**Satellite retrievals of *Karenia brevis* harmful algal blooms in the West Florida Shelf using neural networks and comparisons with other techniques**

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We describe the detection and tracking, of *Karenia brevis* Harmful Algal Blooms (*KB* HABs) that plague the coasts of the West Florida Shelf (WFS) from Visible Infrared Imaging Radiometer Suite (VIIRS) satellite observations without the need for remote sensing reflectance signal at the 678 nm (*Rrs*678), chlorophyll fluorescence band. VIIRS which has replaced the Moderate Resolution Imaging Spectroradiometer Aqua (MODIS-A), unfortunately does not have a 678 nm fluorescence channel which previous approaches for the detection of *KB* HABs in the WFS depended on chlorophyll fluorescence band from MODIS-A satellite. Our *KB* HABs detection approach relay on Neural Network (NN) retrievals of phytoplankton absorption at 443 nm (*ɑph443*), using only *Rrs* measurements from existing VIIRS channels at 486, 551 and 671 nm. NN *ɑph443* can in turn be converted to an equivalent chlorophyll-*ɑ* concentrations [*Chlɑ*] and compared against current default and recent published [*Chlɑ*] retrieval algorithms. Lastly [*Chlɑ*] methods obtained from VIIRS satellite observations can be evaluated against the ground-truth *KB* cell counts measurements reported over a four year period, confirm the viability of the NN technique, when combined with the filtering constraints devised, for effective detection of *KB* HABs.