

OCEAN OPTICS XXIV

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<https://oceanopticsconference.org>

Wednesday, October 10

Poster Session 3

16:00–18:00

Poster 71

HYPERSPECTRAL AIRBORNE REMOTE SENSING OF MARINE LITTER IN THE GREAT PACIFIC GARBAGE PATCH

For more than 40 years marine litter (ML) has been monitored using net tows, occasionally coupled with numerical distribution models. Net tows provide a fundamental ML knowledge-base but have a limited spatiotemporal coverage, a single survey covering at most 0.002 km² of the total sea surface area. We present a proof-of-concept of a complementary monitoring approach, airborne remote sensing of ML in the Great Pacific Garbage Patch. Hyperspectral imagery was captured by a SASI-600 airborne spectrographic imager in the shortwave infrared (SWIR, 950-2450 nm) and true-color images from an Optech-CS-4800i RGB camera mounted on a C-130 Hercules aircraft. The RGB mosaics obtained were inspected for ML that was classified into container, net, float, rope and unknown/other. We then selected the top 30 largest items, > 0.1 m in length, within each ML category to investigate the matching SWIR information. The analyses revealed unique SWIR spectral features common to ML, making it possible to discriminate ML pixels from seawater pixels. Moderate to very strong similarities were determined by spectral angle mapping for each ML class. At-sensor radiances of submerged ML were lower in comparison to radiances of the floating portions. Absorption features at ~1215 and 1732 nm were evaluated for potential detection and quantification of ML from remote sensing through an intervening atmosphere. The appropriateness of common airborne SWIR imagers was explored in relation to monitoring spectral properties of ML. Study findings provide important information to those working towards developing effective remote sensing solutions to monitor ML from above-water platforms.

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