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Estimation of exhaust emission from ocean-going vessels for the Port of Cape Town

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Abstract

International shipping is recognised as an important sector of the global economy with over 80% of trading goods being transported by ships. Emissions from Ocean-Going Vessels (OGVs) which are generally powered by diesel fuel are thus increasingly contributing to the growing emissions from the transport sector. As 70% of emissions from ships occur within 400 km of coastlines this could lead to air quality related problems within and around coastal towns and harbours. South Africa is home to some of the busiest ports on the African continent, thus highlighting the importance of characterising emissions from OGVs. This paper presents the results of ship emissions inventories that were compiled for the Port of Cape Town for a base year of 2012 using three well known emission inventory methodologies. Results for key greenhouse gas emissions, carbon dioxide (CO₂) and methane (CH₄), and air pollutants such as particulate matter, carbon monoxide (CO), oxides of nitrogen (NO_x), and oxides of sulphur (SO_x) are presented. The approaches, data needs/availability and assumptions of these methods in relation to the case study outcomes are used to make recommendations for a suitable approach that could be used in future research to characterise emissions from OGVs for the other major ports of the country.