Distribution and abundance of pelagic Sargassum and their linkage with environmental changes in the Intra-Americas Sea and Tropical Atlantic: an interdisciplinary assessment

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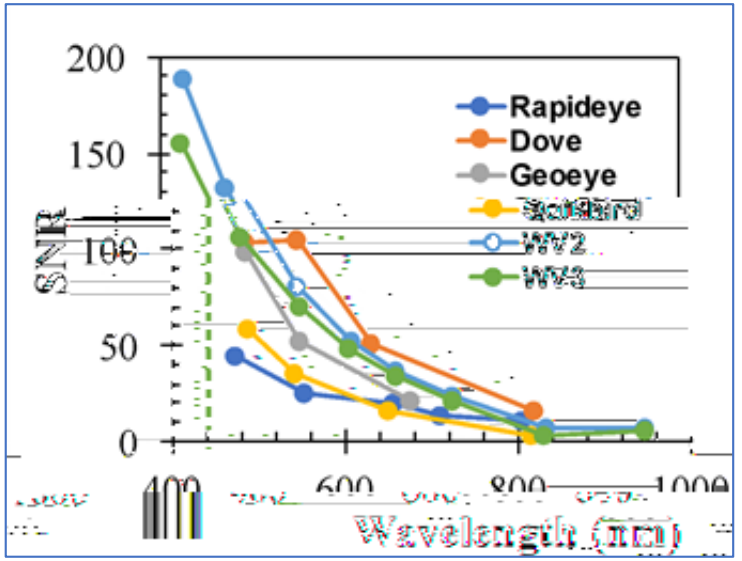
Purpose: Monitor ocean health and advance ocean biology and biogeochemistry research

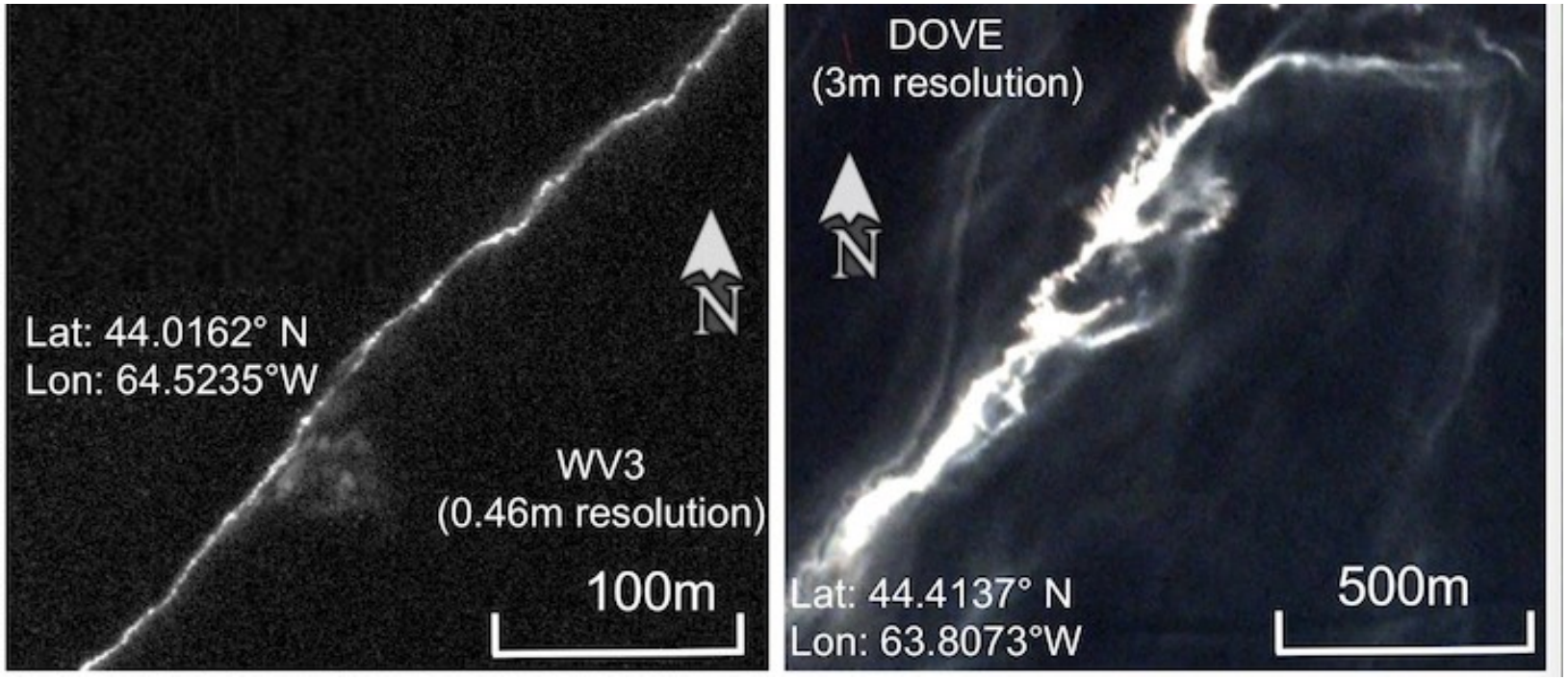
Study Objective: Assess the utility of imagery for mapping macroalgae and oil slicks in the Gulf of Mexico, the Caribbean Sea, East China Sea, and the Yellow Sea

Imagery: PlanetScope, WorldView

Findings: Despite problems associated with sensor calibration and relatively low signal-to-noise ratio, imagery from PlanetScope was found to be effective in detecting and quantifying macroalgae, as well as differentiating oil emulsions from non-emulsions. Both PlanetScope and WorldView imagery show potential in detecting "unknown" ocean surface features, which are speculated to be caused by aggregations of sea jellies. If confirmed, this may represent a milestone in ocean remote sensing. Deep learning techniques appear to be feasible for automatic feature extraction.



Signal-to-noise ratio of the commercial sensors, estimated from relatively homogenous ocean scenes with moderate solar zenith angle. Spatial resolution ranges from 1.65 to 5 m.



WV-3 and PlanetScope images show surface slicks in the North Atlantic, whose spectral shapes (inset figure) indicate transparent organisms/materials, likely aggregation of sea jellies.