A need for intercalibration of atmospheric and oceanic measurements of short-lived halocarbons

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Very short-lived (VSL) halocarbons play significant roles in tropospheric and stratospheric chemistry. These gases have lifetimes of less than 6 months and consequently are not well distributed in the atmosphere. VSL halocarbons and their breakdown products have been implicated in tropospheric oxidation of reduced compounds, in the formation of cloud condensation nuclei, and in stratospheric ozone depletion. The most recent Scientific Assessment of Ozone Depletion suggests that 30% of ozone-depleting bromine in the lower stratosphere derives from VSL halocarbons.

Several studies have highlighted variability in marine concentrations and atmospheric fluxes of these gases. Reported values vary within several orders of magnitude in individual investigations, but they also vary widely among the several reports. The variations result in part from natural spatial and temporal differences, but it is not clear how much the discrepancies emanate from analytical dissimilarities or calibration.

Because of the importance of these gases in climatic processes, it is imperative that sampling, analytical, or calibration discrepancies be accounted for. In this presentation, we demonstrate the extent and implications of the apparent differences among data sets, discuss the difficulties and uncertainties in calibration and analytical procedures, and suggest a plan for resolving discrepancies in future measurements and possibly correcting disparities among some existing data sets.