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Impact of marine inorganic chlorine emissions on the tropospheric oxidizing capacity

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Isotope-resolving measurements of methane at performed at Baring Head, New Zealand, suggest that an appreciable amount of methane is lost through the reaction CH4 Cl which exhibits a large kinetic isotope effect. The measurements lead to an estimate for the reduction of the methane lifetime due to this reaction. Incorporating emissions of inorganic chlorine from the ocean surface into the UKCA whole-atmosphere chemistry-climate model, we calibrate the total global emissions of inorganic chlorine from the sea surface to achieve a reduction of the methane lifetime as indicated by these measurements, versus a model simulation without this additional source of chlorine. We quantify the impact these oceanic inorganic chlorine emissions have on tropospheric ozone and on other organic compounds which also react with chlorine.