

Abstract:

The best prediction of the Nile summer runoff volume using only previous streamflows is not significantly different from the average value. The aim of this study is to forecast the Nile flood using Sea Surface Temperatures (SSTs) averaged over several regions (East Pacific, South Indian Ocean and South Atlantic) as inputs for Artificial Neural Network (ANN) models

The results obtained from the ANN models give correlation coefficient between forecasted and observed values that exceeds 0.85. Mean absolute percentage errors are of the order of 6%. Compared to previously published models, which explain only 36% of the flood variability, the superior performance of ANN models is due to two innovative aspects:

- The first is related to the choice of two SST regions as inputs: The first represents the El-Niño / Southern Oscillation (ENSO). The second is the average SST anomalies in a specific region of the Indian Ocean.
- The second innovative aspect concerns the choice of ANN models to relate the streamflows to SSTs. The forecasting performance of ANN models is markedly superior to those of regression models commonly used to relate streamflows and climatic indices.