



Influence of weather on emissions from the global shipping fleet

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We present a comprehensive inventory of emissions from the global shipping fleet from 2017, as well as the influence of weather on fuel consumption and emissions of greenhouse gases (GHGs) and aerosols. The effects of winds and waves can result in an increase in emissions of as much as 15-20% in some weather prone areas with heavy ship traffic, such as the North Atlantic. Our results indicate that weather is an important factor for emissions from ships, and that revised ship operations and weather routing could substantially reduce emissions of GHGs and aerosols.

The ship emissions were estimated using satellite data (Automatic Identification System (AIS) data) to describe ship activity, combined with technical properties of each vessel, such as e.g. ship dimensions and engine size. Increases in fuel consumption and hence GHG and aerosol emissions (BC, EC, CO, OC, NO_x and SO_x) from the added resistance of waves, swell and winds, were calculated based on reanalysis data for each ship location throughout the year.