



## Sources and cycling of carbonyl sulfide in the Sargasso Sea

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Limnol. Oceanogr., 49(2), 2004, 555-565 | DOI: 10.4319/lo.2004.49.2.0555

**ABSTRACT:** The cycling of the radiatively important gas carbonyl sulfide (OCS) was studied in surface waters of the Sargasso Sea. In August 1999, surface OCS concentrations averaged 8.6 pmol L<sup>-1</sup>, showed minor diel variations, and varied little with depth. An OCS precursor, total dissolved organic sulfur (DOS), was lowest at the surface (40 nmol L<sup>-1</sup>) and increased with depth. The photoproduction rate of OCS from in situ incubations averaged 9.6 pmol L<sup>-1</sup> h<sup>-1</sup>, whereas dark production was 7.0 pmol L<sup>-1</sup> h<sup>-1</sup>. Apparent quantum yields were 10<sup>-5</sup>-10<sup>-7</sup> from 313-436 nm and varied with the water depth irradiated. In March 2000, there were strong diel variations in surface OCS (highest in late afternoon; overall average, 16.9 pmol L<sup>-1</sup>). Depth profiles in the afternoon showed surface water maxima and decreases with depth, whereas DOS had a surface maximum of 419 nmol L<sup>-1</sup> and decreased with depth. Dark production was 4.0 pmol L<sup>-1</sup> h<sup>-1</sup>. Modeling of the diel cycle suggested a photoproduction rate of 16.4 pmol L<sup>-1</sup> h<sup>-1</sup>. Overall, the photochemical production of OCS strongly depended on DOS and chromophoric dissolved organic matter, whereas dark production was influenced by the presence of particles and perhaps microbial respiration, showing a direct biotic influence on OCS cycling.

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