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Halocarbon production in the tropical coastal zone

Although halocarbon production in temperate and polar waters has received much scientific attention over the past few decades, production in tropical regions has mostly been ignored. Despite this lack of data, the tropics are recognised as an important global area for halocarbon production, especially with regard to the deep convective systems that may provide a rapid transport mechanism for delivering short-lived halocarbons to the stratosphere. This study provides the first combined laboratory and field measurements of tropical seaweed species in an effort to begin quantifying productivity in the tropical coastal zone. Sixteen different species from the west coast of Malaysia were incubated under controlled laboratory conditions to determine the rate of production of a number of halocarbon gases. These included $CHBr_3$, CH_2Br_2, CH_3I, CH_2I_2 and a number of mixed bromochloromethanes. The effect of incubation time, and biological variability (sampling the same species from different sites or during different months) were assessed, as was the effect of exposure to the atmosphere and re-submersion to simulate tidal cycles. The work was also combined with ambient and flux chamber field measurements, from along the same coastline, to determine *in situ* halocarbon concentrations and emission rates. An extremely large range of emission rates were observed, not only between species, but even between different samples of the same species. In general rhodophytes were the most prodigious producers, although the Phaeophyceae appeared to preferentially produce iodinated compounds. In

general the emission rate of tropical species overlapped with the range of values for temperate seaweeds seen in our own data sets and published reports.