P3)

Vertical profile and diversity of sediment Phosphorus in an artificle lake and bay of seto inland sea Japan

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1. Introduction

The Kojima bay is located in Okayama prefecture and is an important water flow to the Seto inland sea .the P load to the Seto inland sea appears to have important effect to the eutrophication in this area. Kojima Lake is formed by enclosing the dike in 1959, so research of the effect of formation to the environment is important and interesting. Our study is mainly focused on the effect of phosphorus in sediment and the overlying water samples in Kojima bay and Kojima Lake.

2. Method

The field observations of this study were taken in 2009. 27 surface and 3 core sediment samples were taken in September 2009 in Kojima bay seto inland sea, The nutrients of surface water samples and near bottom water samples were determined by auto analyzer. Sediment TP and P forms were also determined by Aspila method (1976). ^{137}CS and ^{210}Pb activity were determined to calculate the dating data of different depth and also the sedimentation accumulation rate (SAR rate).

3. Results and Discussion

The SAR values shows that the sedimentation has been much slower in the Kojima Lake than in the outer side in the Kojima bay .while after the dike constructed (table 1) .the Kojima Lake seems to act as a trap for material transported from the open sea. In surface sediment samples the Kojima lake samples has the higher TP content in sediment while lower pore water P content, the near bottom water samples shows comparably higher in Kojima bay than Kojima lake sediment P forms which are the redox sensitive P bound to oxides of reducible metals which mainly are Fe and Mn consist of the biggest part of the P forms (Figure .1)

In Kojima lake core samples the redox sensitive P forms leads the decreasing in Kojima lake while the P from Al oxides and non-reducible metals and Apatite and other inorganic P shows the dominate P forms in Kojima Bay.

The SiO_2-Si content in pore water profile shows diversity in the dating of enclosing the dike and the water silica content shows lower in Kojima Lake than in Kojima bay which means the changing of fresh water in Kojima lake decrease the water Silica content.

In this study, part of bay changed to artificial Lake 50 years ago, the environment changes leads to very interesting results. In Kojima bay the surface sediment P fractionation and sediment core seems to be more uniform and of same size of P pool rather than P fractionation in Kojima Lake. The content and the more rivers supply more uniform quality and quantity of P resources deposited in the sediment in Kojima bay.

The low SAR value in Kojima bay may suggest that it is more vulnerable to be the transportation of sedimentation process .the Kojima Lake has higher sedimentation value than the bay samples. But with lower burial of P and higher efflux of P, P fractionation revealed that most part of P sediment in sub layer of sediment is in forms prone to be stable with the depth increasing. While in surface layer is prone to be release under anoxic condition or other digenetic process. The reactive P forms are higher in the Lake environment with the higher SAR value. And the immobile P forms are dominated in the bay sediment cores and surface sediment samples. The Lake samples appear to have higher content of P than Bay samples while the increasing part is mostly NaBD-iP. Through the dating data, P content is increasing in sediment after the dike of Kojima lake is enclosed and the severe water quality was reflected in pore water P and P content in sediment which is mostly reflected by NaBD-iP .In our research. The erosion of sediment and vertical and spatial heterogeneity in the sediment should also be considered and needs more evidences in the future research.

Table 1 Sediment accumulation rates (SAR), sedimentation of extractable P, burial fluxes of immobile P, long-term average for P efflux, and burial efficiency of P at two different sites in Kojima bay and Kojima Lake

site	SAR	sedimentation of P		burial of P		Long term aver.efflux of P		Burial efficiency
	g m^{-2} y^{-1}	**mmol m^{-2} y^{-1}**	g m^{-2} y^{-1}	**mmol m^{-2} y^{-1}**	g m^{-2} y^{-1}	**mmol m^{-2} y^{-1}**	g m^{-2} y^{-1}	(%)
Lake core	4300	140.93	4.37	37.72	1.17	0.97	30.09	27
Bay core	3500	82.42	2.56	45.10	1.40	0.71	21.95	55

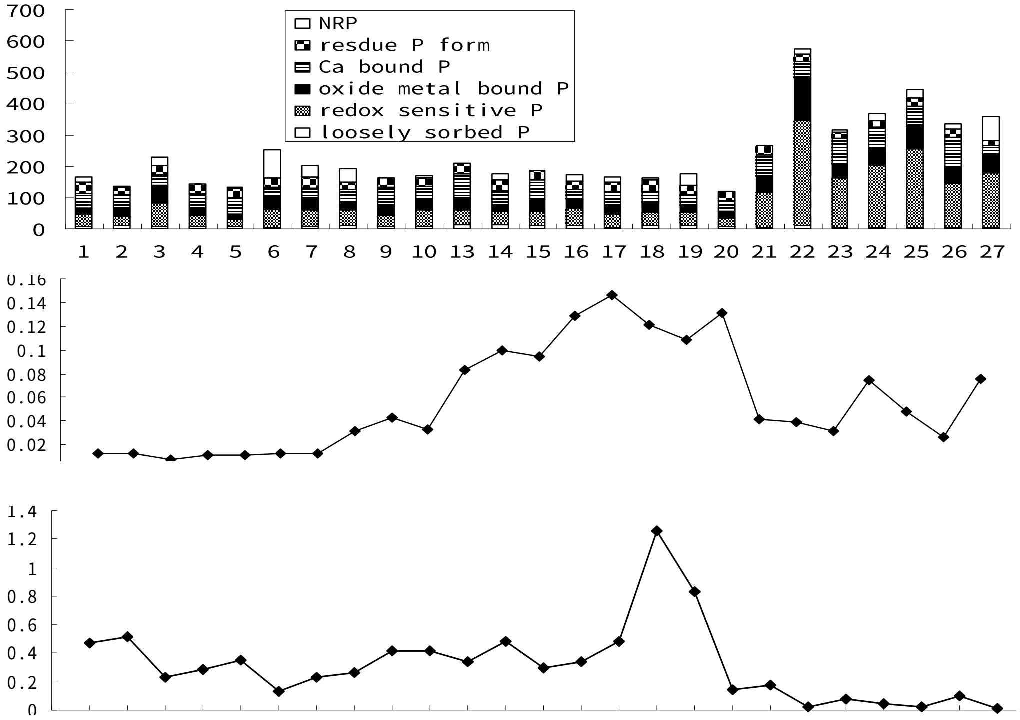

Figure.1 The different P forms of surface sediment samples (upper),the surface water(middle) and pore water PO4-P content(down) . The X-axis represents the sites number the Y-axis represents the sediment P content (μ g/g) PO4-P content(mg/L)