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Climate and environmental impacts of CO2 reduction from shipping using a cost-effectiveness criterion

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The International Maritime Organization (IMO) is currently working to establish CO2 regulations for international shipping and a cost effective approach has been suggested. Eide et al. (2011) analyses the CO2 emission reduction potential and the associated marginal cost levels for the international cargo fleet. Measures to reduce CO2 emissions also influence emissions of other gases and aerosols. This could have a significant additional impact on climate as well as air pollution. We calculate the associated changes in non-CO2 emissions for the 2010 cargo fleet using the regulations from Eide et al. (2011) with costs less than 50 USD per tonne CO2 reduced. We then make an integrated approach using several models (chemical transport model, radiative forcing model and simple climate model) to quantify the impact on pollution levels and temperature. This is the first study calculating the integrated impact of all relevant species due to CO2 mitigation.

We also calculate how the CO2 based mitigations affect emissions from the major ship types. Dalsøren et al. (2009) quantified the impact on concentrations of major pollutants from bulk, tanker and container ships in year 2004 and found substantial geographical differences due to distinct trading patterns and non-linear atmospheric chemistry. With additional emission differences due to ship type dependent mitigation potential the impact diversity between ship sectors could potentially be large. Model studies of changes in pollution levels and temperature for the three major ship types are performed to find out whether this is the case.

References:

Dalsøren, S., M. Eide, O. Endresen, A. Mjelde, G. Gravir, and I. Isaksen (2009). Update on emissions and environmental impacts from the international fleet of ships: the contribution from major ship types and ports, Atmospheric Chemistry and Physics, 2171-2194.

Eide, M., Longva, T., Hoffmann, P., Endresen, Ø., Dalsøren, S., (2011). Future cost scenarios for reduction of ship CO2 emissions. Maritime Policy & Management, 38: 1, 11-37.