Blending two ocean color algorithms to evaluate ultraviolet (UV) optics and photochemistry using the Hyperspectral Imager for the Coastal Ocean (HICO)

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Abstract

Knowledge of light partition into different optically active constitutes particularly chromophoric dissolved organic matter (CDOM) in the ultraviolet (UV) is indispensible for understanding UV dependent biogeochemical issues including photochemical processes in optically complex waters. Herein a new approach is presented to investigate photochemistry by blending two ocean color algorithms, namely the composite Sea*UV* [[*Cao et al.*, 2014](#_ENREF_7)] and the Sea*CDOM* [[*Cao and Miller*, 2014](#_ENREF_6)] algorithms, to visible remote sensing reflectance measured using the Hyperspectral Imager for the Coastal Ocean (HICO). As exemplified with photoproduced carbon monoxide (CO) from CDOM photodegradation, we model CO photoproduction at specific depth as well as integrating over the water column and elucidate the mechanism regulating the depth-integrated photoproduction rates in the UV in a dynamic coastal environment. Decoupled retrieving of bio-optical properties such as diffuse attenuation coefficient (*K*d) and CDOM absorption coefficient (*a*g) in the UV from ocean color observations allows a synoptically dynamic view of CDOM contribution to total light attenuation (*a*g/*K*d) and will have potential to probe UV processes on regional as well as global scales using remote sensing of ocean color.