

Assessing Urban Methane Emissions with Satellite-Derived Enhancement Ratios

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Poster

Reductions in methane emissions will play an important role in meeting short-term emissions reduction goals, and feature prominently in many municipal government net-zero climate plans. Therefore, we must be able to accurately monitor emissions reductions. However, urban methane emissions are difficult to estimate, and bottom-up inventories often disagree with measurements. The use of enhancement ratios derived from satellite measurements of trace gases is a promising tool for estimating emissions and tracking emission reduction efforts. In this work, we use measurements of methane (CH₄), carbon monoxide (CO), and nitrogen dioxide (NO₂) from TROPOMI and carbon dioxide (CO₂) from OCO-2 and OCO-3 to derive CH₄ enhancement ratios. We verify our methodology with measurements from the ground-based TCCON station at Caltech and find promising agreement in the calculated enhancement ratios. We then compare our enhancement ratios measured over cities worldwide to bottom-up inventories and identify discrepancies. Finally, we use our enhancement ratios to calculate urban CH₄ emissions and compare to other top-down studies.

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