



Fresh and Secondary Exhaust Emission Outcomes of Lubricating Oil Blended into Marine Fuel

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Pollutants emitted by internal combustion engines harm human health and contribute to climate change. Diesel engines, commonly used to power ships, are a significant source of these emissions. Eichler et al. (2017) identified lubricating oil as a major contributor to ship exhaust particles. As the shipping industry transitions to decarbonized fuels, the combustion of lubricating oil may remain a source of organic aerosol emissions. This study highlights the role of minimizing lubricating oil combustion in reducing exhaust emissions from ships.

In this study we used a small diesel generator to produce aerosol emissions from marine fuels. Lubricating oil was blended into marine distillate fuel (DMB) to investigate its impact on exhaust emissions. Our results revealed that the addition of lubricating oil led to increased particle number emissions, a marked rise in nucleation-mode particle formation and a reduction in black carbon emissions. We also examined the effects on volatile organic compound emissions (with a PTR-MS), secondary aerosol formation potential (with an OFR), particle chemical composition (with a SP-AMS), and toxicity (with an air-liquid interface). These results, currently under analysis, will be presented in due course.