**ENHANCED SATELLITE REMOTE SENSING OF COASTAL WATERS USING SPATIALLY IMPROVED BIO-OPTICAL PRODUCTS FROM SNPP-VIIRS**

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**Abstract**

The spatial dynamics of coastal and inland regions are highly variable and monitoring these waters with ocean color remote sensors requires increased spatial resolution capabilities. A procedure for the spatial enhancement of ocean color products, including chlorophyll and inherent optical properties (IOPs), is developed using a sharpened visible water-leaving radiance spectrum for the Visible Infrared Imaging Radiometer Suite (VIIRS). A new approach for spectral sharpening is developed by utilizing the spatial covariance of the spectral bands for sharpening the M bands (412, 443, 486, 551, 671 nm; 750-m resolution) with the I-1 band (645 nm; 375-m resolution). The spectral shape remains consistent by the use of a dynamic, wavelength-specific spatial resolution ratio that is weighted as a function of the relationship between proximate I- and M-band variance at each pixel. A comparison of bio-optical satellite products at 375-m and 750-m spatial resolution with *in situ* measurements of water leaving radiance and bio-optical properties show an improved capability of the VIIRS 375-m products in turbid and optically complex waters, such as the Chesapeake Bay and Mississippi River Plume. We demonstrate that the increased spatial resolution improves the ability for VIIRS to characterize bio-optical properties in coastal waters. The benefit of a semi-analytical approach to band sharpening is that is can potentially be applied to other satellite sensors that have wide bandwidth, high spatial resolution bands.