

NO₂ Trends and Hotspots Over Offshore Oil and Gas Operations in the Gulf of Mexico

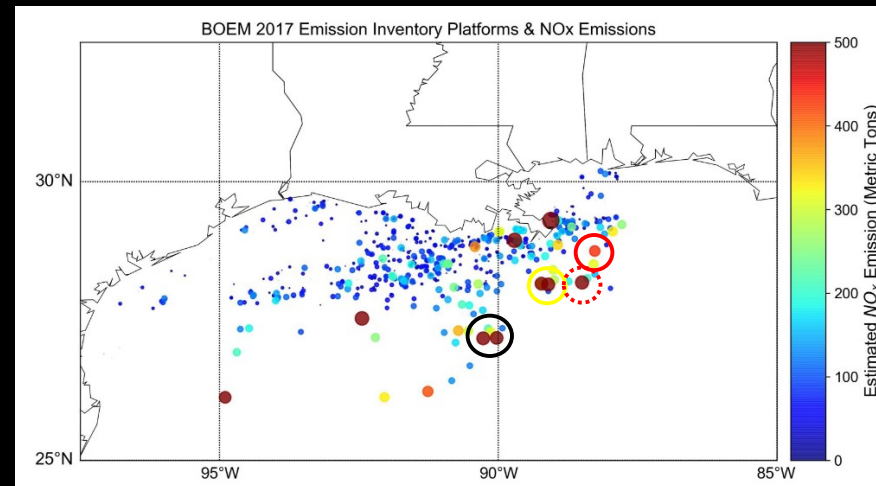
The Bureau of Ocean Energy Management (BOEM) agency is mandated to ensure oil and natural gas (ONG) emissions do not degrade the air quality of coastal states. Oil and natural gas operations emit nitrogen oxides (NO_x), which are major air pollutants and precursors to ground-level ozone.

In collaboration with BOEM, we used satellite data from the OMI and TROPOMI sensors to construct an 18+ year record of tropospheric nitrogen dioxide (NO₂), a proxy for NO_x, in the Gulf Coast region.

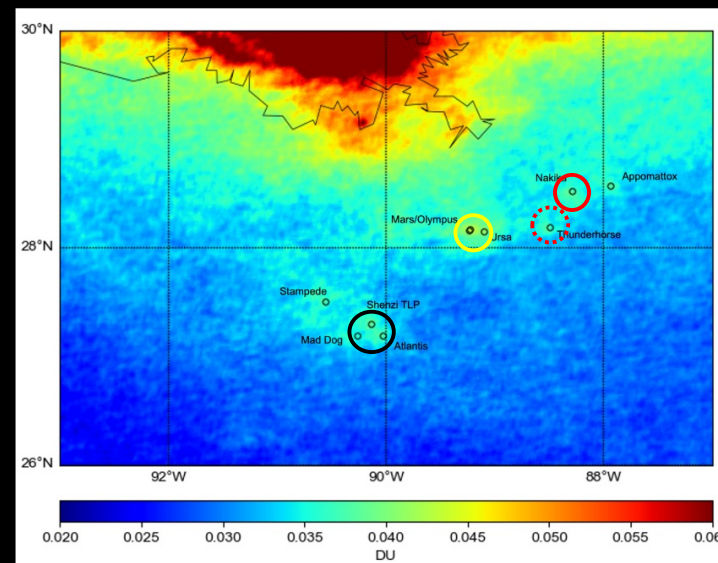
NO₂ hotspots from ONG platforms were identified using TROPOMI NO₂ averages under calm wind conditions. The ONG deepwater platforms increase NO₂ background amounts by 7%–13% on average, and up to 25% for larger hotspots. The results in this study facilitate our work on emissions estimates from these sources and on applications to the recently launched TEMPO instrument.



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Locations of the Gulf of Mexico ONG platforms in the BOEM 2017 NO_x emission inventory. Larger dots and corresponding colors indicate the platforms with the highest annual NO_x emissions. The large circles highlight location of major hotspots observed by TROPOMI (Figure below)



2018-2022 tropospheric NO₂ column averages from TROPOMI, using only days on which winds were calm (emissions remain over sources). The circles and labels show locations of key platforms contributing to the NO₂ column hotspots. The large circles highlight locations of major hotspots observed by TROPOMI