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Computer Simulation of Organic Matter Sedimentation in Lacustrine Environment: a Case Study on Present Lake Tanganyika

To understand and predict the distribution of good source rock in a sedimentary basin, JNOC-TRC has developed a computer simulator by combining ocean circulation model with ecosystem model.

Lake Tanganyika is one of the best fields that can provide us conceptual model for source rock development in tropical lacustrine environment. Many studies suggest that water stratification is essentially important for the deposition of organic-rich sediment. To verify this conceptual idea, we have applied our computer model to the Lake Tanganyika.

The simulation suggests that surface mixing exists in southern lake and it causes strong phytoplankton blooming during dry season. During the dry season, seasonal wind accelerates surface current to the north and leads to deep-water upwelling in southern lake. In northern lake, due to the oscillate of lake water, relatively weak blooming is modeled during wet season.

Our simulation also indicated that although surface phytoplankton productivity is higher in southern lake, particulate organic carbon (POC) flux onto the bottom is lower than northern lake. Since calculated mixing depth is deeper in southern lake, much oxygen supplies to the deeper part of the lake and hence it promotes the decomposition of organic matter.

From our simulation, it is concluded that the balance between productivity and preservation of organic matter is one of the important factor to control the deposition of organic-rich sediment in the Lake Tanganyika.