UPTAKE OF METHANOL TO THE NORTH ATLANTIC OCEAN

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Methanol has an almost ubiquitous presence throughout the depth of the troposphere and has been identified as having an important effect on the atmospheric oxidative capacity, yet its global sources and sinks are not well known. Recent evaluations of the methanol budget conclude that a major uncertainty is whether the ocean is a net source or sink. During the North Atlantic Marine Boundary Layer Experiment (NAMBLEX) in July-August 2002, an anticorrelation between methanol concentrations and wind speed and a positive correlation between dimethylsulphide concentrations and wind speed was observed during a 3 day period of cyclonic activity in which the averaged surface wind speed changed substantially as a low pressure system evolved over the northeast Atlantic. The observations agreed well with theoretical predictions derived assuming air-sea exchange according to the transfer velocity method, embedded in a zero dimensional box model. For the average wind speeds encountered, an irreversible ocean uptake rate of methanol of 8 x 10^-7 s^-1 was calculated, equivalent to a deposition rate of 0.08 cm s^-1, in good agreement with deposition rates used in global models. However, owing to the dependence on wind speed, the uptake rates calculated showed substantial range and the calculated contribution of ocean deposition to total destruction (uptake and OH destruction) varied from approximately 20% to 60%.