

DISTRIBUTION, CHEMICAL SPECIATION AND BIOLOGICAL CYCLING OF IODINE IN THE SURFACE OCEAN AROUND STATION ALOHA

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In the global ocean, total iodine concentrations are relatively uniform at 450-500 nM, with iodate (IO_3^-), the oxidized form, being dominant throughout most of the water column. However, at low latitudes and along ocean margins, concentrations of iodide (I^-) in surface waters are often higher than 100 nM. The reduction of iodate to iodide is attributed to biological activity. Iodate is also incorporated into dissolved organic matter, although the speciation and cycling of this fraction of iodine is not well understood. Here we characterize the speciation and distribution of iodine at Station ALOHA, a long-term ecological study site in the subtropical north Pacific Ocean. Total iodine, I^- and IO_3^- concentrations were measured to investigate their distribution in the upper 1,000 m of the water column. Shipboard incubations using ^{129}I as a tracer were completed over a 60-hour interval to measure rates of iodide oxidation to iodate. We also describe a new method to characterize organic iodine speciation at the molecular level using liquid chromatography coupled to mass spectrometry. We use this approach to determine the vertical distribution of dissolved organic iodine recovered from filtered seawater by solid-phase extraction. Finally, we measured the rate of dissolved organic iodine turnover through a series of deck incubation experiments using the ^{129}I tracer.