Quantification of Blue Carbon Burial in Seagrass Ecosystems

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Purpose: Global ocean monitoring

Study Objective: Evaluate the utility of commercial imagery for quantifying the abundance and distribution of submerged aquatic vegetation (SAV) in nearshore coastal waters, and sea ice conditions in the Chukchi-Beaufort Sea region of the Arctic Ocean.

Imagery: WorldView-2, WoldView-3, GeoEye, PlanetScope

Findings: The higher spatial resolution imagery from WorldView-2 and 3 proved adequate for mapping the percent cover of SAV by expert analysts without the need for radiometric calibration or atmospheric correction. The relatively coarser spatial resolution and sun glint contamination made GeoEye and PlanetScope imagery less useful. While there is considerable potential utility for high resolution commercial imagery, more work needs to be done to standardize and automate procedures for orthorectification, radiometric calibration and atmospheric correction that will enable scientists to advance their research.

WV3 image of South Bay, VA showing characteristic R_{rs} spectra of clean offshore water, seagrass, dirty coastal water and unvegetated sand (B) before and (C) after atmospheric correction.
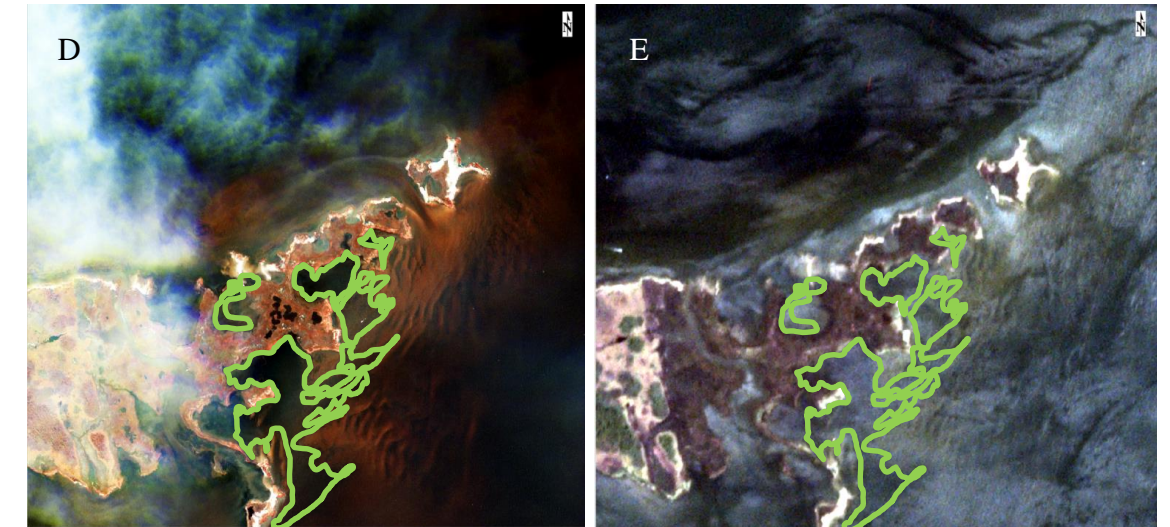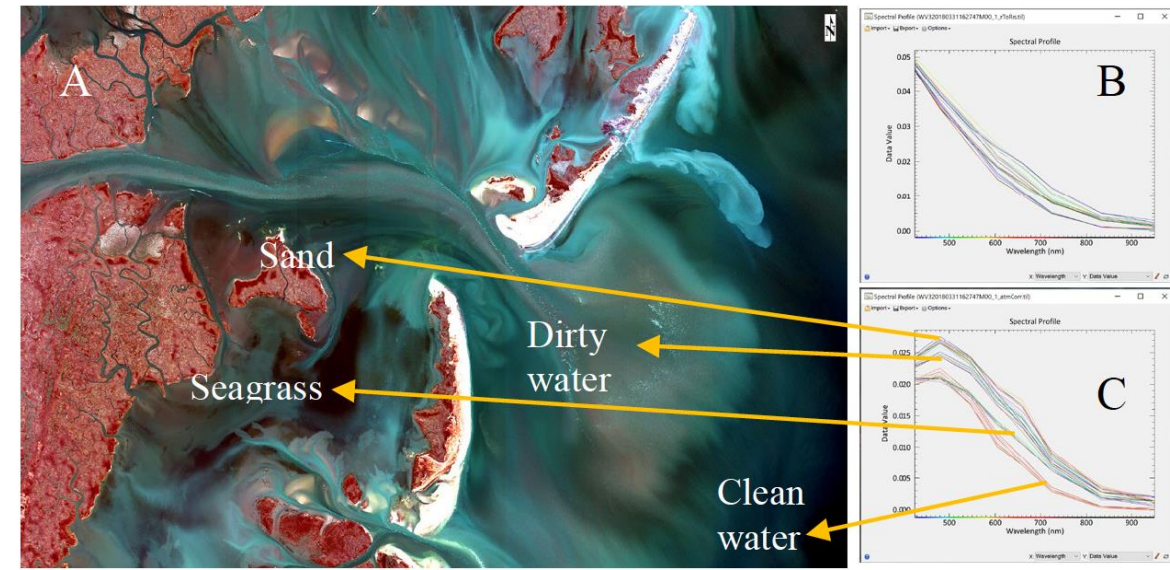
(D) WorldView-2 image of the Goodwin Island National Estuarine Research Reserve, located at the mouth of the York River in Chesapeake Bay collected on 19 July 2018. (E) Planet Dove image of the same location collected on 14 July 2018 with extensive sunglint (white haze) over almost all the aquatic areas but not the land. Areas outlined in green on both images indicate dense seagrass vegetation detected by visual inspection of the WV-2 image. Visual contrast in both images presented here was enhanced using a histogram equalization stretch that scales the data to have the same number of digital numbers (DNs) in each bin.