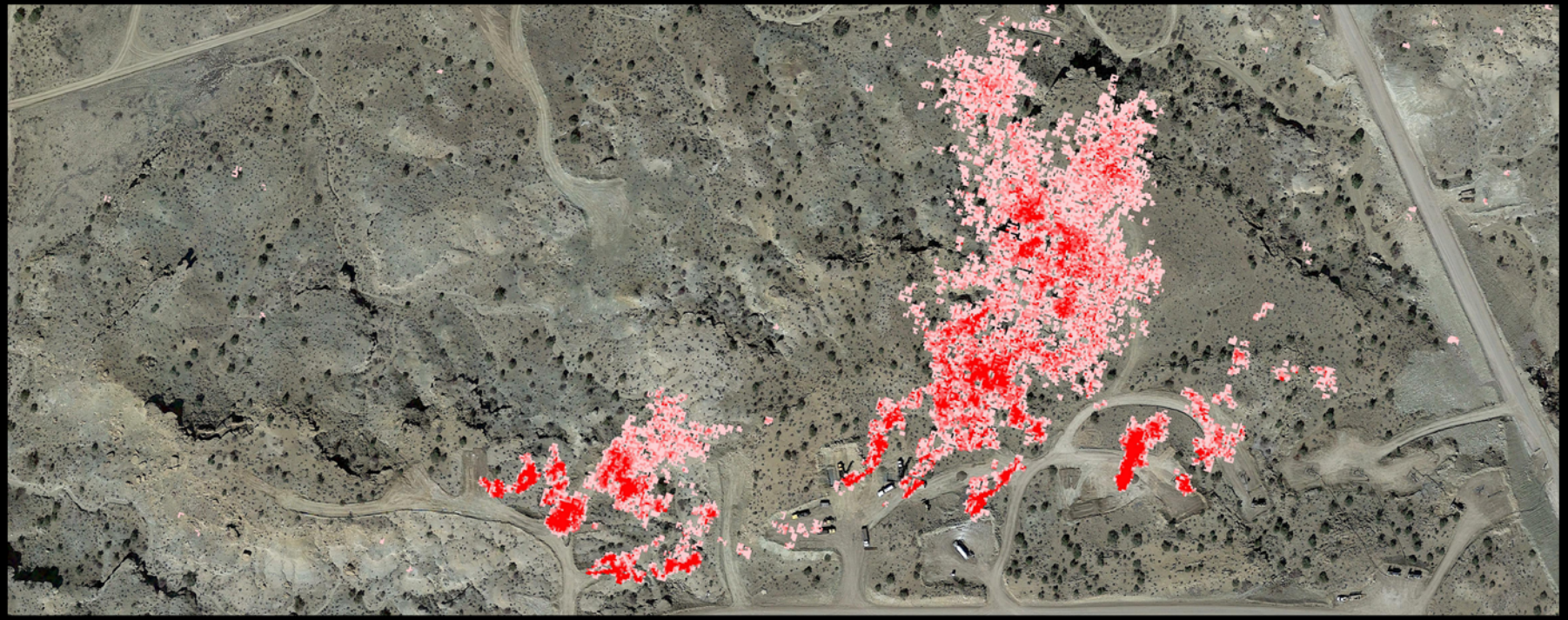
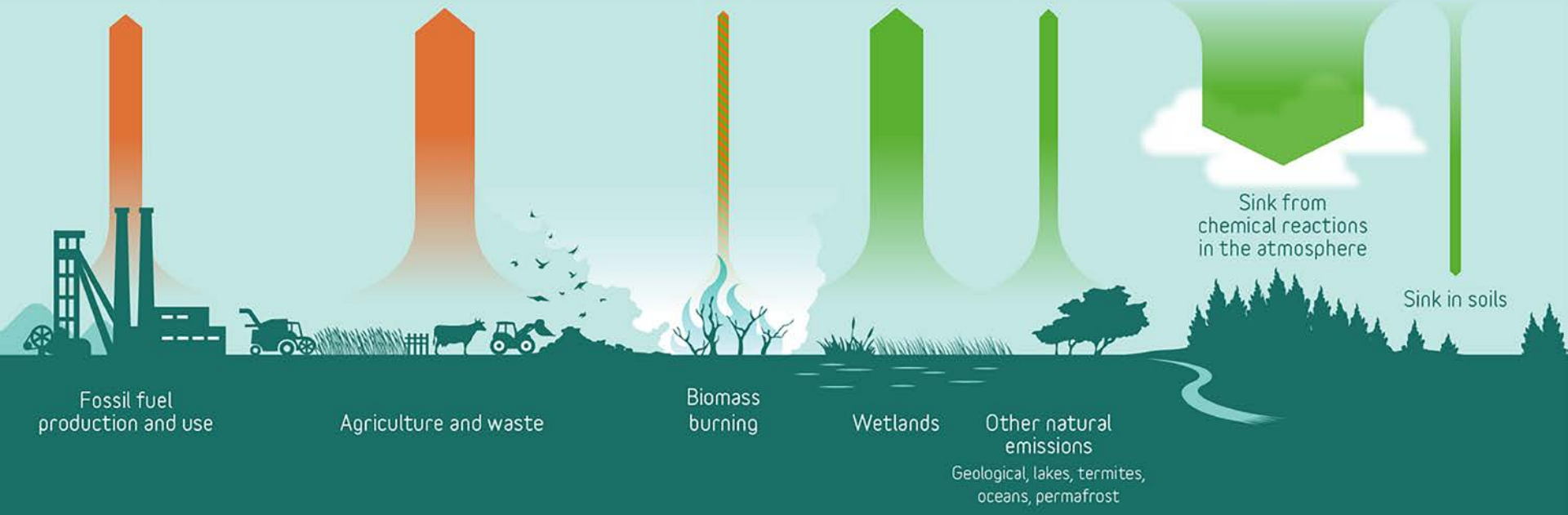
Mapping methane plumes with AVIRIS-NG



Dr. Andrew Thorpe, Jet Propulsion Laboratory, California Institute of Technology

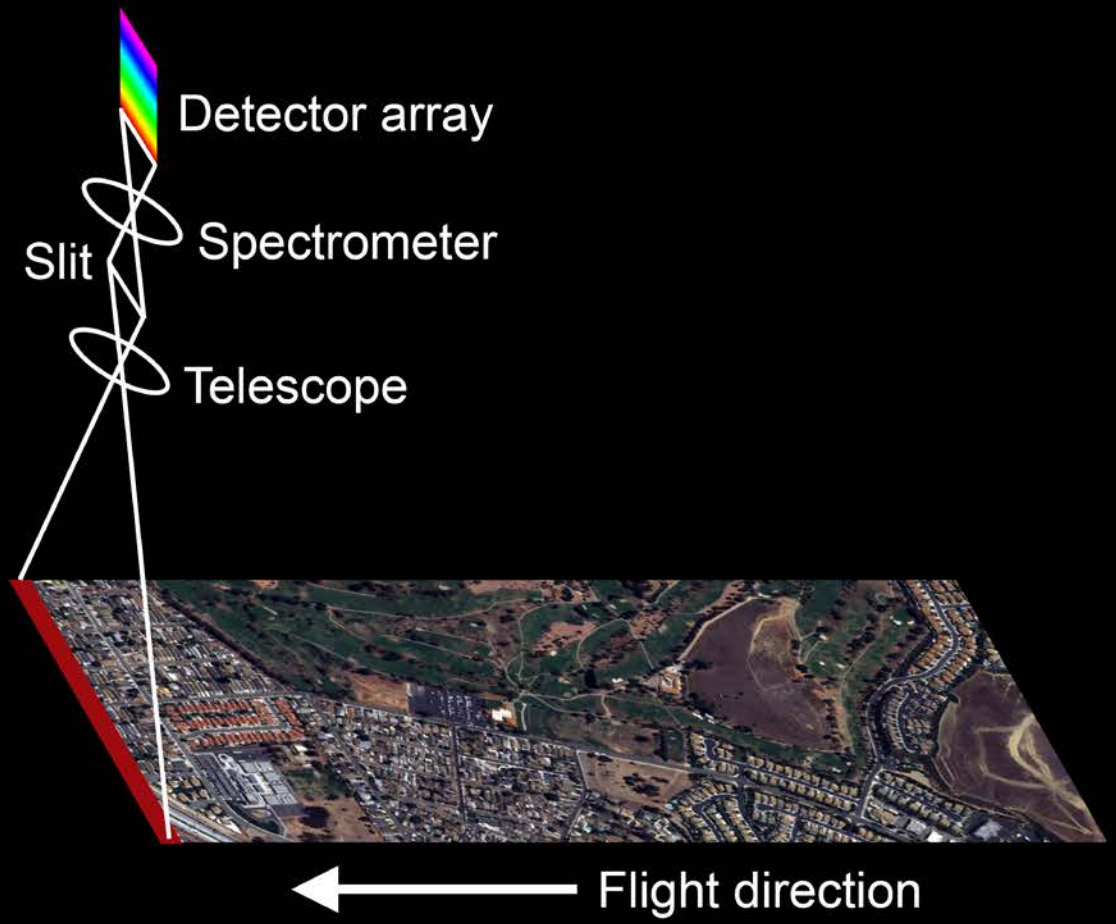
GLOBAL METHANE BUDGET

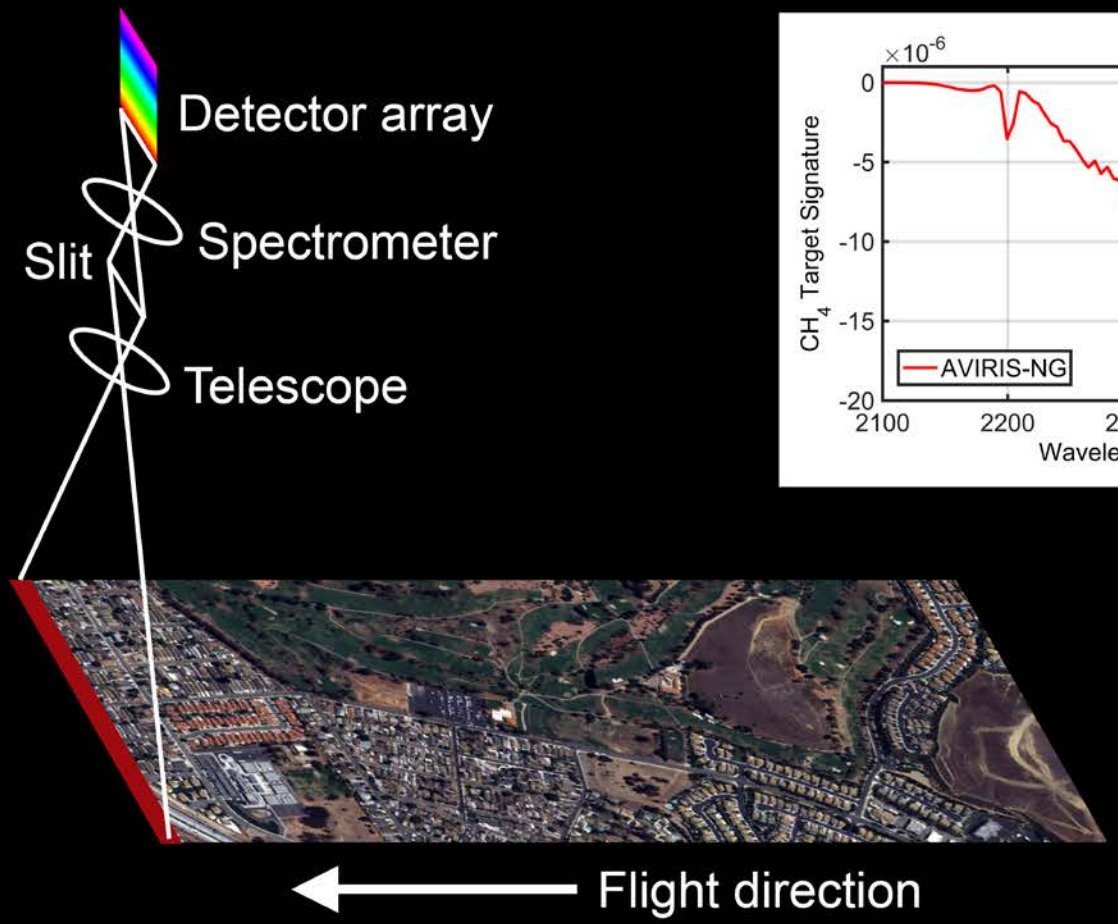
Global Carbon Project

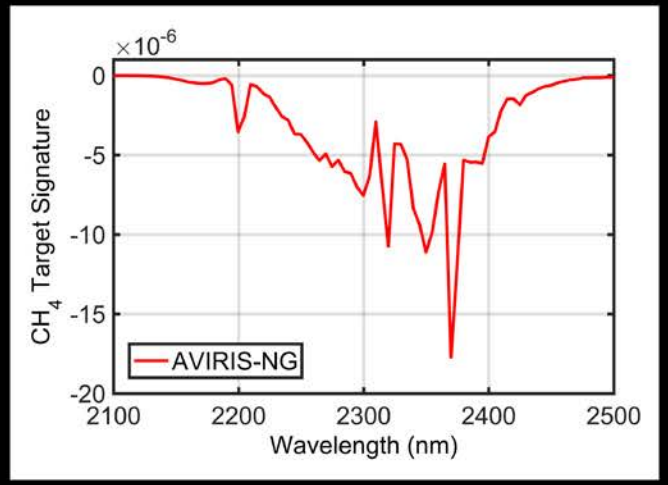


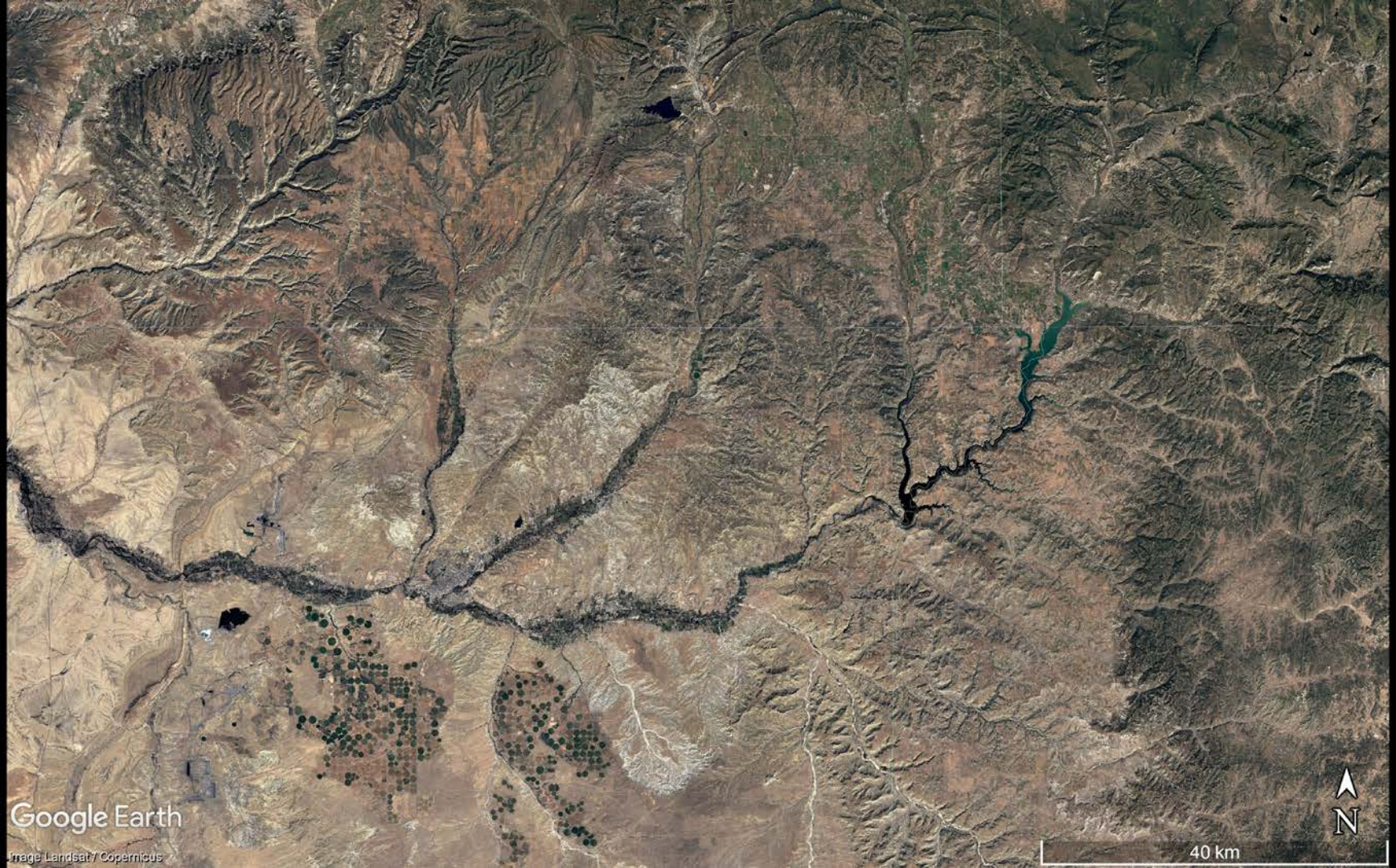
Anthropogenic fluxes | Natural fluxes | Natural and anthropogenic

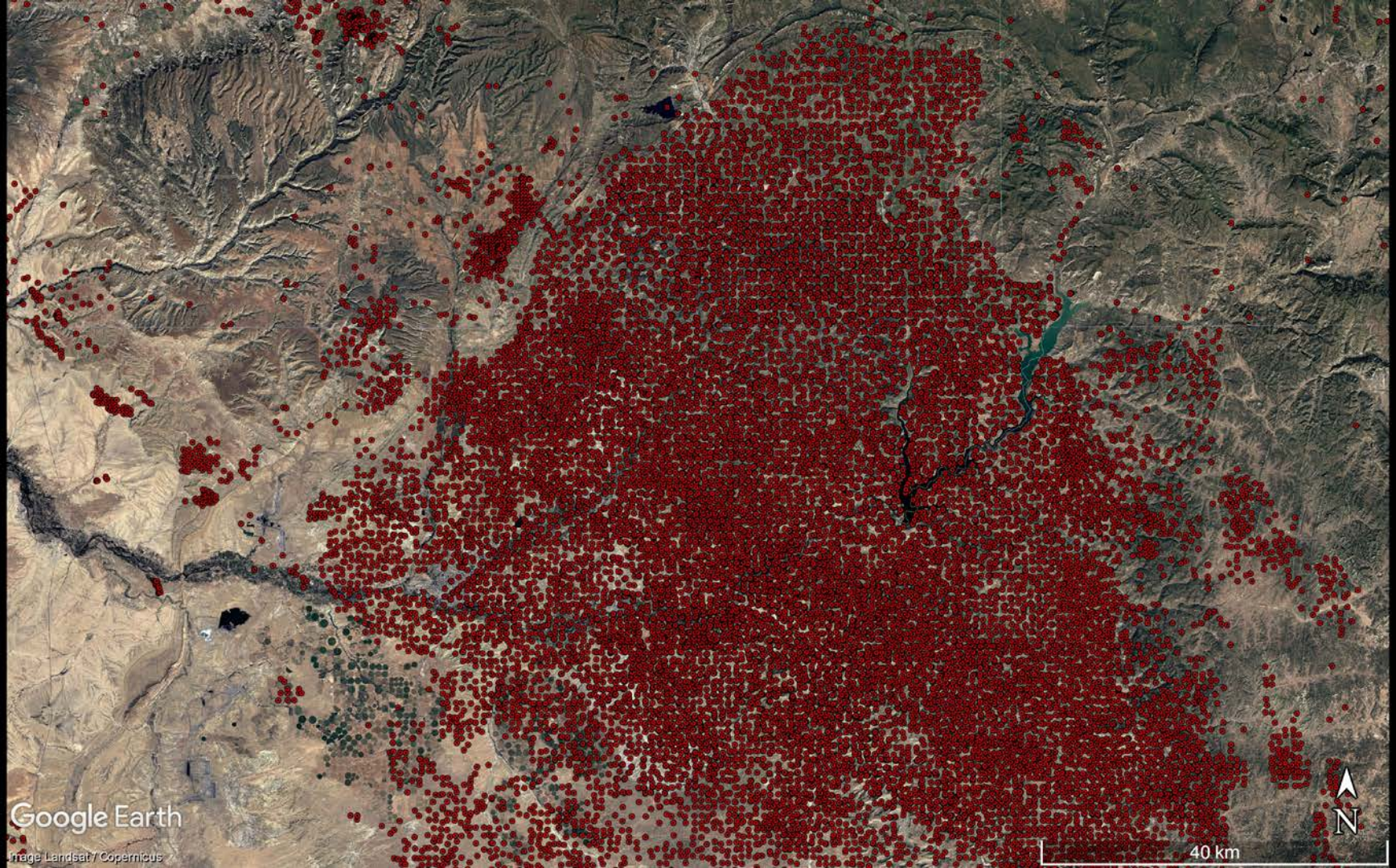
GLOBAL CARBON PROJECT
FONDATION BNP PARIBAS


Detector array
Spectrometer
Slit
Telescope
Flight direction


Detector array
Spectrometer
Slit
Telescope
Flight direction


×10^-6
0
-5
-10
-15
-20
CH4 Target Signature
AVIRIS-NG
2100
2200
2300
2400
2500
Wavelength (nm)


Google Earth
Image Landsat / Copernicus
N
40 km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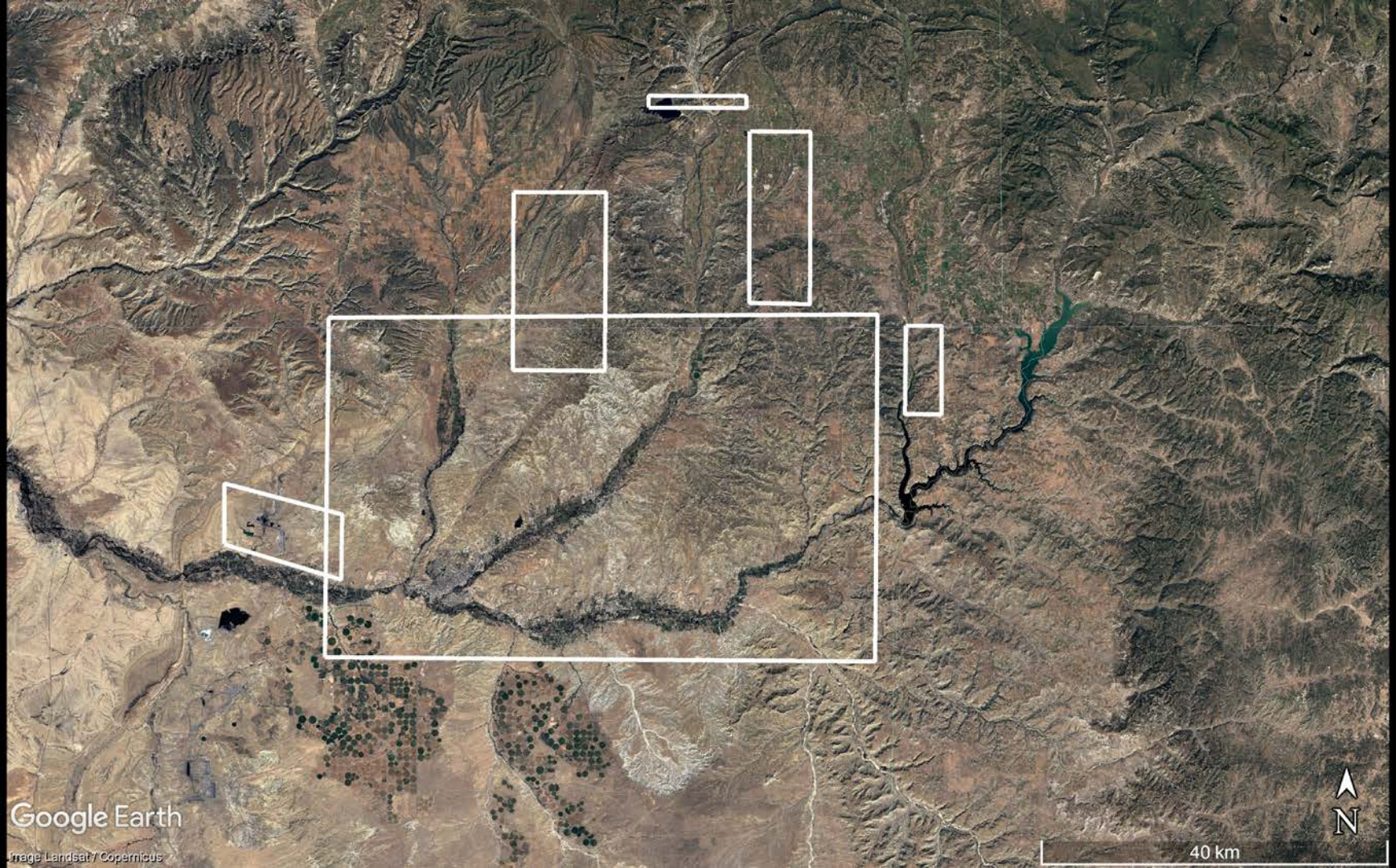
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40 km
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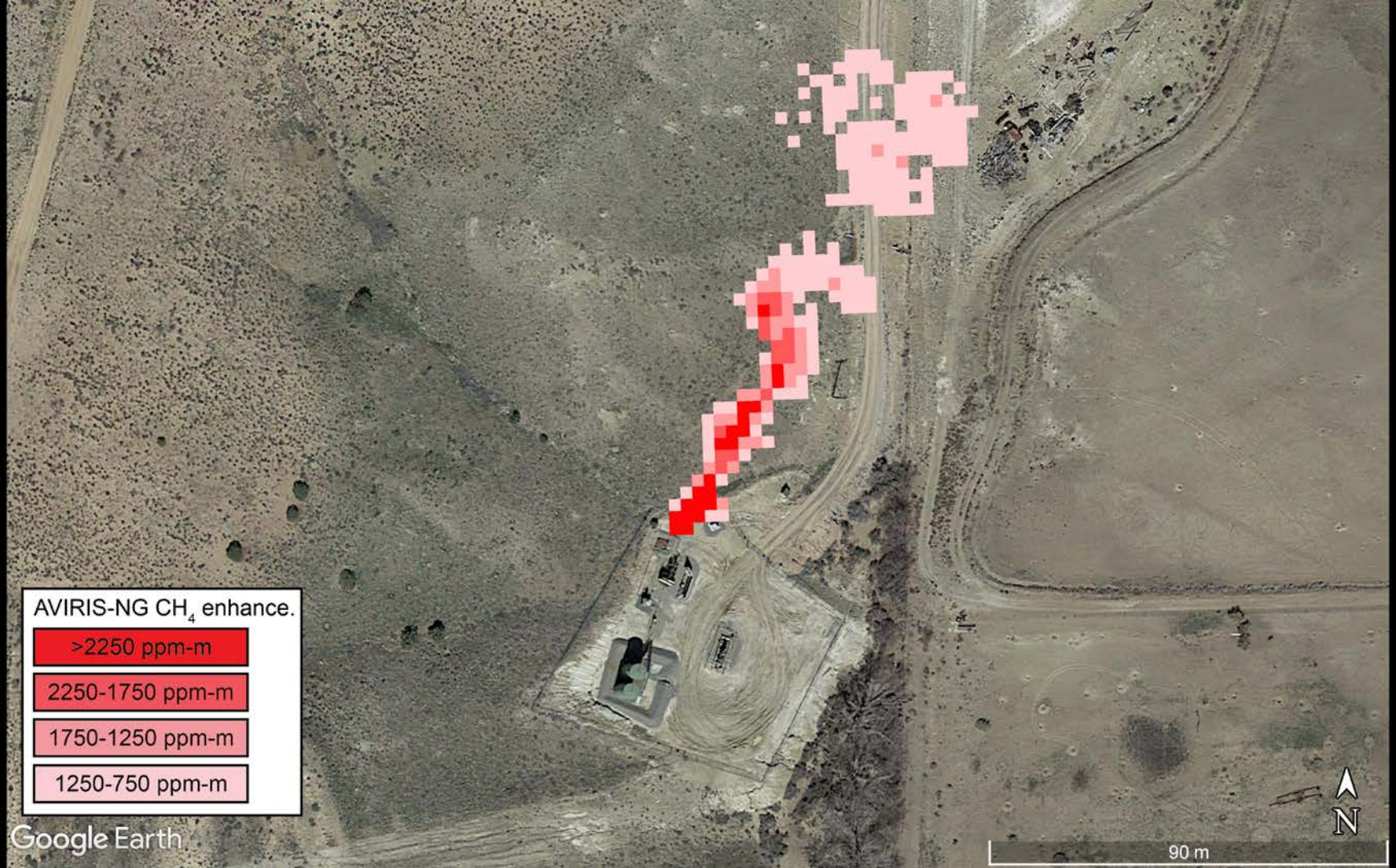
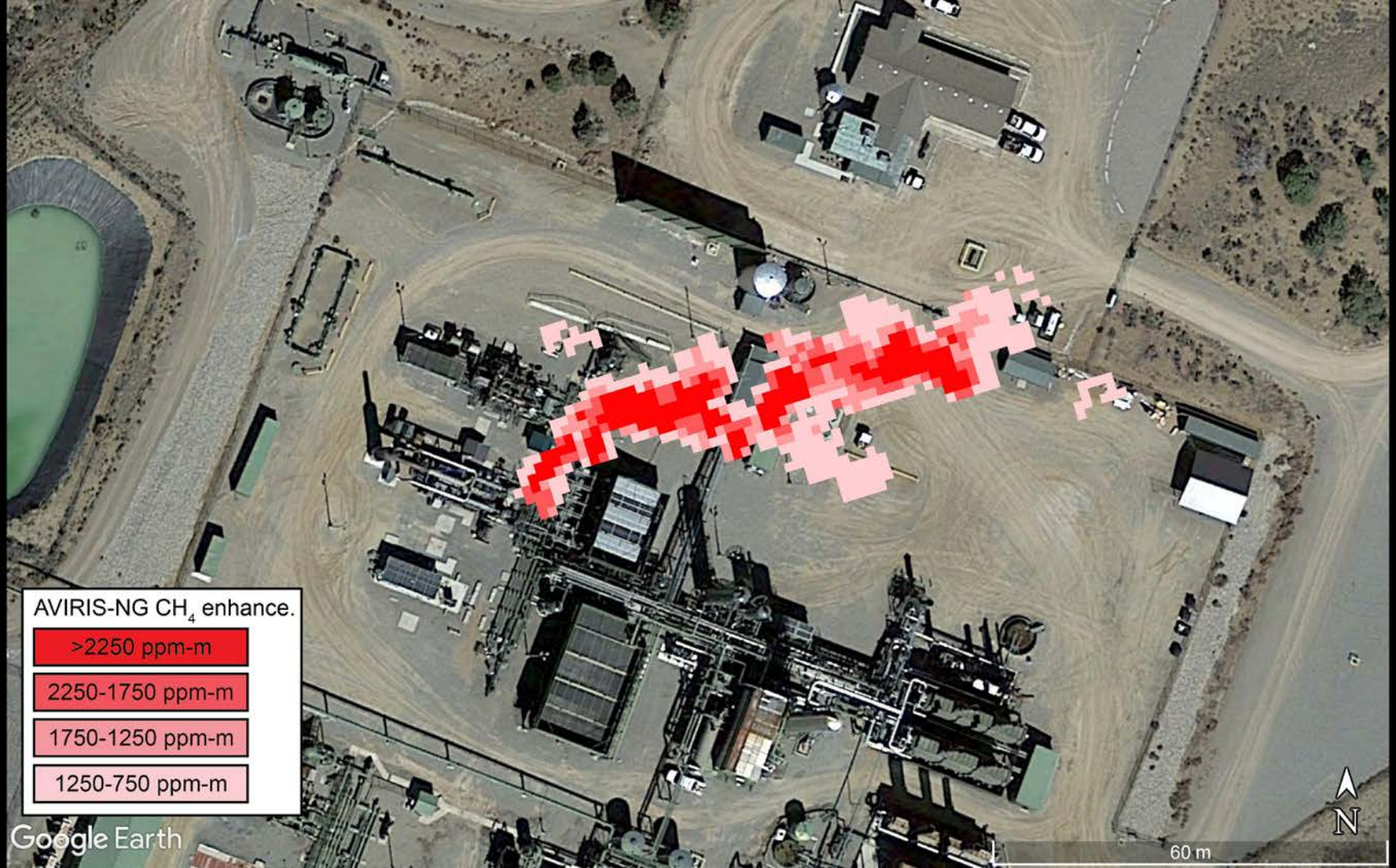

AVIRIS-NG CH_4 enhance.
>2250 ppm-m
2250-1750 ppm-m
1750-1250 ppm-m
1250-750 ppm-m
Google Earth
N
90 m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2250-1750 ppm-m
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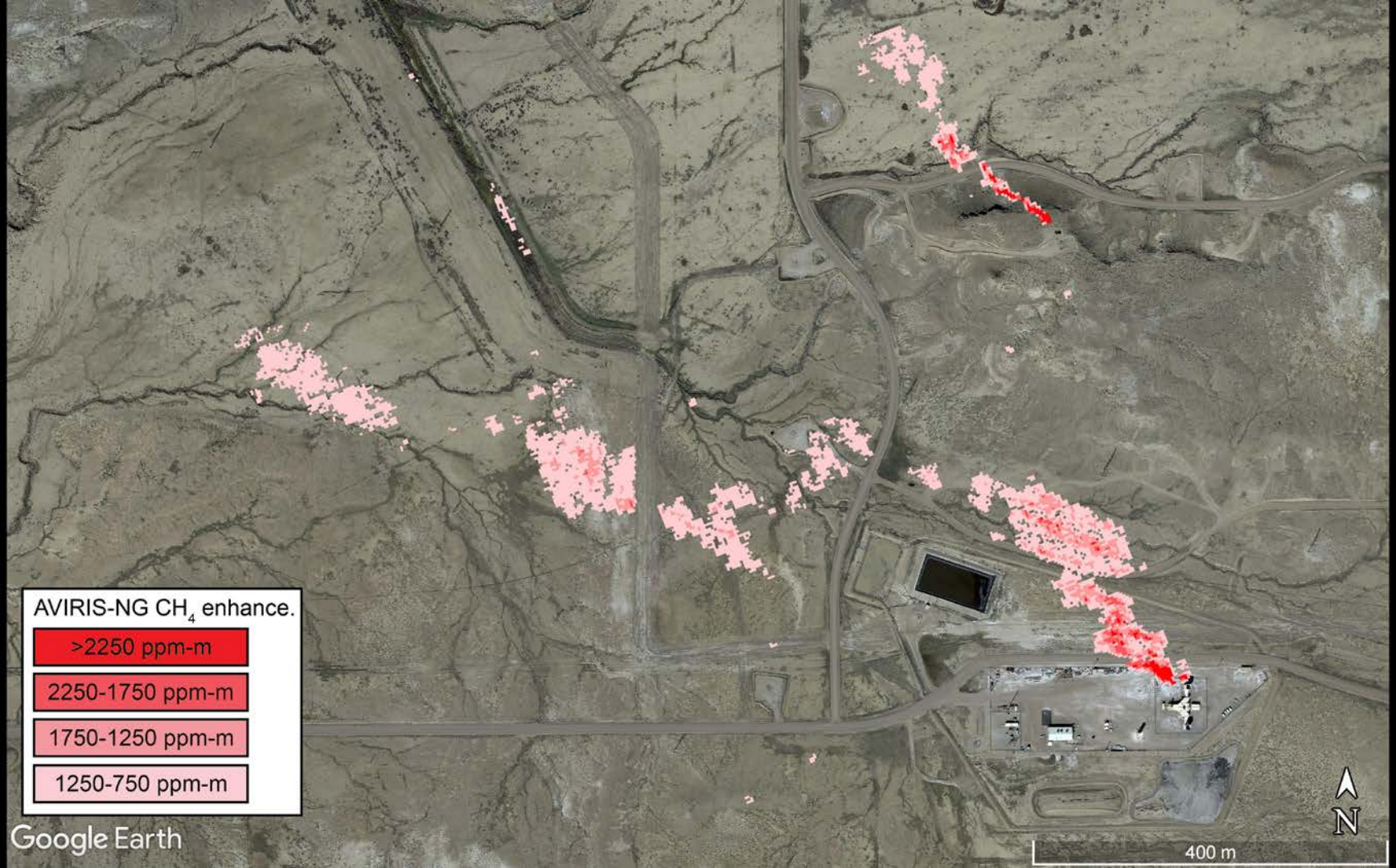
Google Earth
60 m
N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1750-1250 ppm-m
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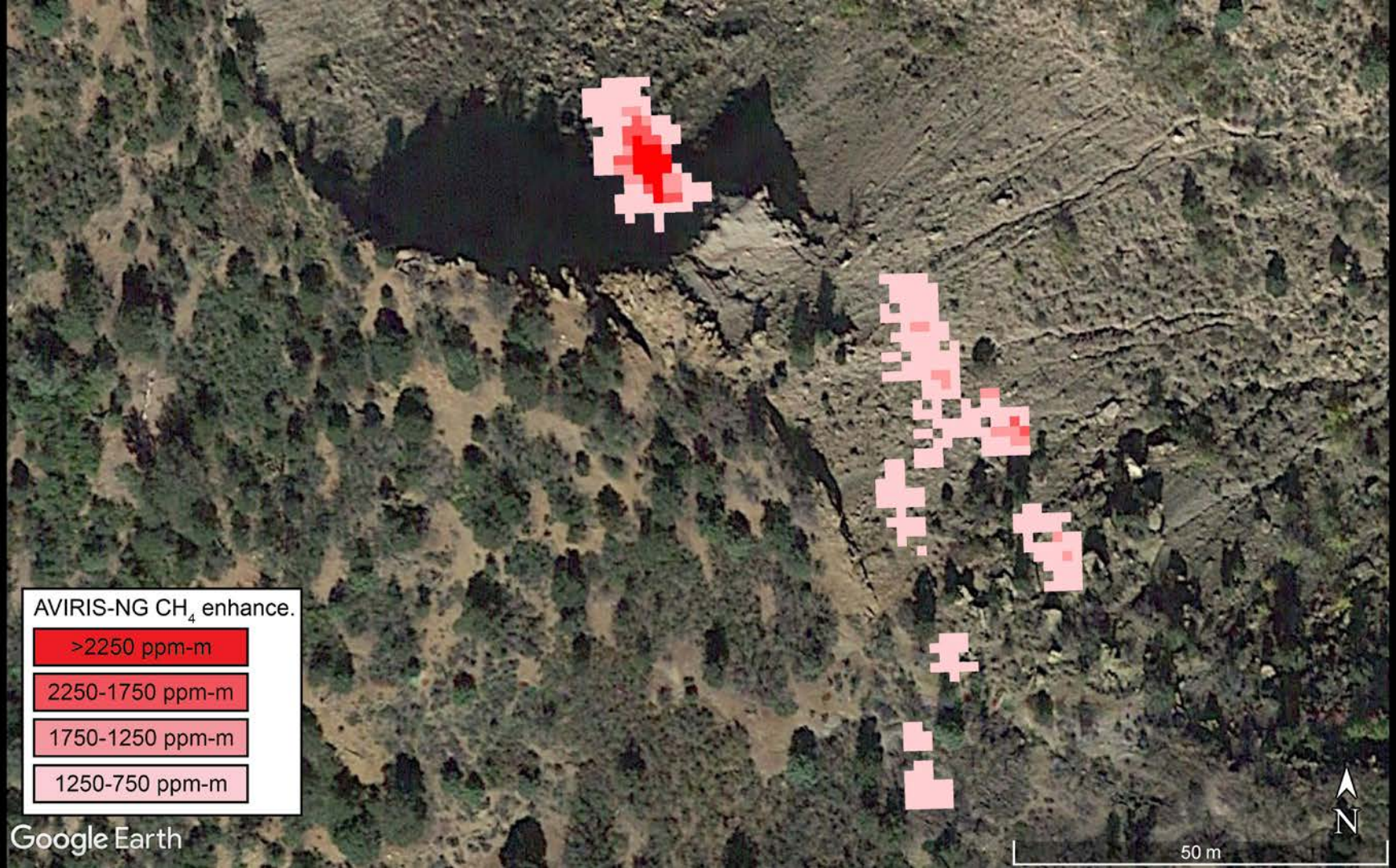
Google Earth
400 m
N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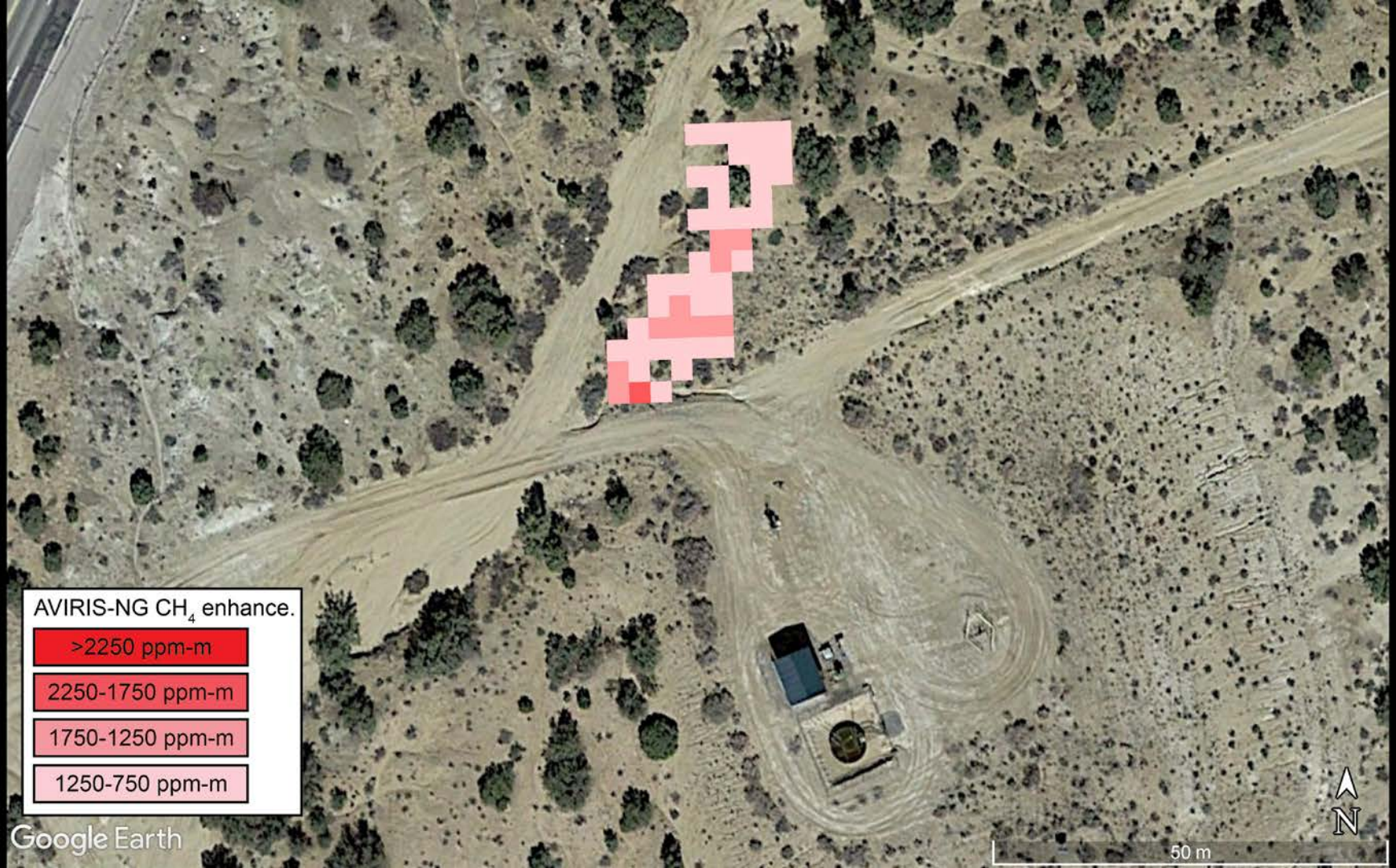
1250-750 ppm-m
Google Earth
N
50 m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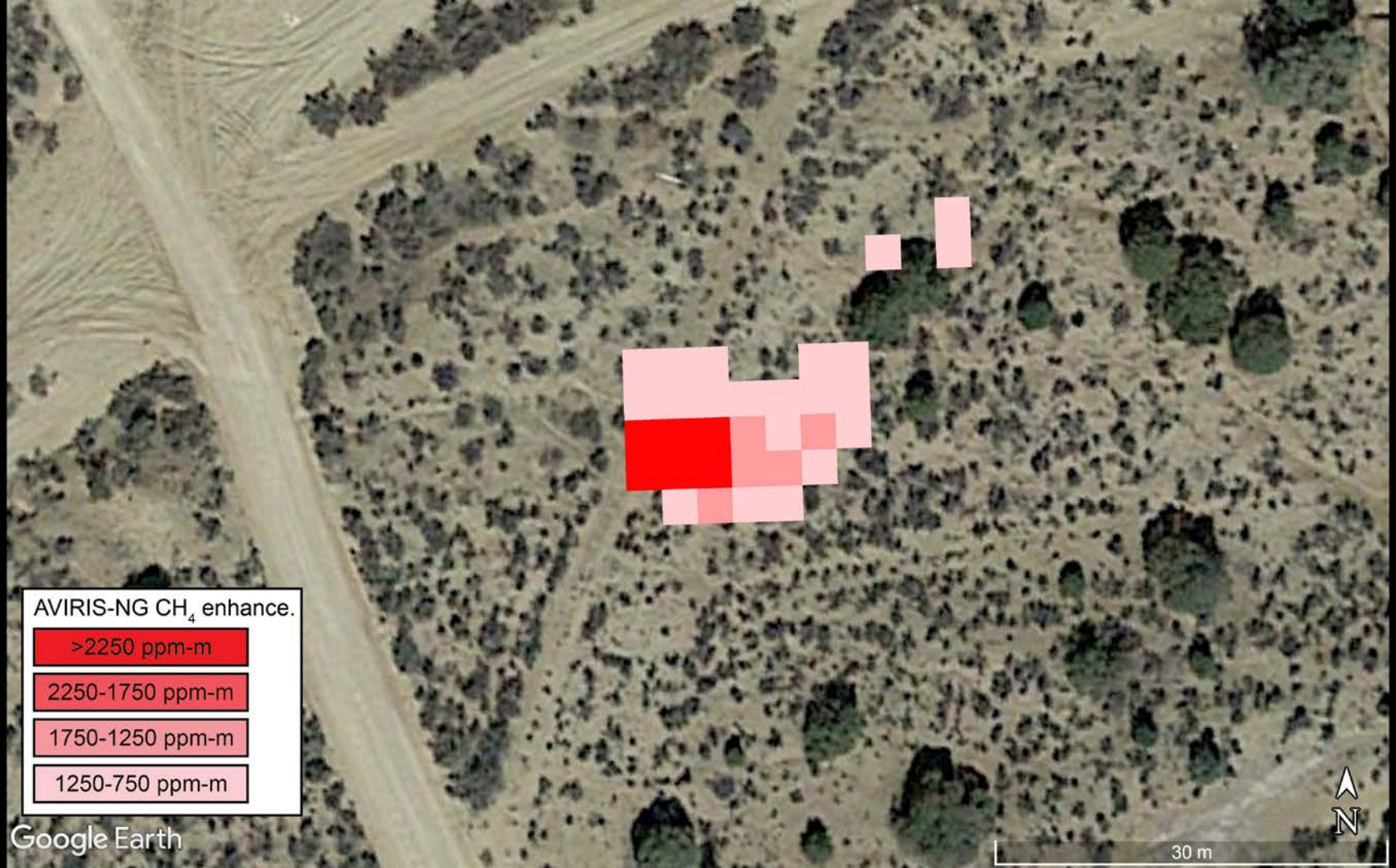
1750-1250 ppm-m
1250-750 ppm-m
Google Earth
N
50 m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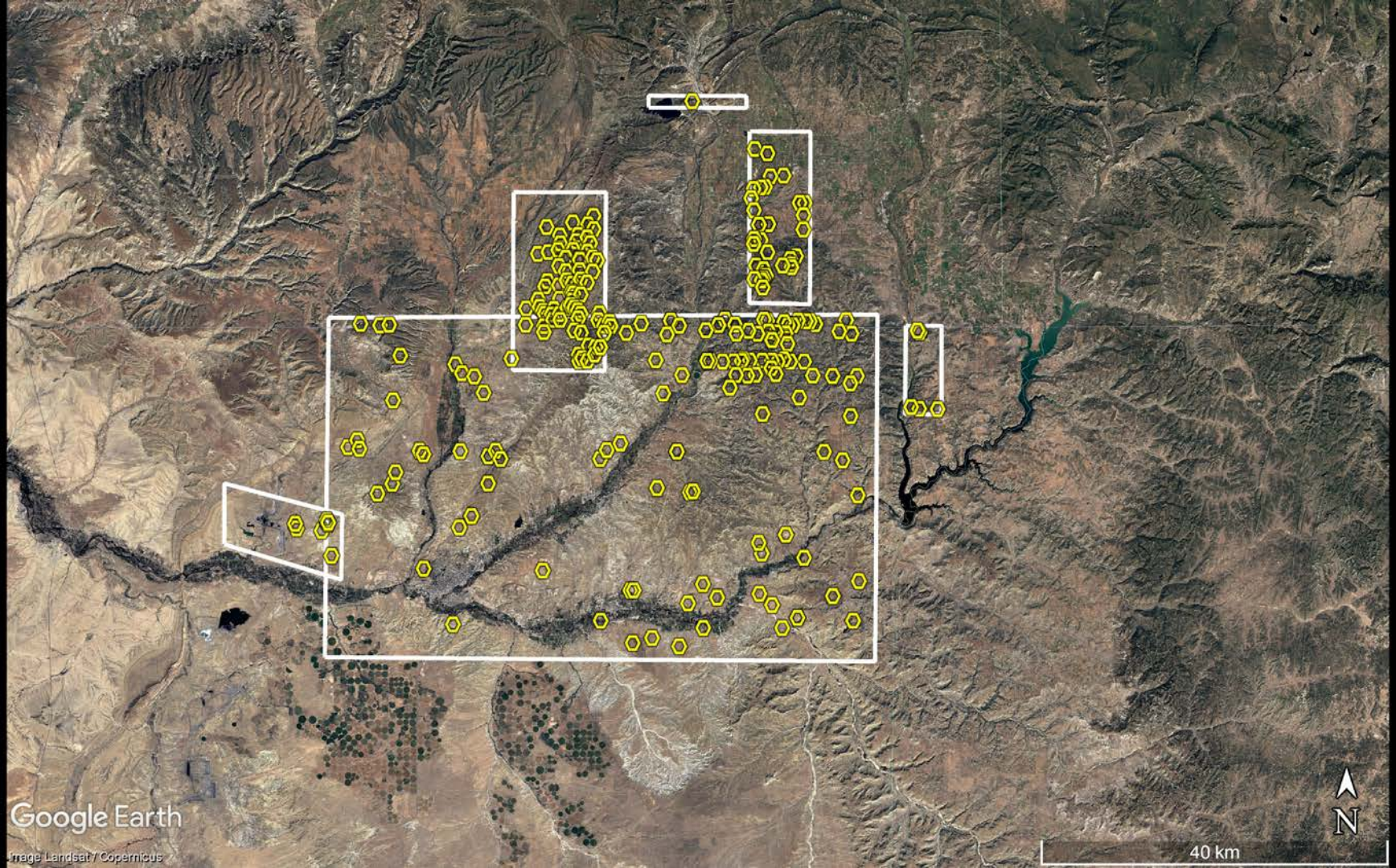
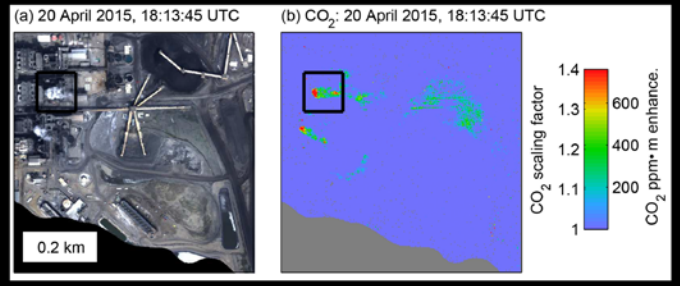
1750-1250 ppm-m
1250-750 ppm-m
Google Earth
N
30 m

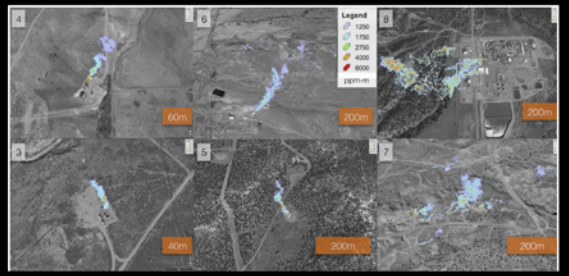

Google Earth
Image Landsat / Copernicus
40 km
N

Publications

Thorpe, A. K. et al., 2017. Airborne DOAS retrievals of methane, carbon dioxide, and water vapor concentrations at high spatial resolution: application to AVIRIS-NG, Atmos. Meas. Tech.



Frankenberg, C. et al., 2016. Airborne methane remote measurements reveal heavy-tail flux distribution in Four Corners region. Proceedings of the National Academy of Sciences.



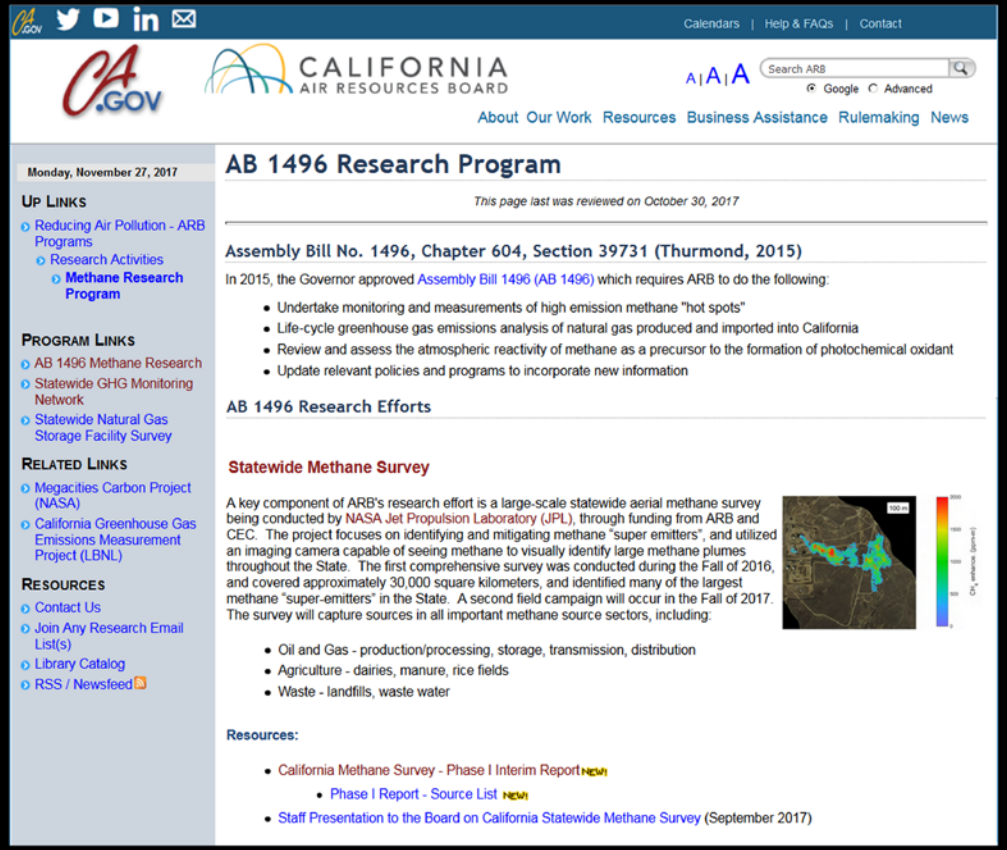
Thompson, D. R. et al., 2015. Real-time remote detection and measurement for airborne imaging spectroscopy: a case study with methane. Atmos. Meas. Tech.

California Baseline Methane Survey

Ongoing project to identify methane emissions across California

Funded by California Air Resources Board (CARB) and California Energy Commission (CEC)

Initial report available online: https://www.arb.ca.gov/research/methane/ab1496_research.htm



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Monday, November 27, 2017

Up Links

- Reducing Air Pollution - ARB Programs
  - Research Activities
    - **Methane Research Program**

Program Links

- AB 1496 Methane Research
- Statewide GHG Monitoring Network
- Statewide Natural Gas Storage Facility Survey

Related Links

- Megacities Carbon Project (NASA)
- California Greenhouse Gas Emissions Measurement Project (LBNL)

Resources

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- Join Any Research Email List(s)
- Library Catalog
- RSS / Newsfeed

AB 1496 Research Program

This page last was reviewed on October 30, 2017

Assembly Bill No. 1496, Chapter 604, Section 39731 (Thurmond, 2015)

In 2015, the Governor approved Assembly Bill 1496 (AB 1496) which requires ARB to do the following:

- Undertake monitoring and measurements of high emission methane "hot spots"
- Life-cycle greenhouse gas emissions analysis of natural gas produced and imported into California
- Review and assess the atmospheric reactivity of methane as a precursor to the formation of photochemical oxidant
- Update relevant policies and programs to incorporate new information

AB 1496 Research Efforts

Statewide Methane Survey

A key component of ARB's research effort is a large-scale statewide aerial methane survey being conducted by NASA Jet Propulsion Laboratory (JPL), through funding from ARB and CEC. The project focuses on identifying and mitigating methane "super emitters", and utilized an imaging camera capable of seeing methane to visually identify large methane plumes throughout the State. The first comprehensive survey was conducted during the Fall of 2016, and covered approximately 30,000 square kilometers, and identified many of the largest methane "super-emitters" in the State. A second field campaign will occur in the Fall of 2017. The survey will capture sources in all important methane source sectors, including:

- Oil and Gas - production/processing, storage, transmission, distribution
- Agriculture - dairies, manure, rice fields
- Waste - landfills, waste water

Resources:

- California Methane Survey - Phase I Interim Report NEW!
  - Phase I Report - Source List NEW!
- Staff Presentation to the Board on California Statewide Methane Survey (September 2017)

Acknowledgments

Coauthors: Christian Frankenberg, David Thompson, Riley Duren, Brian Bue, Robert Green

AVIRIS team

NASA headquarters