Finding significant climatic frequencies from satellite observations, a case study for Lake Victoria basin

E. Forootan (1,2), M.A. Sharifi (2), and E.E. van Loon (1)

(1) The University of Amsterdam, Institute for Biodiversity and Ecosystem Dynamics, Faculty of Science, Amsterdam, The Netherlands (ehsforootan@gmail.com, E.E.vanLoon@uva.nl), (2) The University of Tehran, Faculty of Surveying and Geomatics Engineering, Tehran, Iran (sharifi@ut.ac.ir)

Lake Victoria is the second largest freshwater lake in the world by area. A dramatic fall in the water level of the lake between 2002 and 2007 attracted a lot of worldwide attention.

A recent study on the Lake Victoria basin using data from GRACE, TOPEX/Poseidon, Jason-1, TRMM and as well as GLDAS data products suggested the possibility of the expansion of Naluabaale Dam in Uganda for the declining water level in the lake. However, Lake Victoria does not receive water from a large catchment area: most of its water comes from rain that falls directly over the huge surface of the lake. For this reason, climatic contributions cannot be ignored in the recent declining.

This research aims at analyzing the contribution of rainfall over the lake area between the years 1998 and 2008. Least squares spectral analysis (LSSA) is applied on 400 cycles of TOPEX/Poseidon and 232 cycles of Jason1 altimeter data along with monthly TRMM data from 1998 to 2008 to reveal the specific frequencies.

From our results, yearly, half-yearly and seasonal frequencies along with a long term frequency are clearly visible in the Lake Victoria level variations.

Key words. Lake Victoria, Least Squares Spectral Analysis, TOPEX/Poseidon, Jason1, TRMM