Category and Session Number: Ocean and Atmospheres (OA17)
http://www.asiaoceania.org/submitabstract/authorkit.html

Preferred Mode of Presentation: Oral

Light reflection from a rough ocean surface including wind–wave states

S.V. Salinas[1] and S.C. Liew[1]

[1] *Centre for Remote Imaging, Sensing and Processing*
National University of Singapore, Singapore 119260
e-mail: crsscsv@nus.edu.sg, scliew@nus.edu.sg

On Earth based remote sensing of sea surface reflectance wind speed has been used as the dominant parameter to characterize the sea roughness via a probability distribution of water facet normals on the sea surface. A common approach to describe this probability distribution is the mean square slope (MSS) function which is usually directly link to the sea surface wind speed as shown in the pioneering work of Cox and Munk and others. However, these approaches do not include the influence of wave states, gravity, surface tension and viscous effects. Recently, Zhao and Toba[2] introduced an analytical method to calculate the MSS by integration of a widely accepted wind–wave spectrum which includes the gravity–capillary wave range. This method, which is consistent with current empirical algorithms specially at low wind speeds, coupled with linear wave theory can be used to model the MSS of a rough ocean in a more realistic way by directly including the physical properties of the atmosphere–ocean boundary. Herein, we compute light reflection and scattering into the atmosphere from an ocean– like surface and investigate wind–wave effects on the computed solar glitter as compared with empirical methods. The radiative transfer equation is effectively solved via the doubling and adding method including Fourier series expansion of the radiation field which is naturally extended to incorporate the surface term to preserve the azimuth decomposition[1]. The model can then be used to retrieve ocean surface properties or to perform atmospheric correction. Model computations and comparative test scenarios with remote sensing data are presented in this work.

References

[1] J.L. Deuzé, M. Herman and R. Santer, *J. Quant. Spectrosc. Radiat. Transfer* **Vol. 41, No. 6**, pp. 483–494 (1989).

[2] D. Zhao and Y. Toba, *J. of Oceanography* **Vol. 59**, pp. 235–244 (2002).