

[JJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-OS Ocean Sciences & Ocean Environment

[A-OS17] Ocean circulation and material cycle in coastal seas

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Costal seas have high biodiversity and high productivity, while various environmental problems such as eutrophication, red tide, and hypoxia are occurred by human activity. In order to understand material cycle and various phenomena and to maintain sustainable environment in costal seas, interdisciplinary research is needed. In the present session, we invite researchers who are interested in physical phenomena, material cycle, biological responsive dynamics, and those interactions in coastal seas. We do not confine study field, area, and method and welcome presentations of wide-range topics. We try to commoditize knowledge in terms of phenomena in coastal seas based on the presentations and discussion.

[AOS17-P06] Experimental Study on Sustainable Seawater

Purification System from the Depth to the Shallows Built in Quays and Piles Using Purifying Functions of Microorganisms and Tidal Energy

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Keywords: Seawater purification, Contact Oxidation method

1.Intoroduction

In closed sea areas in the world the eutrophication is being progressed day by day. Nowadays in closed sea areas in japan it is hard to control the seawater quality in deep areas because of the poor oxygen seawater or the anoxic seawater.

Aerobic microorganisms can contribute to decompose organic compounds as lomg as they live to consume oxygen. As a result the oxygen decreases in deep areas.

It is necessary to maintain that the seawater is clean and rich in nature for the sustainable development. One of methods is this sustainable seawater purification system built in quays and piles using purifying functions of microorganisms and the tidal energy (Dan et al. 2017).

2.Methodology

It is shown that this system can decrease Chemical Oxygen Demand (COD) in the seawater experimentally and can be utilized to in order to purify the seawater from the depth to the shallows using this system built in quays and partially using this system built in piles.

This system has following advantages.

- (1)Using the tidal energy -->"ecosystem";
- (2)Using the purifying functions of microorganisms, decomposing organic compounds-->"ecological and natiral without chemicals";
- (3)Capable of purifying the seawater in the shallow area, especially also in the deep ares -->"useful"; in closed sea area
- (4)This system built in quays or piles is simple. Not to construct new quays but to construct the purifying room additionally. It costs less.-->"economical";

3.Experimental approach

Microorganisms can decompose organic compounds in the seawater depending on the seawater temperature, DO, the velocity of seawater through the gravels and so on. The experiment was performed

changing these conditions. The size of the used tank is 50cm tall, 45cm wide and 120cm long. This system has two gates. There are the upward and downward purifications in piles or in the vessel of quay. While the seawater moves in the pile through gravels it can be purified by the contact oxidation method with the help of microorganisms. Next the purified seawater moves out of the upper gate to the outer sea areas in case of the upward purification. Then the tidal current can carry the purified seawater to another places.

4.Results and discussion

The initial COD is almost 8 by putting sugar adequately in seawater and mixing. The changing process of COD is checked by measuring COD according to JIS K 0102.

COD is becoming smaller and it shows that this system can reduce COD using the tidal energy and purifying functions of microorganisms.

Th results are shown,

- (1)COD can be reduced greater in case of using gravels with microorganisms than in case of without gravels
- (2)COD can be reduced greater in summer than in winter
- (3)In both cases of upward and downward purifications COD can be reduced
- (4)Microorganisms require sufficient oxygen concentration in seawater to resolve the organisms

5.Conclusions

The initial COD is almost 8 by putting sugar adequately in seawater and mixing. The changing process of COD is checked by measuring COD.

In the case of seawater purification system COD is becoming smaller and it is found that this system can reduce COD in seawater.

This quay or pile can be utilized in order to decrease COD using tidal energy and purifying functions of microorganisms.