

### 3.049 US Oil and Gas Emissions: Are they Rapidly Increasing?.

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Abstract:

Recent studies have proposed significant increases in CH<sub>4</sub> emissions from North America over the past decade, and implicated rapid growth in U.S. gas and oil production. The evidence for the increase in North American oil and gas emissions is based on (1) observed increases in co-emitted species such as ethane and propane (2) a trend derived from different atmospheric inversions (3) spatial differences across North America derived from space-based retrievals of column CH<sub>4</sub> abundance. We examine these claims using an ensemble of time-dependent inversions collected as part of the Global Carbon Project, and we also consider what long-term observations from the NOAA aircraft observation network tell us about US emissions. We find that none of the time-dependent inversions estimate large trends in US emissions, and this is true for inversions using only surface observations and for those that use retrieved column CH<sub>4</sub>. Furthermore, we find that short term (< 5 year) trends of up to 1.5 ppb/yr can occur in spatial gradients between the Pacific “background” CH<sub>4</sub> values and continental locations due to transport effects. Furthermore, we show that zonal spatial differences for long-lived atmospheric species are not likely to be sensitive to even large trends due to relatively fast synoptic zonal transport. Finally, we consider the extent to which trends in co-emitted hydrocarbons can be used to estimate emissions of CH<sub>4</sub>.