

## Science Question

At what level of prevalence and persistence do large landfill emissions exist? How much do they contribute to total emissions? Are these emissions anticipated in bottom-up process models?

## Analysis

Airborne flights across 200+ large GHGRP-reporting landfills in 2016-2022 (more than 20% of all open landfills in U.S.) with AVIRIS-NG and GAO imaging spectrometers. Largest direct survey of open landfills by aircraft to date.

## Results

- 52% of surveyed landfills had observable point source emissions. This far exceeds the 0.2% to 1% detection rate observed for super-emitters oil & gas infrastructure
- For those landfills with observed emissions, 60% had emissions that persisted over months or years. These persistent emissions totaled 87% of all emissions in the study.
- No correlation with emission derived from process-models/bottom-up inventories.

## Significance

This study reveals the need for a comprehensive monitoring strategy to measure, quantify and act on methane emissions at landfills more effectively. Like oil&gas, there is strong evidence of outsized emission sources – in oil&gas coined as “super-emitters.” For the landfill sector, these large emissions make an even greater and outsized impact on total emissions.

## Acknowledgements

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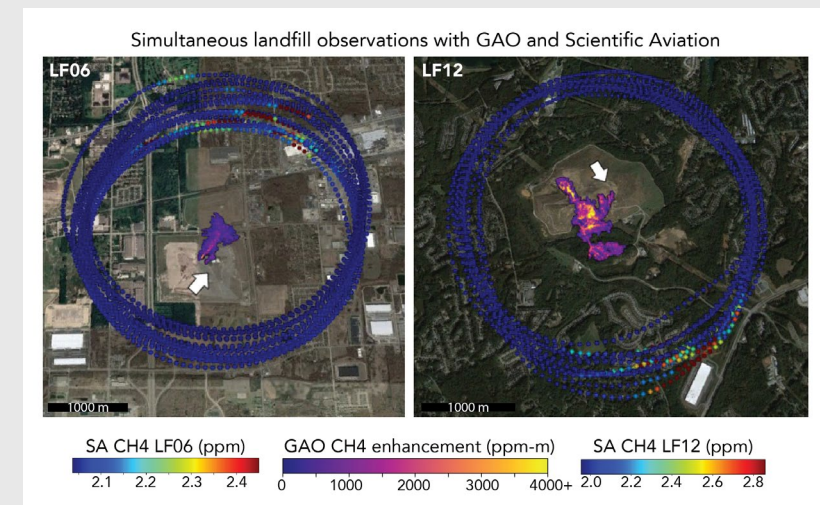
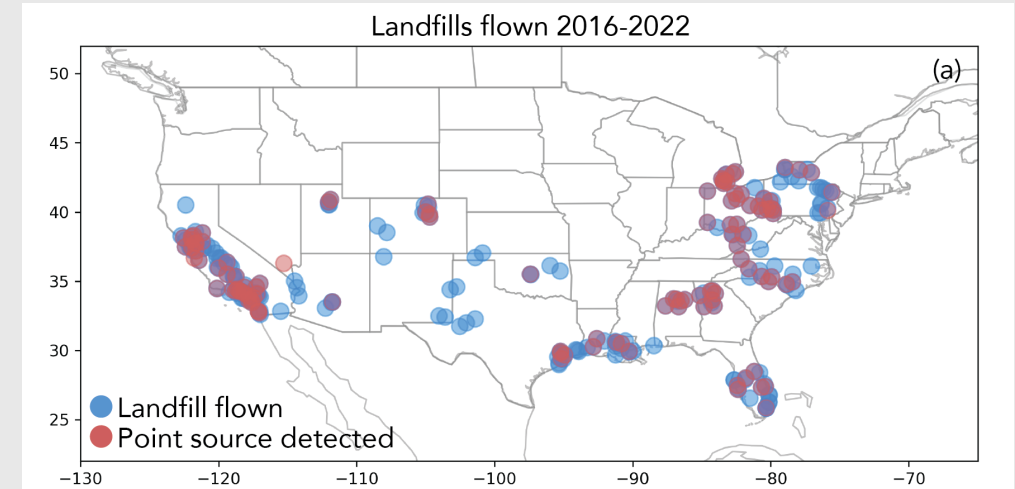


Figure 1. (Top Panel). Landfills flowing by imaging spectrometer surveys (AVIRIS-NG + GAO) between 2016-2022. (Bottom-panel) Simultaneous quantification of landfill plumes by GAO and mass-balance flights (Scientific Aviation).