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# spatial variations and chemical characters of sediment phosphorus in an artifical lake and Kojima bay

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Eutrophication is an important world wide problem and became a heated debate recent years. In many costal sea areas around the world, Such as Tokyo bay and Baltic Sea, the Phosphorus (P) plays a key role in this process; 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 P formation to the environment is important and interesting. Our studies is mainly focused on the effect of phosphorus in sediment and the overlying water samples in Kojima bay and Kojima Lake

Surface and core sediment samples were collected both in Kojima bay and Kojima Lake in this study. the surface sediment samples were collected by box sampler, the core samples in Kojima lake were taken by piston core sampler while the cores in Kojima bay is taken by diver .using acrylic tubes(7-8 cm diameter) . Pore water samples were also extracted by centrifuge and the nutrient in pore water, near bottom and surface water samples were determined in the laboratory with a spectrophotometer (Bltec Swaat autoanalyser). We use the $^{210}$Pb activity and $^{137}$Cs activity to determine the sedimentation and dating data of the core samples. In this study, a Six step extraction method of P in sediment was used to describe the chemical species of P. by divided the P into active forms (loosely sorbed P, Redox sensitive P) and immobile forms (Oxide metal bound P, apatite P and residue P),

The sediment accumulation rates (SAR) and the sedimentation of P in Kojima lake (SAR=4300g $m^{-2}$ $y^{-1}$ , P=140.1mmol $m^{-2}$ $y^{-1}$) are higher than that in Kojima bay (SAR=3500g $m^{-2}$ $y^{-1}$ ,P=82.4mmol $m^{-2}$ $y^{-1}$). The sediment phosphorus content in both surface and core samples are higher in the lake samples than in the bay samples, while the pore water samples and water samples both showed higher in bay samples than in lake, It may indicate that the P supply of Ashahi River is at very high level than Kurashiki and Sasagase River. While the retention of P is lower in Kojima bay because of the high water flow of Ashahi River. After the dike constructed .the Kojima Lake seems to act as a trap for material transported from the open sea. Kojima Lake seems has richer phosphorus content than in the Kojima bay.

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 .this could also indicate that the early diagenetic process may have enough time to transform the deposited P into the more immobile forms and at last buried forms. The content and the more rivers supply leads 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 more uniformed and immobile phosphorus forms in Kojima bay than in Kojima lake leads to a higher burial efficiency of phosphorus at 55% in Kojima bay sediment compare to that of Kojima lake (35%), The efflux of losing P through the time at a prediction value of is lower in Kojima bay at 0.71 mmol $m^{-2}$ $y^{-1}$is lower than the inner site 0.97mmol $m^{-2}$ $y^{-1}$

In this study, the Kojima bay and part of bay changed to Artificle Lake 50 years ago, the environment changes leads to a very interesting results. 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.

Keywords: sediment, phosphorus, fractionation, artifical lake