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Airborne emissions of methane at offshore oil platforms in Newfoundland and Labrador, Canada

Afshan Khaleghi¹, Katlyn MacKay¹, Evelise Bourlon¹, Martin Lavoie¹, Andrea Darlington², Lesley A. James³, and David Risk¹

¹Department of Earth Sciences St. Francis Xavier University Antigonish, Nova Scotia Canada (akhalegh@stfx.ca)

²Air Quality Processes Research Section, Air Quality Research Division, Environment and Climate Change Canada, Toronto, Canada (Andrea.Darlington@ec.gc.ca)

³Department of Oil and Gas Engineering, Memorial University of Newfoundland, Newfoundland and Labrador, Canada (ljames@mun.ca)

In Canada, offshore oil production facilities are exempt from new methane mitigation requirements that apply to onshore producers. Since onshore oil and gas operations have been shown in Canada to emit more methane than is reported in the federal inventory, it is reasonable to question methane emission levels, and intensity, of Canada's offshore oil production. In this study, we measured methane emissions from an aircraft equipped with Picarro 2210-i gas analyzer and Aventech wind measurement system (AIMMs_30). The top-down emission rate retrieval algorithm (TERRA) was used to calculate the emission rate using a mass balance technique. The algorithm was developed by Environment and Climate Change Canada and has been used previously for airborne emissions measurement campaigns around oil and gas facilities. In addition to mass balance estimates, we also derived estimates from downwind transects using a Gaussian Dispersion model. We flew around each of the 3 offshore facilities 3 times to ensure accurate measurements considering the unpredictable offshore weather conditions. Our emissions estimates were overall comparable with inventory estimates, which demonstrate a much lower methane emissions intensity than onshore oil production in western Canada. We compared our results against reported values for other aircraft-based measurement studies including those in the North Sea and the Gulf of Mexico. Although average measured emission rates in Eastern Canada are higher in absolute terms than similar platforms in the Gulf of Mexico or the North Sea, methane emission intensity is lower because production levels are very high.

Keyword: Methane emission rate, Inventories, Mass balance, Top-down, Airborne measurement