

**BETTER PRECIPITATION AND EVAPORATION ESTIMATE TO
IMPROVE LAKE VICTORIA WATER BALANCE**

BY

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ABSTRACT

Lake Victoria and the Nile River with their catchments form the Nile Basin. Fluctuations in Lake Victoria water levels and its anomalous hydrological behavior affect the entire Nile basin water resources and their utilization. This makes it necessary to constantly monitor, predict and forecast the hydrological behavior of the lake. This is achieved using a water balance model. Existing models were not good enough for this task due to poor estimates of the model components. The objective of this research was therefore to improve the lake water balance model through better estimates of its components. This was done, through utilization of lake data and better methods in estimating the biggest water balance components of precipitation and evaporation, whose earlier poor estimates had been blamed for the model shortcomings. The precipitation and evaporation were evaluated by interpolation and the Combined Penman equation respectively. That these were better component estimates was deduced from the final model improvement and the favorable comparisons of the component estimates with results of precipitation and evaporation from isotope sampling studies of the lake. In addition, for the first time, satellite data was used with the Split Window Technique (SWT) to assess possible groundwater contribution to the lake water balance. The groundwater studies were inconclusive but will provide a way forward in determining the groundwater contribution which might be the missing link in the lake water balance model.

The better precipitation and evaporation estimates resulted in an improved lake model in which the discrepancy between inflow and outflow was reduced to 50% of the original value. This was a remarkable achievement. When the groundwater contribution is ascertained, a much better model will be obtained. For this purpose it is recommended

that the traditional well and piezometer conventional techniques be employed in further groundwater investigations in those littoral parts of the lake where interaction between groundwater and lake water was identified in an attempt to quantify the groundwater contribution. More research is needed to explore use of satellite data in estimating lake precipitation and evaporation to further improve the model.