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Seamless study of ocean ecosystem, atmosphere and land with observation from space

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Phytoplankton as a major primary producer in the ocean is not only important to control the ocean ecosystem and fish production but also to control material cycles such as carbon. Visible light radiated from sun passes through atmosphere and transports to ocean, and it is absorbed and scattered by phytoplankton and other materials. Then, part of the radiation goes back to space after radiation from the sea surface. It is now becoming possible to measure the wavelength dependency of the light (ocean color) to estimate quantity and quality of phytoplankton and other materials in the water. From the ocean color remote sensing data, variation of phytoplankton amount in the East China Sea is clearly depended on the variation of the Changjiang river discharge, and the high phytoplankton water reached to near Japan when the discharge was high. This is because Changjiang river water is influenced by human activity, and contains large amount of nutrients. On the other hand, phytoplankton in the Yellow Sea is increasing, and phytoplankton composition is also changing. Very high phytoplankton water is called red tide and influenced to human activity, such as aquaculture, and it is also detected by satellite. GCOM-C will be launched in 2017 and observe almost everyday with 250m resolution, and it is expected to be used to reduce the damage of the red tide. On the other hand, Korean geostationally ocean color sensor, GOCI, is possible to observe every one hour during the daytime, and rapid change of phytoplankton after passing the typhoon was detected. Furthermore, nutrient can be transported though atmosphere and phytoplankton amount can be increased; however, improvement of accuracy of phytoplankton concentration is necessary because of the error caused by the aerosol. It is expected to study seamlessly though ocean ecosystem, atmosphere and land with the ocean color remote sensing from space.

Keywords: ocean color remote sensing, phytoplankton, river, aerosol, typhoon, ocean ecosystem