

Isotopic investigation into the interaction between the Mekong and the Tonle Sap

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The Great Lake (Tonle Sap) located in the Midwest of Cambodia. This lake is the greatest lake in Southeast Asia joins the Mekong through the Tonle Sap. During the peak monsoon from about the end of May each year, the capacity of the Mekong is inadequate to convey the floodwaters, and the water level at the Mekong/Tonle Sap confluence rises to about nine meters. At this time of year the flow direction in the Tonle Sap reverses and flood water from the Mekong flows to the Great Lake adding to the flood runoff from the Great Lake catchment, storing some $72 \times 10^9 \text{ m}^3$. Concurrently the lake surface is increasing to more than $13,000 \text{ km}^2$ and inundating adjacent land for up to five months each year. When the flow in the Mekong reduces sufficiently, usually in October, the Tonle Sap reverses direction and drains the stored floodwaters from the Great Lake back towards the Mekong.

Since it is very important to understand the interaction of the Mekong river water and the Tonle Sap river water for flood regulation and water-resources management in Cambodia, quantitative analyses have been performed using numerical models and remote sensing techniques. However, qualitative understandings of the interaction of each river water are insufficient.

As such, this study aims for understanding the interaction of the Mekong and the Tonle Sap by stable isotope ratios of river water. River water sampling was done at the Mekong before and after joining the Tonle Sap, the Tonle Sap, and the Chinit river that is the branch of the Tonle Sap in October and November, 2002. October is the end of the rainy season, and November is the beginning of the dry season. The stable isotopic ratios of sampled river water were measured by mass spectrometer.

As a result of analysis, it became clear that the stable isotopic ratios of the Mekong water changed before and after the confluence of the Tonle Sap. The stable isotopic ratios of the Mekong water after the confluence was plotted between the values of the Mekong water before the confluence, the Tonle Sap river water, and its branch river water on the delta-diagram. It probably suggests that the information about interaction of the Mekong river water and the Tonle Sap river water could be extracted from stable isotopic ratios of water.