

DEVELOPMENT OF COASTAL SURFACE WATER QUALITY INDEX USING GEOSTATIONARY OCEAN COLOR IMAGER (GOCI) SATELLITE PRODUCTS

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Geostationary Ocean Color Imager (GOCI), launched in June 2010, is the first geostationary ocean color observation satellite in the world. GOCI collects data hourly for 8 hours a day at 6 visible and 2 near-infrared bands at a 500 m resolution with 2,500 x 2,500 km square around Korean peninsula. There are many basic and applied products from GOCI data, including chlorophyll concentration, total suspended sediments, total dissolved organic materials, ocean current vectors, ocean primary productivity, and red tide. However, there is a need for developing additional useful products from GOCI data that are necessary to manage coastal areas and ocean more efficiently.

This study proposed a method to assess coastal surface water quality using GOCI products. Three basic GOCI products—chlorophyll concentration, total suspended sediments, and total dissolved organic materials—were used to evaluate water quality especially focusing on coastal ocean. Machine learning approaches such as regression trees, random forest, Qubist, and support vector regression as well as conventional statistical methods (i.e., stepwise linear regression) were used to estimate coastal water quality. Based on the estimation results and variable importance identified by machine learning approaches, a new coastal surface water quality index (CSWQI) was proposed. This new index was evaluated using *in situ* observations measured for five ecology-based coastal divisions (East Sea, Korea Strait Western Channel, Southwest Sea, Middle West Sea, and Jeju) in South Korea.

Although this new index is only applicable to ocean surface, it is expected to be a key indicator of coastal water quality that can be used for various decision making processes and sustainable management of coastal ocean areas.

Keyword: GOCI, Water quality index, Chlorophyll concentration, Suspended sediments, Dissolved organic materials