

OCEAN OPTICS XXIV

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Tuesday, October 9

Oral Session 3

08:30–10:30

09:30–09:50

EFFECTS OF EARTH CURVATURE ON ATMOSPHERIC CORRECTION FOR OCEAN COLOR REMOTE SENSING

In this study, a vector radiative transfer model for the coupled ocean-atmosphere system with consideration of the effects of Earth curvature (named PCOART-SA) was developed using the pseudo-spherical approximation. Both downward and reflected solar beam radiation were corrected accounting for Earth curvature effects. Validation showed that the PCOART-SA results agreed well with literature benchmarks and the CDISORT and AccuRT model results. Based on PCOART-SA, Earth curvature effects on Rayleigh-scattering radiance including polarization were investigated. The results showed that the influence of Earth curvature increased rapidly with solar zenith angle, with influences up to 1%, 3%, and 12% for solar zenith angles at 75°, 80°, and 85°, respectively, which should be considered for high accuracy atmospheric correction. We also found that the Rayleigh-scattering look-up table in SeaDAS after version 7.2 showed significant bias at high solar zenith angles, which needs further investigation. Finally, using the PCOART-SA model, we generated Rayleigh-scattering lookup tables for Aqua/MODIS with consideration of Earth curvature effects, which can be directly used in SeaDAS.

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