

OCEAN OPTICS XXIV

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Tuesday, October 9

Poster Session 2

10:30–12:30

Poster 50

HIGH RESOLUTION SATELLITE DATA REVEALS MASSIVE EXPORT OF CARBON AND NITROGEN-RICH SEAGRASS WRACK FROM GREATER FLORIDA BAY TO THE OPEN OCEAN AFTER HURRICANE IRMA

Episodic storms are known to be important drivers of ocean ecosystem processes, but the impacts are notoriously difficult to quantify with traditional sampling techniques. Here, we use Sentinel 2A imagery collected 13 September 2017, only days after Hurricane Irma passed directly over the Florida Keys, to quantify massive amounts of floating vegetative material. This Category 4 storm passed directly over the Florida Keys, bringing wind gusts over 35 m s^{-1} and creating turbulence in the water column that scoured the seafloor. The imagery reveals an initial estimate of 40 km^2 of surface drifting seagrass leaves or “wrack” advected under high winds from dense beds of *Syringodium filiforme* within Greater Florida Bay to the oceanic waters of the Atlantic. In total, this corresponds to export of $9.7 \times 10^{10} \text{ gC}$ and $2.7 \times 10^9 \text{ gN}$ from the seagrass beds. Elemental analysis of seagrass leaves is consistent with nitrogen-fixation in the beds, which could provide the means to sustain a large export of nitrogen from the meadows. Although wrack can potentially remain floating for months, the ultimate fate of the wrack is to either wash ashore, providing connectivity between marine and terrestrial ecosystems, or sink to the seafloor. If most of the wrack sinks, this single localized event represents 0.3-0.7% of the average daily carbon export of phytoplankton to the seafloor for the entire ocean ($5\text{-}12 \text{ Pg C yr}^{-1}$). Satellite technology is allowing for more detailed analyses of the important role of episodic events in shaping aquatic ecology and influencing global biogeochemistry.

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