

Primary production and respiration in permeable coral reef sands measured with an improved eddy covariance instrument

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Carbonate sands are an integral part of coral reef environments but their role in the cycling of matter in the reef is understudied. Here a novel aquatic eddy covariance instrument was used in a Florida coral reef sand flat to quantify benthic oxygen fluxes as proxy for benthic metabolism. The non-invasive measurements characterize the carbonate sands as sites of intensive organic matter production and consumption and underline their dependency on key environmental drivers such as light, water current velocity, and significant wave height. The positive response to light and increasing light intensity revealed significant benthic primary production with large temporal dynamics at ~9 m water depth. The oxygen fluxes reveal permeable coral reef carbonate sands as sites of intensive primary production and benthic mineralization underlining their role in the reef as hotspots of benthic carbon cycling.

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