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Bromoform and Dibromomethane from AGAGE stations

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Bromoform and dibromomethane are ubiquitously present in the marine atmosphere due to its release from algae, providing an important source of reactive bromine to the atmosphere. Photo-destruction of these two organic bromine-containing trace gases releases Br atoms, which can initiate catalytic ozone depletion and alters NO/NO_2 and HO/HO_2 chemistry.

5-40% of stratospheric bromines are believed to have been originated from bromoform and dibromomethane, however high spatial and seasonal variability in the ambient mixing ratios of Bromoform and Dibromomethane gives rise to considerable uncertainty in their global scale emission estimates and sources of stratospheric bromine have been inadequately quantified.

Using the high frequency, continues bromoform and dibromomethane data collected at several AGAGE stations, dibromomethane correlates well with bromoform, suggesting common regional sources. The bromoform and dibromomethane ratio can be considered as an indicator of distance between the stations and the source areas.

Bivariate Polar plot findings at most AGAGE stations are consistent with the observations that high level of bromoform and dibromomethane emissions are from macroalgae whose growth is concentrated to coastal regions, rather than open ocean. The seasonal trend agrees well with this statement, with high bromoform and dibromomethane mixing ratio generally associated with periods of high primary productivity around coastal stations, correlating positively to oceanic chlorophyll A level.

The NAME model is used as a first estimate to quantify the amount of bromoform and dibromomethane emission at the source regions around the AGAGE stations.