

# OCEAN OPTICS XXIV

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<https://oceanopticsconference.org>

Monday, October 8

Poster Session 1

16:00–18:00

## Poster 121

### **CALIBRATION AND VALIDATION OF A NEW INSTRUMENT FOR MEASURING THE ANGULAR LIGHT SCATTERING PROPERTIES OF SEAWATER**

Despite the relative importance of the volume scattering function (VSF), the ocean optics community has historically relied on theoretical models and a limited dataset of measurements made using custom-built instruments. A new instrument (LISST-VSF, Sequoia Scientific) capable of in situ operation has recently become commercially available to provide measurements of the VSF and the degree of linear polarization (DoLP) of scattered light at 532 nm with high angular resolution within the range of scattering angles from  $\sim 0.1^\circ$  to  $155^\circ$ . A thorough and independent characterization, calibration, and validation of the instrument has been completed. We describe laboratory experiments using 6 different diameter NIST certified polystyrene bead standards coupled with theoretical light scattering calculations to both evaluate instrument performance and to develop angle-dependent calibration correction functions for improved estimates of the VSF and DoLP. For the VSF, corrections on the order of 150 – 200% were required for nearly all scattering angles. Following correction, measured VSF values agree well with the theoretical VSF with a median absolute percent difference (MAPD) of 3.92% and a mean bias (MB) of  $-0.028 \text{ m}^{-1} \text{ sr}^{-1}$ . Similarly, the correction yielded improved comparisons of measured DoLP values with theoretical estimates (MAPD of 4.44% and MB of 0.017). The corrections for both VSF and DoLP were further validated through comparison with an independent multi-angle light scattering meter (DAWN-EOS, Wyatt Technologies). The improved measurement capabilities are used to investigate variability in the VSF and DoLP for natural seawater samples representing distinctly different assemblages of suspended particulate matter.

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