

OCEAN OPTICS XXIV

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<https://oceanopticsconference.org>

Tuesday, October 9

Poster Session 2

10:30–12:30

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LOW ALTITUDE REMOTE SENSING OF SUSPENDED SEDIMENT CONCENTRATION FROM AN UNMANNED AERIAL VEHICLE

Tidally driven sediment transport plays an important role controlling water quality, fate of contaminants, and shoreline morphology. Scientists studying these phenomena have traditionally relied on in situ measurements that often lack spatial coverage required when determining regional sediment budgets. While the capabilities of satellite remote sensing in coastal seas and estuaries has improved in recent years enabling estimates of suspended sediment concentration (SSC) at increasingly finer resolution, the sensors' infrequent overpasses limit their usefulness in estuaries like San Francisco Bay, where resuspension due to waves and tides occur at a time scale of hours. To fill the gap in this technology, we developed a system for remotely sensing surface SSC from an unmanned aerial vehicle (UAV). The platform consists of an off-the-shelf multispectral camera and a downwelling irradiance sensor that provides reflectance observations at a centimeter scale. In order to mitigate sources of measurement error not resolved in traditional satellite imagery, we developed an algorithm that masks areas of sun glint and filters out the effects of wind-generated waves. The system was tested in a series of experiments in the summer of 2017 and spring of 2018 in South San Francisco Bay, during which we compared remotely sensed measurements with in situ hyperspectral reflectance and SSC. This work provides promise that UAVs will be a powerful, flexible, and cost-effective tool in water-quality monitoring and reveals new challenges that must be addressed moving forward.

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