

Understanding Hydrodynamic in Lake Victoria Basin in a Catchment Scale: A Literature Review

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Abstract : The purpose of this review paper is to develop an understanding of lake hydrodynamics and the potential climate impact on the Lake Victoria (LV) catchment scale. This paper briefly discusses the main problems of lake hydrodynamics and its' solutions that are related to quality assessment and climate effect. An empirical methodology in modeling and mapping have considered for understanding lake hydrodynamic and visualizing the long-term observational daily, monthly, and yearly mean dataset results by using geographical information system (GIS) and Comsol techniques. Data were obtained for the whole lake and five different meteorological stations, and several geoprocessing tools with spatial analysis are considered to produce results. The linear regression analyses were developed to build climate scenarios and a linear trend on lake rainfall data for a long period. A potential evapotranspiration rate has been described by the MODIS and the Thornthwaite method. The rainfall effect on lake water level observed by Partial Differential Equations (PDE), and water quality has manifested by a few nutrients parameters. The study revealed monthly and yearly rainfall varies with monthly and yearly maximum and minimum temperatures, and the rainfall is high during cool years and the temperature is high associated with below and average rainfall patterns. Rising temperatures are likely to accelerate evapotranspiration rates and more evapotranspiration is likely to lead to more rainfall, drought is more correlated with temperature and cloud is more correlated with rainfall. There is a trend in lake rainfall and long-time rainfall on the lake water surface has affected the lake level. The onshore and offshore have been concentrated by initial literature nutrients data. The study recommended that further studies should consider fully lake bathymetry development with flow analysis and its' water balance, hydro-meteorological processes, solute transport, wind hydrodynamics, pollution and eutrophication these are crucial for lake water quality, climate impact assessment, and water sustainability.

Keywords : climograph, climate scenarios, evapotranspiration, linear trend flow, rainfall event on LV, concentration

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