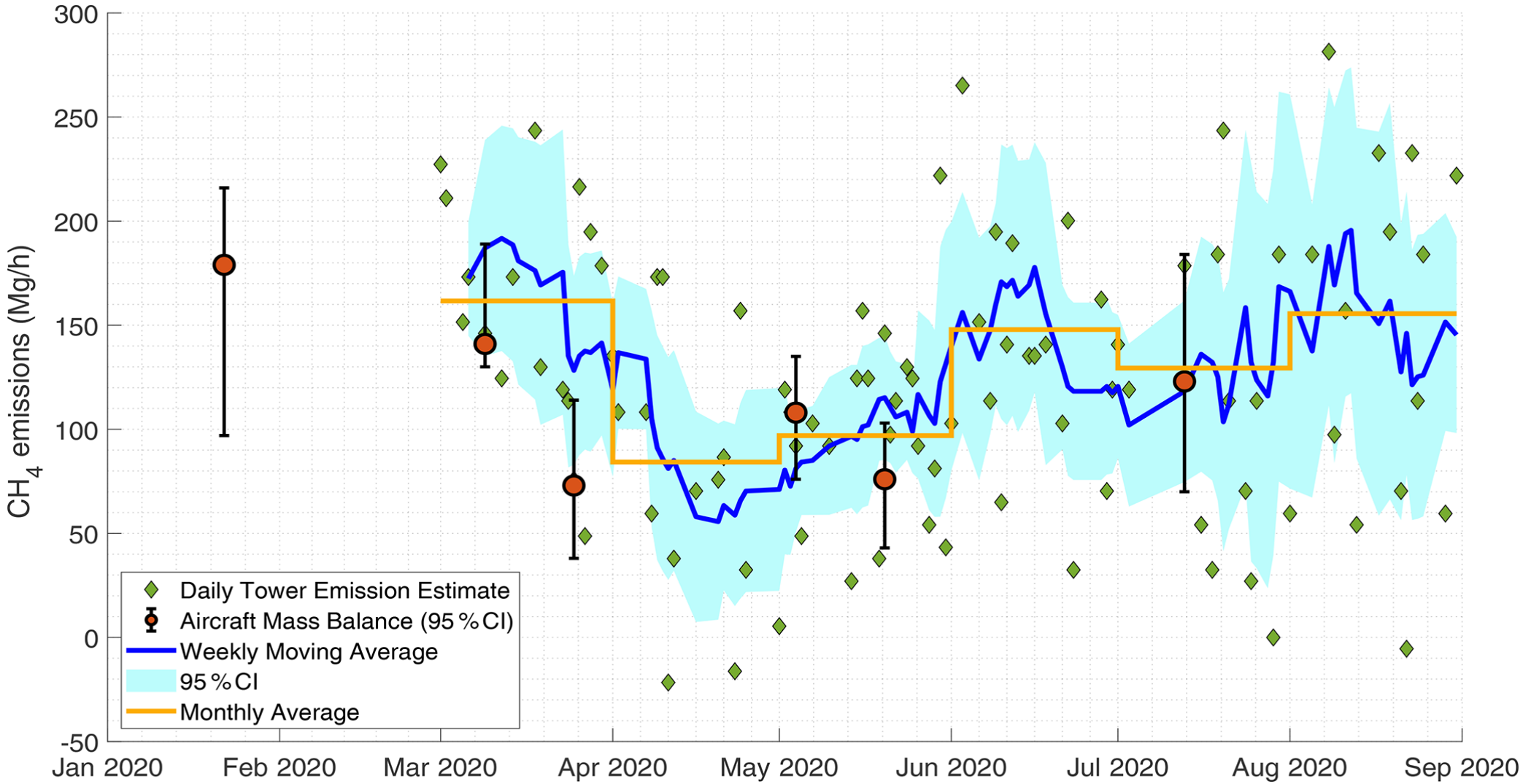


Zhang et al. (2020) Science Advances. **6**: eaaz5120


5
10
Miles


Permian Basin
Santa Fe
Albuquerque
New Mexico
Amarillo
Abilene
El Paso
Juárez
San Angelo
Texas
Acuña
Chihuahua

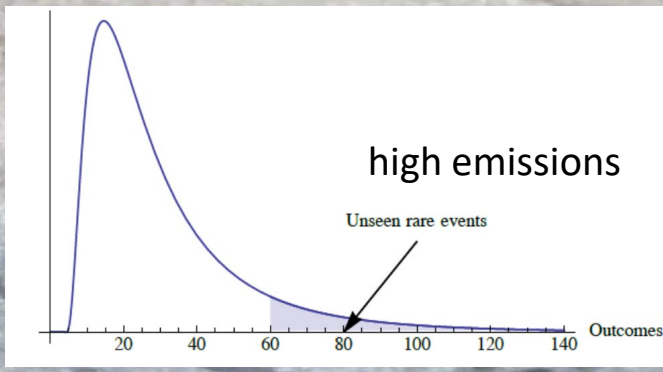
Permian Basin Methane Emissions Trends in 2020



Lyon et al. 2021. Concurrent variation in oil and gas methane emissions and oil price during the COVID-19 pandemic. *Atmospheric Chemistry and. Physics* 21: 6605–6626, https://doi.org/10.5194/acp-21-6605-2021

Most readily identified and mitigated

Fat tail: ~30% ?



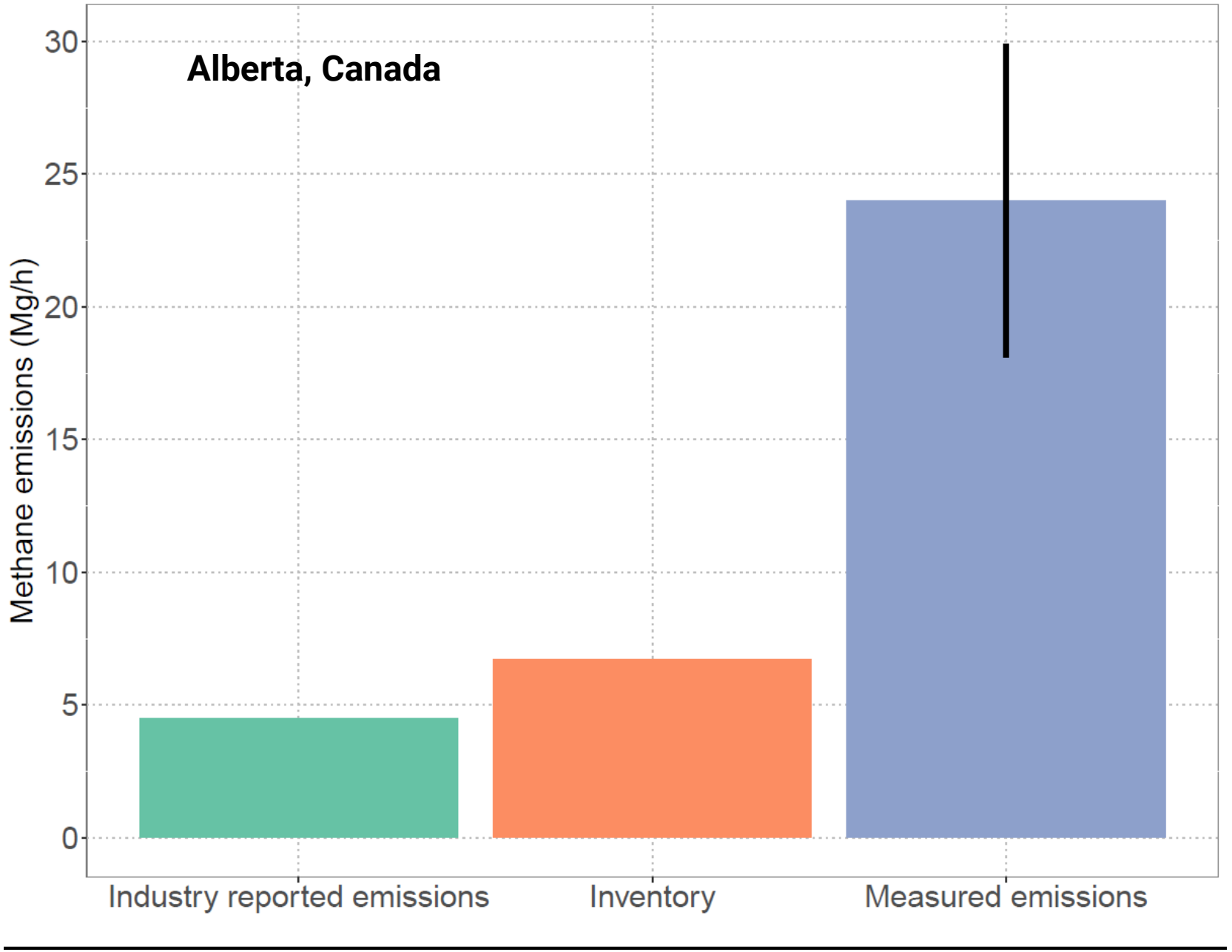
Body of the distribution: ~70% ?

What is the role of Intermittency?

Must be mitigated to reduce overall emissions

Adapted from S. Wofsy

Better data is needed to enable targeted methane mitigation strategies and policies



(Johnson, et al. ES&T 2017)

MethaneSAT

- Primary Mission Objective
  - Provide **policy-relevant/actionable data**
  - Enabling a 45% reduction in CH_4 emissions from oil & gas production by 2025, 75% by 2030
- Mission Overview
  - Regular monitoring of regions accounting for > 80% of global oil & gas production
  - Designed to detect, quantify, and track ***area emission*** rates as well as those from ***point source emissions***
  - **Flux data** product available immediately – data publicly available free of charge
  - Targeting satellite
  - Near real time data availability
  - Philanthropically funded
  - Partnering with New Zealand
  -

MethaneSAT℠

Necessary For Tacking Flux data product publicly available free of charge

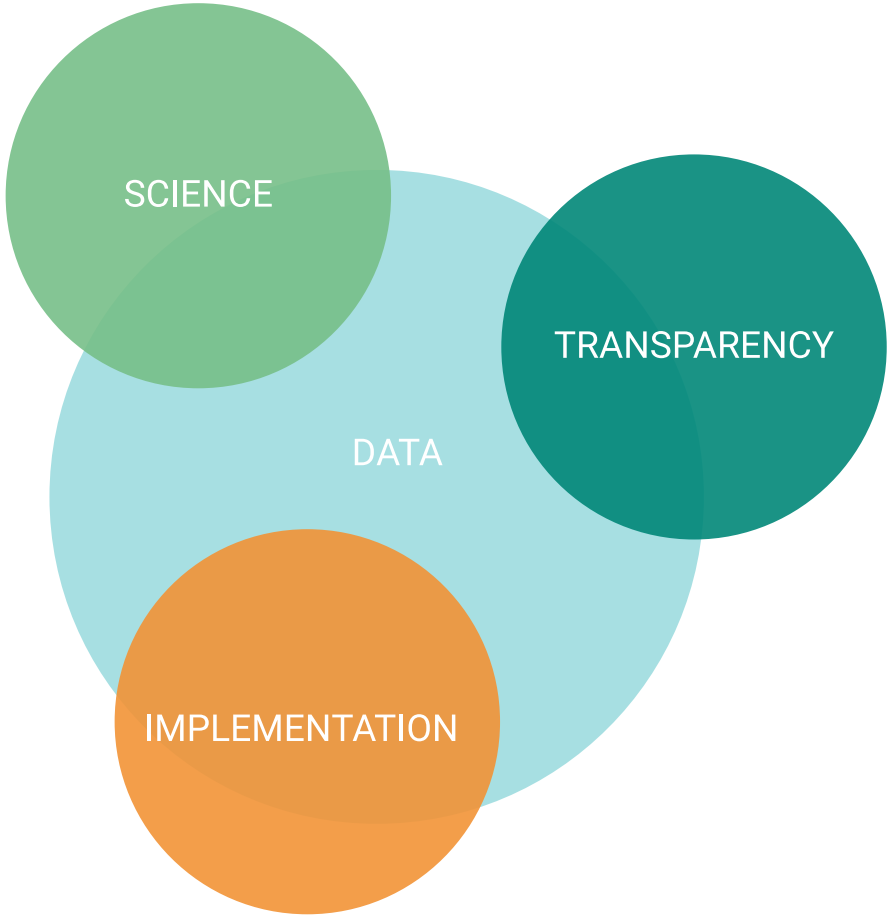
Instrument	Dates operational	Grid size (subgrid pixel) (km)	Swath (km)	Precision (ppbv)
MethaneSAT	**2023-**	**1 × 1 (0.1 x 0.4 raw)**	**200±**	**2-3***
GOSAT	2009 -	10 km dia., single	Sparse	~13
GHGSat	2016 -	0.05 x 0.05	12 x 12	~50
TROPOMI	2017-	7 × 5	2600	~11
GOSAT-2	2018 -	10 km dia., single	Sparse	~8
GeoCARB	2022 -	3 × 6	2800	~18
Carbon Mapper	2023 -	0.03 x 0.03	18	~30

* Gradient measured over 10 – 100 km length scales.

The International Methane Emissions Observatory will integrate all the data we have on methane emissions

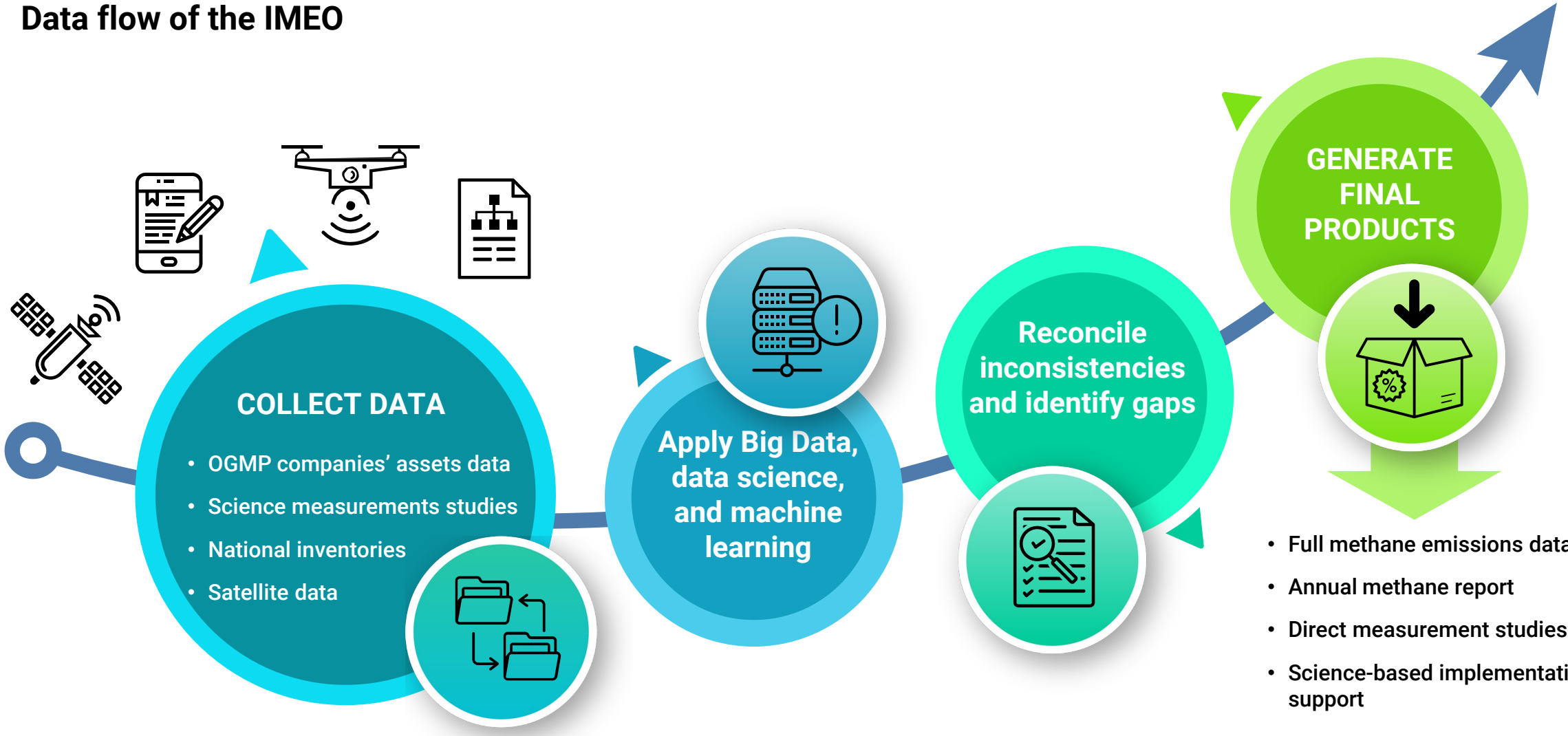
Each element is necessary, but not sufficient to drive change

IMEO interconnects activities across the methane ecosystem



How will IMEO integrate methane emissions data?

Data flow of the IMEO



What is required to collect the data needed to catalyze greenhouse gas emissions reductions?

- Diverse types of satellites – including LiDAR
- High precision detectors
- Flux rate data products – from day 1
- Rapid development and deployment
- Source attribution
- Fine spatial scale
- Frequent repeat times at different times of the day

Thank you