



## **Emissions measurements downwind of offshore oil and gas platforms in the Gulf of Mexico**

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A suite of instruments was integrated onto a 70-foot research vessel in order to measure methane emissions downwind of offshore oil and gas platforms. Continuous measurements of methane, methane isotopes ( $^{13}\text{C}$  and  $\text{D}$ ), carbon dioxide, carbon monoxide, water vapor, nitrogen dioxide and particulate matter size were made, supported by GPS and wind measurements. This dataset was acquired between February 9th to 23rd, 2018, and sampled locations off the coasts of Texas, Louisiana and Florida, USA. A variety of facility types, sizes and locations were sampled. The dataset covers a range of atmospheric dispersion conditions and includes both daytime and nighttime measurements.

Emissions of methane, ethane and combustion species were observed from offshore platforms. Ethane and the isotopes of methane provide a means of confirming that methane emissions were thermogenic in nature. Platform plume dispersion over the ocean differed greatly from dispersion over land. An analysis of downwind data from platforms using modified Gaussian dispersion tools will highlight this discrepancy. Methane emission magnitudes are estimated using this methodology and suggest a highly skewed distribution of emitters.

Occasional broad enhancements in ethane and methane background concentrations were also observed at sea, and a long-range chemical transport model (Hysplit) is used to investigate the possible sources of these enhancements.