

Estimating mixing ratio of the sediments from tributaries in the sediments from Yangtze River mouth

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Yangtze river is the largest river in eastern Asia. The rain front is accompanied with the development of summer monsoon, and moves within the Yangtze drainage, bringing heavy rain. Thus, the spatial fluctuation is also important for understanding the behavior of summer monsoon.

A paleoclimate record is needed for reconstructing the distribution of precipitation before metrological record. In Yangtze, over 95% of yielded sediment is suspended particle matter (SPM). The precipitation in drainage is proportional to water discharge, and water discharge is also proportional to suspended sediment concentration.

In this study, as a basis for reconstructing the past distribution of rain in Yangtze drainage, 1) analyze the ESR (Electron Spin Resonance) signal intensity of each tributary, 2) confirm that ESR values can explain the mixture of sediments in the mainstream, 3) discussing how large flood can be detected as a change of ESR values in the river mouth.

The sediments from major tributaries of Yangtze shows different ESR values each other. Using ESR values of each tributary as end members, the modern ESR value at rivermouth is estimated. The estimated value is consistent with the analyzed ESR value of sediments near rivermouth. So, ESR signal intensity can be used for estimating mixture of sediments.

We also calculated how large ESR value at rivermouth can change on the assumption that the flood occurs in specific tributaries. As a result, the flood can be detected as the change of ESR value at rivermouth when the sediment yield increases 5 times than usual.