



## Photochemical production of dissolved organic carbon from resuspended sediments

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**ABSTRACT:** A series of controlled photolysis experiments using simulated sunlight was conducted in the presence and absence of estuarine bottom sediments to address the role of sediment resuspension on dissolved organic carbon (DOC) cycling in estuarine and coastal waters. In 0.2- $\mu\text{m}$ -filtered estuarine water samples with no added sediment, DOC concentrations decreased from 0.4 to 3  $\mu\text{mol L}^{-1} \text{h}^{-1}$  as a result of photooxidation. When 0.2- $\mu\text{m}$ -filtered water samples with the addition of 1-2 grams of estuarine sediment per liter were irradiated, DOC was produced at rates of 3 to 150  $\mu\text{mol L}^{-1}$  DOC per gram dry sediment. Photoproduction of DOC from resuspended sediments increased in direct proportion to the percent organic carbon content of the added sediment. Highenergy ultraviolet light was the most effective for photodegrading DOC in filtered samples and for photoproducing DOC from resuspended sediments. Photosynthetically active radiation (PAR; 400-700 nm) did not significantly degrade DOC in filtered water. However, PAR did produce half as much DOC from resuspended sediments in organic-rich regions of the estuary relative to full spectrum sunlight irradiations. The photoproduction of DOC from resuspended sediments, calculated for the top 1 m of coastal waters, resulted in fluxes that were significantly larger than benthic and riverine fluxes of DOC. Photoproduction from resuspended sediments therefore represents an episodically significant but previously unrecognized source of DOC to estuarine and coastal ecosystems receiving large sediment plumes.

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