*Proceedings of the Eighth (1998) International Offshore and Polar Engineering Conference*
*Montréal, Canada, May 24-29, 1998*

*ISBN 1-880653-34-6 (Set); ISBN 1-880653-37-0 (Vol. III)*

# Ocean Color Imager — Taiwan's First Spaceborne Ocean Color Sensor

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## ABSTRACT

**The first Taiwan's scientific experimental satellite, "ROCSAT-1," will be launched by February 1999 to a 600 km circular orbit with a 35° inclination. It will carry an ocean color instrument named "Ocean Color Imager (OCI)" on board to monitor ocean color. The OCI has a 700 km swath with an 800-m square footprint on the ground. It will perform imaging any time between 9:00 to 15:00 local time. Data from the OCI instrument will be processed and then distributed by the OCI Science Data Distribution Center. The data will be free to the scientific communities.**

KEY WORDS: ocean color, remote sensing, OCI, spaceborne sensor, ROCSAT-1

## INTRODUCTION

The color of ocean is not blue only. It may be green, yellow, or even red. Generally, ocean color is affected by the concentrations of phytoplankton, suspended matters and gelbstoffe (yellow substance). The change of ocean color means the change of concentrations of such materials near the sea surface and it may also relate to marine productivity and pollution. In coastal waters, for instance, abundant marine organism, suspended matters and dissolved organic substances absorb light caused the water color changes from the bluish region typical of clear ocean water to longer wavelengths. It is an accepted tool now by using imaging spectrometers in the visible region to investigate ocean colors. From remote sensing point of view, we mean that ocean color is the relative amounts of water-leaving radiance in the various portions of the visible spectrum. Measuring water-leaving radiance can derive concentrations of pigment or chlorophyll *a*. Therefore, ocean color maps are typically presented in a "false color" format that highlights this information. Because of the role of phytoplankton in the global carbon cycle, to understand its distribution and variability can help us to assess the role of ocean in the global change. The distribution and variability of ocean color can also help the scientific communities to study the dynamics of ocean, the evolution of eddies, coastal currents and the physics of mixing. From a scientific perspective, acquisition of ocean color data from space in the 1990s is a high priority goal that has been recognized in reports of the National Research Council of the National Academy of Science (Hooker et al, 1992).

The National Space Program Office (NSPO) in Taiwan has developed a visible/near-infrared imaging spectrometer named OCI (Ocean Color Imager) which will be flown on board the Taiwan's first experimental satellite. The satellite is named "ROCSAT-1" which is a 400 kg, three-axis stabilized, low-earth orbit satellite. It will be launched by February 1999 to a 600 km circular orbit with a 35° inclination. The ROCSAT-1 is designed to carry out three scientific experiments, including ocean color imaging, ionospheric plasma and electrodynamics, and Ka-band communication. The ocean color imaging is to follow the success of Nimbus-7 Coastal Zone Color Scanner (CZCS, 1978-1986) and the SeaStar Sea-viewing Wide Field-of-View Sensor (SeaWiFS) to better understand environmental changes. The OCI's wavelengths span from 443 nm to 865 nm, for measuring water-leaving radiance, mapping chlorophyll *a* concentration distribution, investigating influence of atmospheric aerosols in remote sensing.

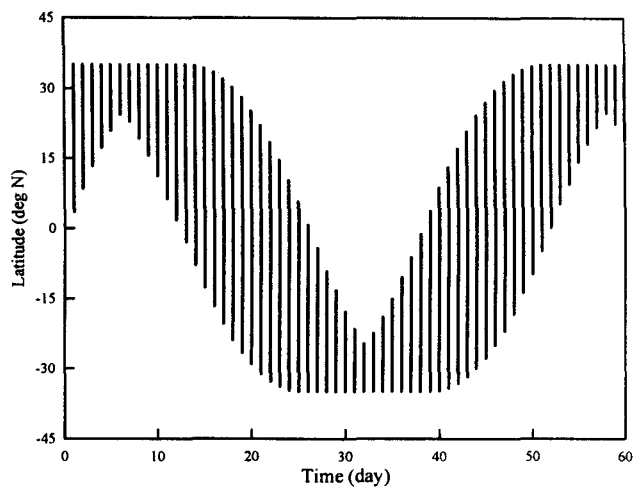


Fig. 1 OCI latitude coverage between 9:00 and 15:00 local time.

## THE OCI ORBIT