

Reconstruction of 100-years variation in phosphorus load using the sediment profile of an artificial lake in western Japan

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Abstract In this research, the phosphorus (P) discharge was reconstructed for the last 100 years. We used the ²¹⁰Pb and ¹³⁷Cs activities to date a core sample. The total phosphorus (TP) and the total inorganic phosphorus (TIP) in the sediment showed a slightly decreasing trend with depth and a peak of P content at the depth with an age of around 1970s. This suggests eutrophication in Kojima Lake, Japan, during the last century and a peak of nutrient load around the 1970s. In addition, TP and TIP contents in the sediment indicated yearly variations. These variations are not affected by annual precipitation, local population and paddy field area; in contrast, they are related to the annual number of rainstorms with daily rainfall over 100 mm. This suggests that most of the TP load is transported in stormflows during extreme rainstorms. An increase in the number of torrential rainstorms is assumed to increase the P that is transported to the ocean.

Key words sediment; phosphorus; precipitation; extreme events; rainstorms; Japan