Spatio-temporal changes of seagrass beds in western Nanao Bay detected by Google Earth Engine

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Western Nanao Bay is an enclosed bay, located on the east side of Noto Peninsula, Ishikawa Prefecture, with one of the largest (more than 1,000 ha) seagrass habitats in the Sea of Japan. Due to its topographical features that are surrounded by the land, water remains relatively calm throughout the year. Seagrasses provide valuable ecosystem services such as maintaining marine biodiversity, regulating quality of coastal water and protection of the coast line. A large-scale die-off of seagrass from late summer to early autumn has been reported in western Nanao Bay in recent years. Here we demonstrate use of Google Earth Engine (GEE), a planetary-scale platform for Earth science data and analysis, to monitor spatio-temporal changes of seagrass beds in western Nanao Bay.

Field surveys to study sea floor substrates were carried out with an underwater video camera in June and October of the years 2015 and 2019 in western Nanao Bay. Sea floor substrates were then classified into 6 types; dense seagrass, dense seagrass with Sargassum, Sargassum, sandy bottom, mud and exposed sand. This information was used as training data to classify sea floor substrates from satellite imagery using the GEE. The obtained results showed that seagrasses have disappeared from June to October in both 2015 and 2019. However, the area of the seagrass disappearance was greater in 2019 than that of 2015 possibly due to higher sea surface temperature in 2019. Spatio-temporal changes of seagrass beds in the past years will be studied using the GEE by the workshop.

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