

Exploring the Potentials of Google Earth Engine for Global Assessment of Coastal Eutrophication Based on Chlorophyll-a concentration

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Eutrophication is either emerging or growing environmental issue in many parts of the global marine systems in the ocean. This deterioration in water quality in the coastal regions may at times result in the appearance of harmful algal blooms or hypoxic conditions that affects large spatial and temporal scales with serious damages to the environment and economy, and the marine ecosystem itself. To assess the coastal eutrophication the Special Monitoring and Coastal Environment Assessment Regional Activity Centre (of the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region of the United Nations Environmental Programme) developed a screening procedure to detect symptoms of eutrophication based on satellite observations of chlorophyll-a concentration. The methodology was originally developed for the Toyama Bay, Japan and later applied to the whole Northwest Pacific region. In this presentation, we introduced the method and its applicability to the global ocean. Furthermore, we also introduce the potentials of the Google Earth Engine (GEE)—a cloud-based tool with planetary-scale analysis capability—for future coastal eutrophication assessment based on recent higher resolution ocean colour sensors such as SGLI on GCOM-C with 250 m or Sentinel-3 with 300 m spatial resolutions. Once the GEE is proven useful, it will be an important tool in providing rapid assessment of the status of marine systems in many regions where the information on the status and extent of coastal eutrophication is very limited.

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