Correction of Sun Glint Contamination for Ocean Colour Satellite Measurement

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ABSTRACT

The specular reflection of sunlight off the sea surface known as sun glint is one of the issues encountered in the ocean colour remote sensing measurements. The sun glint reflectance is spectrally flat over the spectral range of interest and the reflectance depends on many factors such as wind speed, wind direction, sun-target-sensor configurations, and the water refractive index. In order to reduce the effect of sun glint, sensor which has glint-tilting capability such as Sea-viewing Wide Field-of-view Sensor (SeaWiFS) can avoid looking into the sun glint field. Yet this is not a case for Moderate Resolution Imaging Spectroradiometer (MODIS) sensor without glint-tilting feature and as a result glint affected areas tend to be considerably larger. The glint affected ocean surface appears bright and its radiance is far exceeding the total radiance scattered by both the atmosphere and ocean layers. This causes the information driven by water-leaving radiance is heavily contaminated and impossible to be used. Besides all ocean sensors performing in-flight glint calibration using inter-band calibration technique are limited to low to moderate glint signal. This study therefore aims to perform an alternative method to correct the sun glint problem for MODIS ocean colour retrieval. In this case the method applies an iterative semi-empirical approach of which statistical feature representing the glint on MODIS ocean colour is estimated based on the extreme attributes and later deducted from the total pixel values. The study anticipates the impact of sun glint is significantly reduced and this method has advantages to improve the accuracy and provide fast pre-processing of MODIS ocean colour retrieval particularly when dealing with massive MODIS data with higher glint effects.

Keywords: sun glint; ocean colour; MODIS