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Thursday, October 11
Oral Session 9
08:30–10:30

08:50–09:10

ABSORPTION COEFFICIENTS DERIVED FROM IN SITU RADIOMETRY USING GERSHUN'S LAW

Absorption is a fundamental process influencing the shape and magnitude of the light field underwater. However, in situ absorption coefficients are difficult to measure accurately with currently available instruments due to the presence of scattering material. An alternative technique to determine in situ absorption spectra uses Gershun's equation to derive absorption coefficients from in situ radiometry measurements of Ed, Eu, and Eo. The number of studies using this technique in the past 20 year is extremely limited. Given significant developments in radiometric sensor technology during this time, it is timely to re-assess the quality of Gershun absorption data. Practical advantages of the Gershun method compared to established instruments are reduced bias associated with sample collection (pumping or discrete) and that absorption is determined from much larger sample volumes. This difference in sample volume might be significant when comparing field data to data from satellites which detect large surface areas. Here, two contrasting datasets of in situ radiometry were used to calculate spectral absorption coefficients. Resulting absorption spectra were highly sensitive to data quality control and number of depth bins included in the calculations. Comparison with PSICAM absorption data showed a tendency to overestimate PSICAM values by up to 30% (400–625 nm), with expected maximum deviation >100% in the red region, where inelastic processes (ignored in the classic Gershun equation) have a significant effect. Potential sources of systematic errors in Gershun's and PSICAM data are explored, taking into account inelastic scattering effects and potential impact of large, relatively sparse coloured particles.

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