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Long Term Evaporative Losses Estimation and Water Budget Assessment of Lake Nasser, Nile River

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Abstract

Following the continuous pressure on the Nile River, it becomes more crucial to precisely assess the losses from the Nile River storage lakes, such as Lake Nasser, to support the optimum management and operation of the system. In this study, an updated field validated water balance model for Lake Nasser is developed by combining heterogeneous sources of information, including in-situ gauge data, bias corrected reanalysed data, and remote sensing information. The monthly linear regression and artificial neural network have been used to bias correct streamflow information at the entrance point of the lake. Then, a dynamic system simulation software, GoldSim, is utilized to develop the water balance for the lake. The average yearly losses from the lake was estimated with increasing trend through the last 50 years. This study provides an informative data about the relationship between evaporation losses, water level from altimetry data, inflow to the lake at Dongola station, and changes of the lake water storage. The study suggested more investigation and comparisons with the expected losses rates with storage at the Ethiopian Renaissance Dam are needed to support the operational plans for both dams.

Keywords: Nile River; Lake Nasser; Evaporation Losses; Reanalysed data; Water Balance, GERD

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