

Reducing greenhouse gas emissions through effective use of dredged sediment

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1. Introduction

The reduction of greenhouse gases is an important issue to prevent global warming. To solve this problem, we focused on organic matter deposited in the harbor. Organic matter deposited on the seabed can be regarded as carbon storage if it is stably maintained for more than 100 years, but it is difficult to say that it is carbon storage because the harbor is dredged as needed. Dredged sediment containing organic matter can be stably contained in another place to achieve carbon storage (Fig.1). In this study, we examined the carbon storage effect when dredged sediment was contained as a substrate material for a developed tidal flat and seagrass meadows.

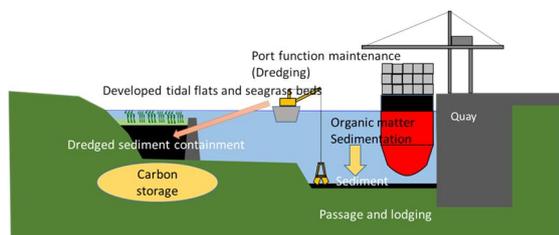


Fig. 1 Image of carbon storage using dredged sediment as a substrate material for a developed tidal flat and seagrass meadows

2. Methods

Carbon residual rates in dredged sediment used as a substrate material were investigated in 3 types

of developed tidal flats with different structures more than 10 years after development. Type (1): Sand cover on dredged sediment, Type (2): Sheet between dredged sediment and sand cover, and Type (3): No sand cover. In each tidal flat, survey points were established in the supratidal, intertidal, and subtidal zones (Fig.2). Vertical samples of bottom mud of about 1-3 m were collected in each tidal flat, and soil properties and carbon content were analyzed to calculate carbon residual rate. The higher the carbon residual rate, the higher the carbon storage effect.

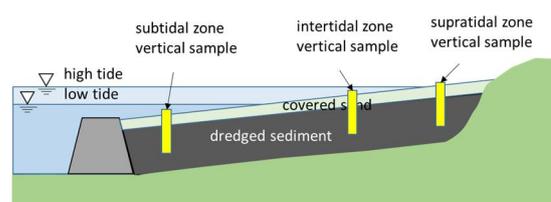


Fig.2 Image of a tidal flat using dredged sediment as a substrate and vertical sampling

3. Results

The carbon residual rate of organic matter in the dredged sediment used as the substrate of the tidal flat was about 70 ~ 80%. The carbon residual rate of Type (3) was smaller than that of Types (1) and (2), indicating the effect of covering the dredged

sediment with sand in terms of carbon storage. There was no difference in the carbon residual rate of the dredged sediment in the supratidal, intertidal, and subtidal zones, although the drying time was different. There was no difference in the redox potential of the dredged sand layer even when the drying time was different, and it was considered that the anaerobic condition was similar in the three depth zones.

4. Future prospects

In addition to inhabiting rich and diverse organisms, tidal flats and seagrass meadows with carbon storage effects should be developed to contribute to a coastal zone that achieves both biodiversity and global warming control.

☞ For more information

1) National Institute for Land and Infrastructure Management, No. 1242, pp. 1-14

<https://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn1242.htm>