# PRIMARY PRODUCTION STRUCTURE AND ENERGY FLOW OF COASTAL ECOSYSTEMS IN AKI-NADA ALONG THE COAST OF THE SHIKOKU ISLAND, JAPAN

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The primary production of phytoplankton species in coastal waters seasonally changes usually with two peaks in the late spring and the autumn in the Temperate Zone. In the summer, thermally stratified areas appear depending on the balance of the heating of a surface layer by solar radiation and tidal movement. Within the warm surface layer of the stratified areas, the primary production rate of phytoplankton diminishes due to the decrease of regenerated nutrient supply from the bottom layer and predation by zooplankton. However, in well-mixed areas, such as straits, the primary production depends only on the seasonal changes of temperature and solar radiation. Therefore, the primary production may show seasonal variation with one weak peak in the summer.

In the Seto Inland Sea, the primary production of phytoplankton shows one seasonal peak in the summer, probably due to many well-mixed waters around many straits adjacent to stratified waters. The depth of these waters is usually deeper than the compensation depth of photosynthesis by phytoplankton. Therefore, the well-mixed waters have an advantage in nutrient supply even in the summer but have a disadvantage in solar radiation. On the other hand, in stratified waters, the phytoplankton in the warm surface layer can get enough light but have not so much supply of nutrients. The tidal front, which appears between well-mixed waters and stratified ones, can be a bypass of nutrients and heat between the two waters. Near the front, the primary production of phytoplankton can be high. In addition, however, in the Seto Inland Sea, many sand banks, most of which are composed of sand grains derived from broken particles of the hard bottom of straits, are located around straits and between the two waters. The depth of the sand banks is shallower than the compensation depth of phytoplankton, and it covers the disadvantage in the well-mixed areas, keeping its advantage of rich nutrient supply. It leads to the relatively high primary production of phytoplankton around the sand banks. Moreover, shallow waters can get sufficient light even at the bottom surface, and it means the possibility of the primary production by benthic algae, to which a large amount of nutrient is supplied through strong tidal current.

Recently, many of these sandbanks have been destroyed, by being taken away as construction materials. The destruction of them may lead to the loss of a part of high primary production areas around well-mixed waters. In the present study, we tried to know about the primary production process of both phytoplankton and benthic algae around sand banks and its importance in coastal ecosystems.