



Open ocean measurements of trace gas air/sea concentrations and eddy correlation fluxes in the N. Atlantic Ocean

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Shipboard dimethylsulfide (DMS) air/sea concentrations and eddy correlation fluxes were measured aboard the R/V Knorr in July, 2007. The cruise track extended from Iceland to Woods Hole, MA and traversed the later stages of the North Atlantic coccolithophore bloom. Atmospheric and seawater DMS were measured using atmospheric pressure chemical ionization mass spectrometry (API-CIMS) and a membrane equilibrator. The bloom region was characterized by extremely high surface seawater and atmospheric DMS levels. The inferred gas transfer coefficients (k) were larger than expected based on the observed wind speed and the measured air/sea concentration gradient. The wind-speed dependence of k was also steeper than previously observed in other oceanographic regions. Outside the bloom area, DMS levels and gas transfer coefficients were considerably lower. The wind speed-dependence of k was similar to wind speed dependences derived from eddy covariance and dual tracer techniques performed in other oceanographic regions.

Atmospheric and seawater P_{CO_2} were also measured on the cruise, using open and closed path LI-COR infrared gas analyzers. Both a showerhead and a membrane equilibrator were used for seawater measurements. Preliminary results indicate that eddy correlation air/sea fluxes were above the instrumental detection limit only for brief periods over the cruise track. The instrumental limitations on measurement of air/sea CO_2 fluxes are discussed.