

Isotope techniques for assessment of interactions between surface water, groundwater and wetlands within the L. Victoria Basin of Uganda

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Outline

- Introduction
- Objectives
- Study area
- Surface water & Groundwater monitoring
- Hydrochemistry
- Environmental Isotopes
- Conclusions

Objectives

The primary purpose of this study is to assess interactions between wetlands, groundwater and surface water.

Specific objectives;

- Understand the major exchange processes between wetland and larger water body.
- Define the key sources of water to the wetland.
- Understand, in qualitative sense, the time-scale of key hydrological processes for a wetland.

Introduction

- The wetlands dominate the northern catchment of the Victoria Basin and play important role in the ecosystem (maintenance of waterlevels, flood control and habitat for aquatic plants and organisms).
- Urbanization has led to industry and commercial agriculture that has adverse impacts on quality and quantity of both surface and groundwater.
- Under conditions of long and short term climate variability and change, it is critical to assess flow and solute transport among wetlands, groundwater and surface water.
- A combination of conventional hydrological methods environmental isotope techniques are of potential use in evaluating surface and subsurface flowpaths to & from wetlands.

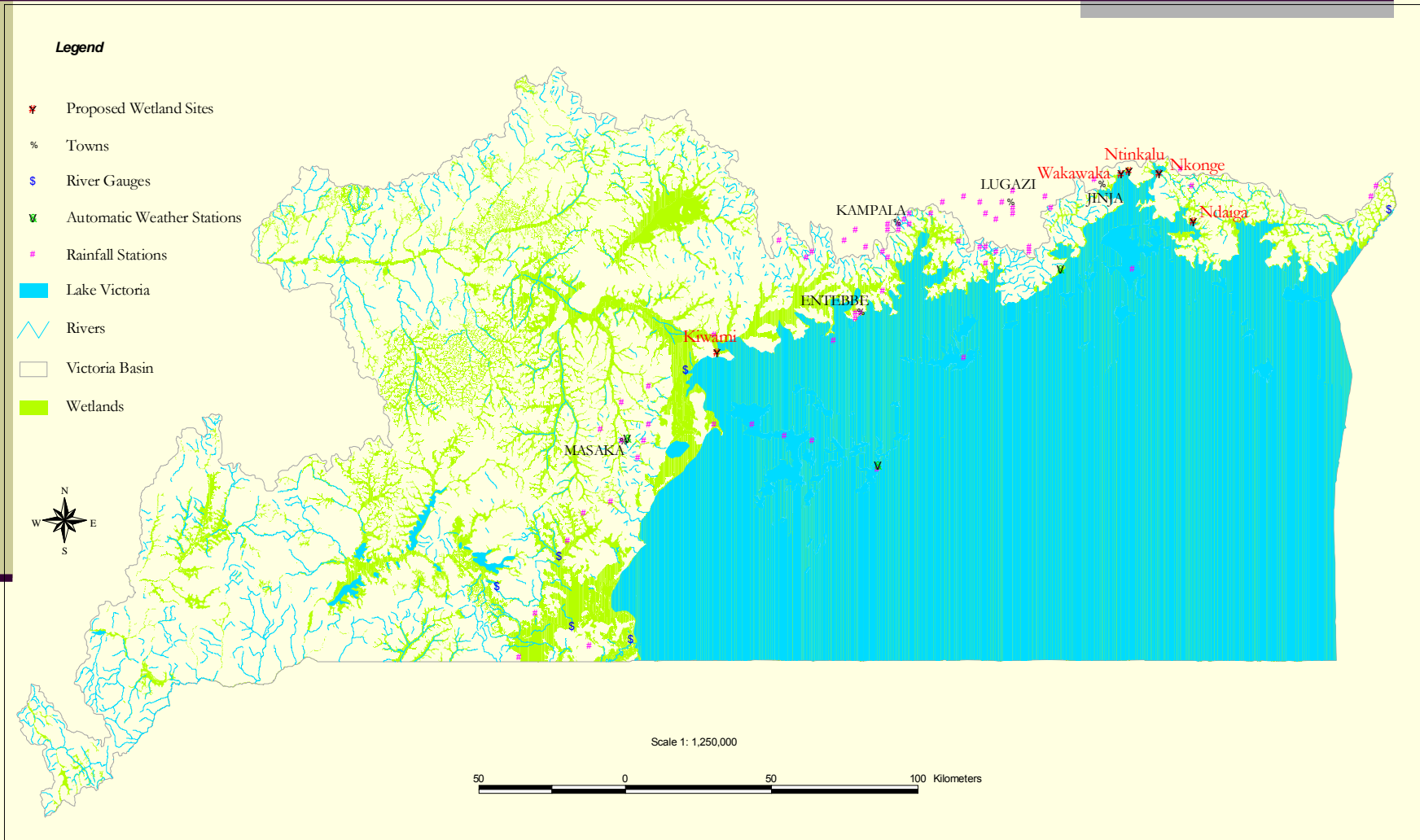
Study Area

- The shoreline of Lake Victoria about 3,500km long, 60% of which is covered by swamps and wetlands.
- Lake Victoria covers a surface area of 68,800 sq. km with an adjoining catchment of 184,000 sq. km. The Ugandan part of L.Victoria Basin covers 59,858 sq. km.
- Tropical climate characterized by a bi-modal rainfall distribution with average annual rainfall varying between 1200 and 1600mm.
- Rocks composed of undifferentiated gneisses, granites and phyllites.
- Alluvial sediments made up of a mixture of sands, silts and clays characterize shorelines and bays.

Study Area (cont...)

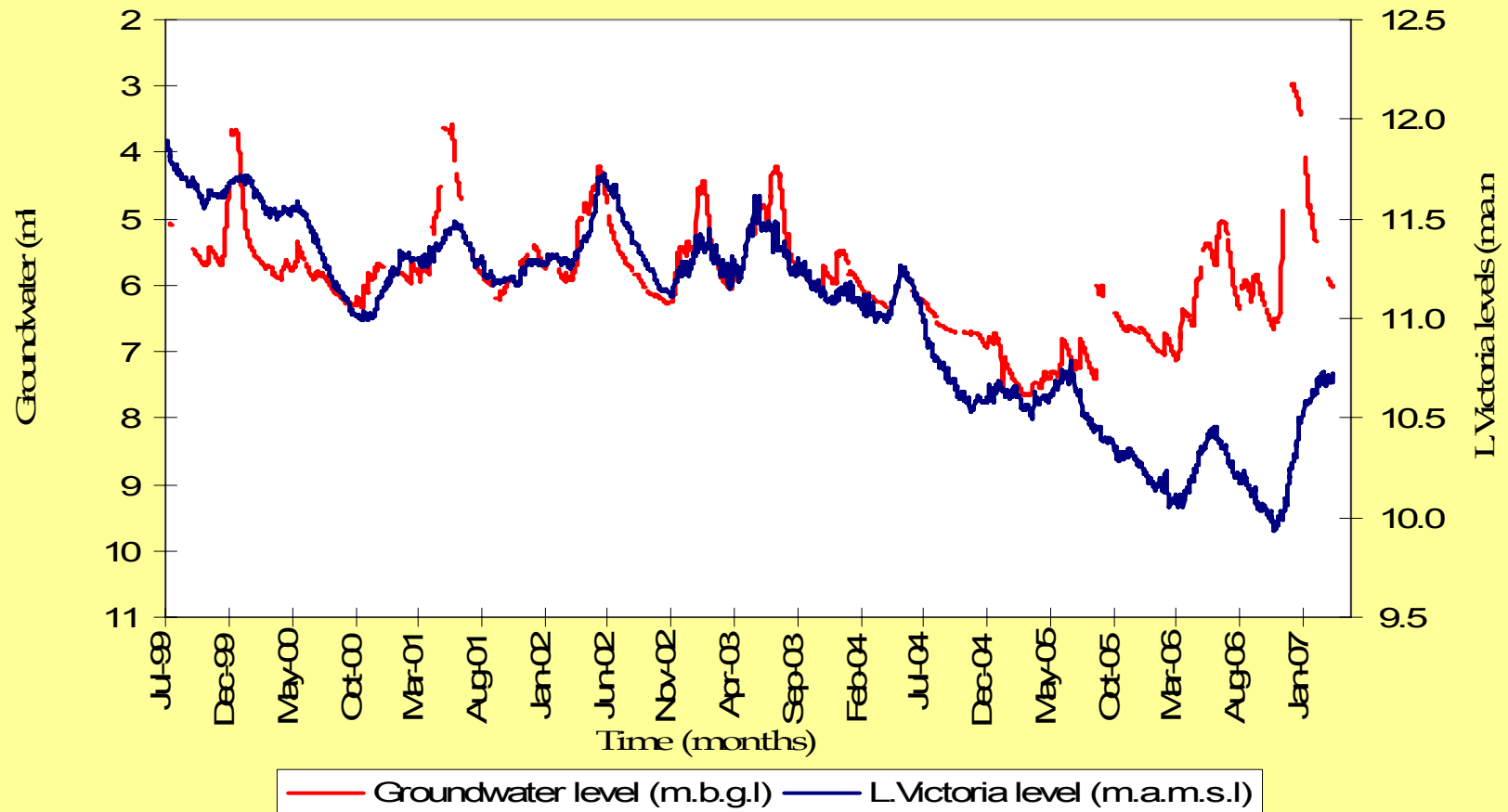
- Lakeshore characterized by relatively low topography with an average elevation of 1100 meters above sea level.
- Lake shoreline is convoluted, enclosing innumerable small, shallow bays and inlets, many of which include swamps and wetlands.
- The lakeshore covered by papyrus reeds.

MAP OF UGANDA SHOWING STUDY SITES

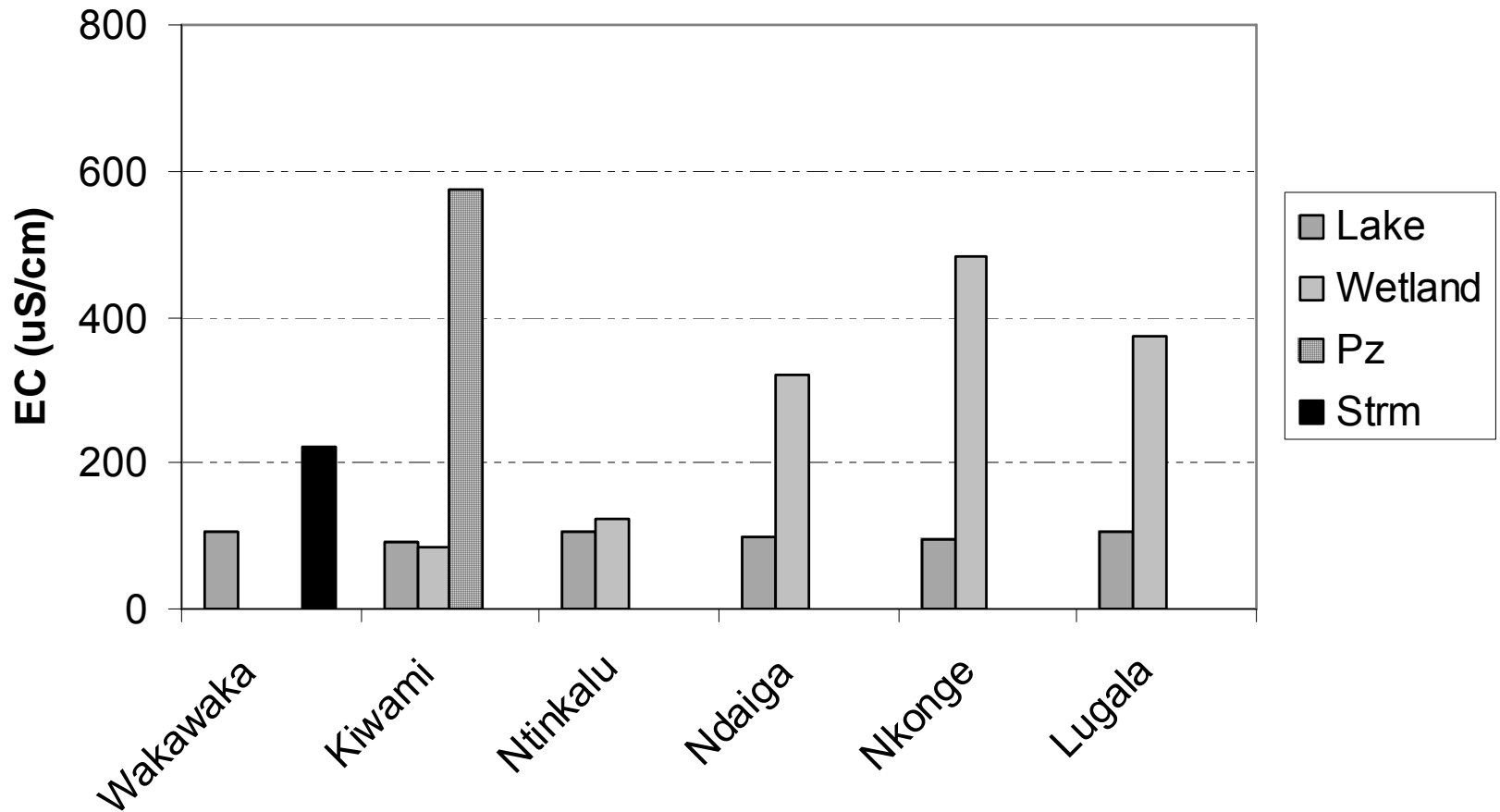


Groundwater & surface water monitoring

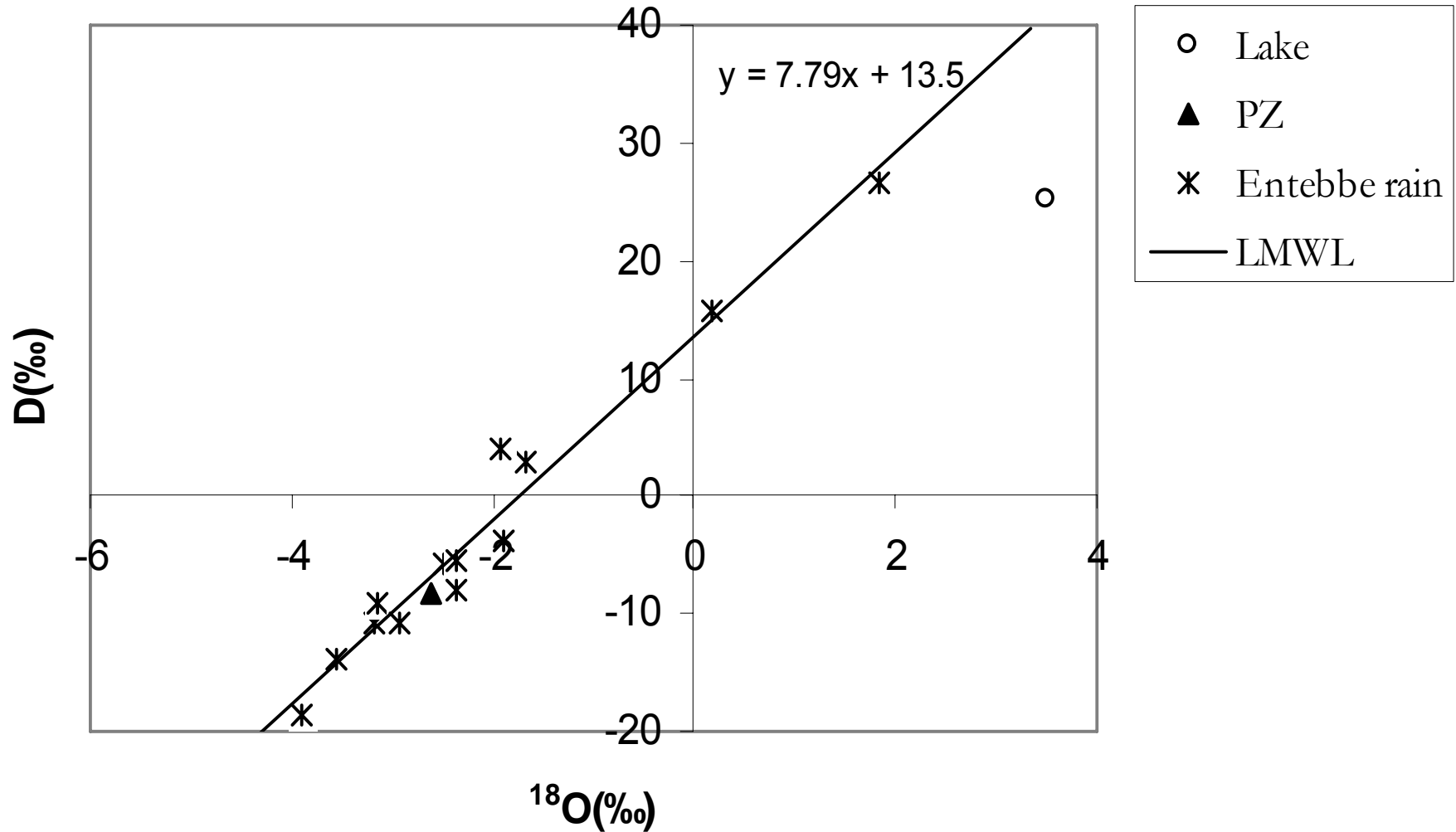
Waterlevels fluctuations in L. Victoria and in groundwater at Entebbe, Uganda



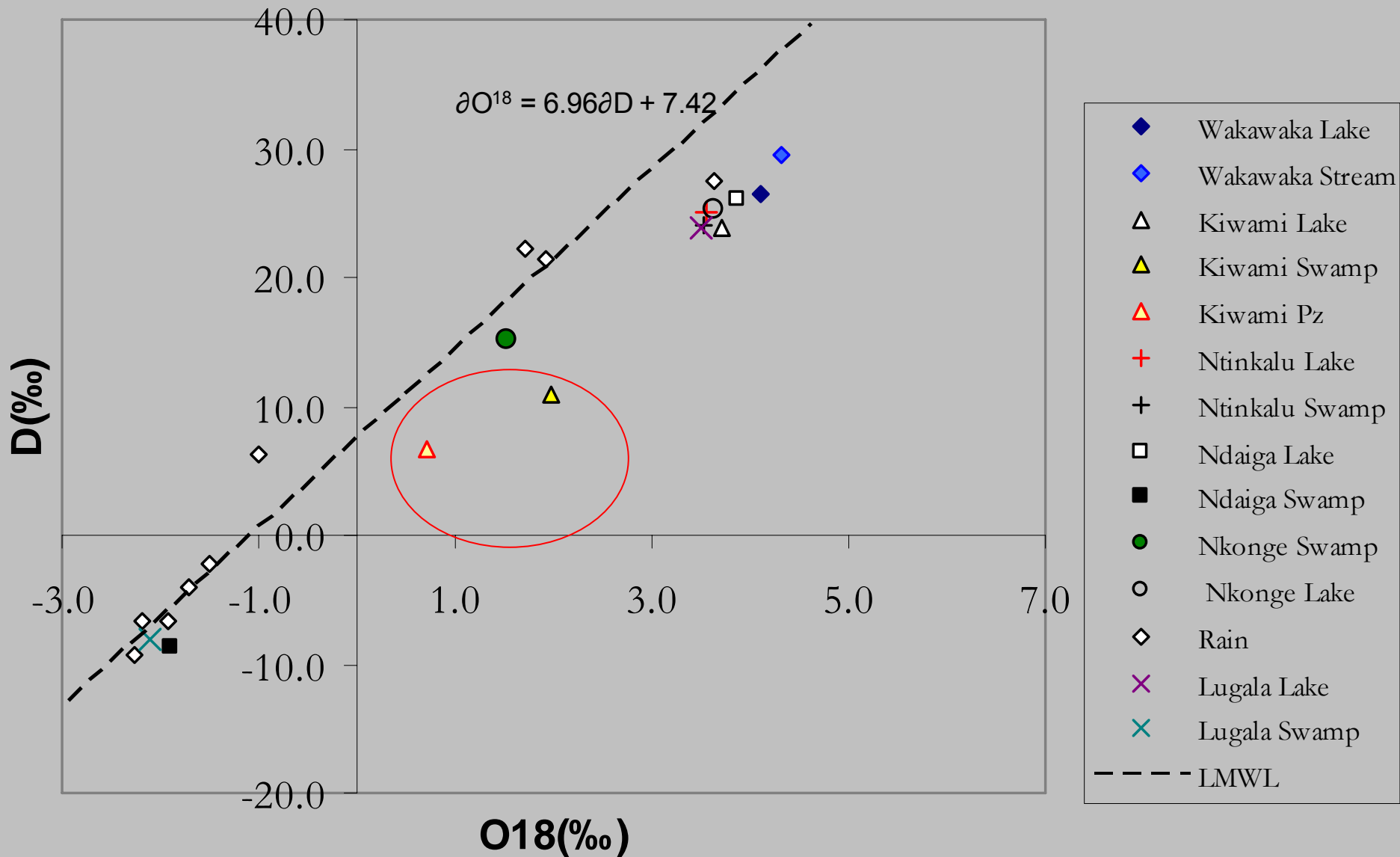
Hydrochemistry



Environmental Isotopes



Environmental Isotopes



Conclusions & Recommendations

- Stable isotope results at Entebbe indicate that there is no interaction between groundwater and surface water.
- Stable isotope results indicate that groundwater feeds the wetlands and there is of the influence of the lake on the groundwater.

Conclusions & Recommendations

- EC and stable isotope results indicate that there is an interaction between groundwater with Nkonge wetlands, which suggests that Lugala, and Ndaiga wetlands could also be groundwater-fed.
- EC and stable isotope results indicate that there is an interaction between lake water at Kiwami and Ntinkalu wetlands suggesting that these wetlands are lake-fed.



END

Thank you