



Due to technical problems, there is a delay in posting the full text version of articles. We hope to have this resolved soon.  
In the meantime please see the PDF version of articles.

## Abstract View

[Volume 3, Issue 4 \(October 1973\)](#)

### Journal of Physical Oceanography

Article: pp. 353–372 | [Abstract](#) | [PDF \(1.31M\)](#)

# Monte Carlo Calculations of the Polarization of Radiation in the Earth's Atmosphere-Ocean System

**George W. Kattawar, Gilbert N. Plass, and John A. Guinn Jr.**

*Dept. of Physics, Texas A & M University, College Station 77843*

(Manuscript received May 10, 1973, in final form July 12, 1973)

DOI: 10.1175/1520-0485(1973)003<0353:MCCOTP>2.0.CO;2

### ABSTRACT

The degree and direction of polarization, the ellipticity, and the radiance of the radiation at various levels in the atmosphere and ocean are calculated by a Monte Carlo method which includes all orders of multiple scattering. Both Rayleigh scattering by the molecules and Mie scattering by the aerosols, as well as molecular and aerosol absorption, are included in the model of the atmosphere. Similarly, in the ocean, both Rayleigh scattering by the water molecules and Mie scattering by the hydrosols, as well as absorption by the water molecules and hydrosols, are considered. Separate single-scattering phase matrices are calculated from Mie theory for the aerosols and hydrosols. Both the reflected and refracted rays, as well as the rays that undergo total internal reflection, are followed from the ocean surface which is assumed to be flat. The degree and direction of polarization, the ellipticity, the radiance and the flux are given as functions of the turbidity of the ocean, the solar zenith angle, and the wavelength of the radiation.

#### Options:

- [Create Reference](#)
- [Email this Article](#)
- [Add to MyArchive](#)
- [Search AMS Glossary](#)

#### Search CrossRef for:

- [Articles Citing This Article](#)

#### Search Google Scholar for:

- [George W. Kattawar](#)
- [Gilbert N. Plass](#)
- [John A. Guinn](#)



© 2009 American Meteorological Society [Privacy Policy and Disclaimer](#)

Headquarters: 45 Beacon Street Boston, MA 02108-3693

DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826

[amsinfo@ametsoc.org](mailto:amsinfo@ametsoc.org) Phone: 617-227-2425 Fax: 617-742-8718

[Allen Press, Inc.](#) assists in the online publication of *AMS* journals.