

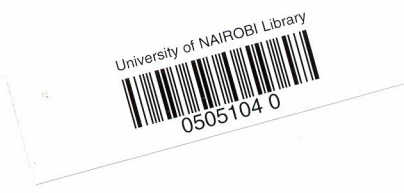
**STRUCTURAL CONTROLS OF GROUNDWATER FLOW
IN THE LUGARI-CHEKALINI AREA, WESTERN KENYA.**

UNIVERSITY OF NAIROBI LIBRARY

ISAAC KEVERENGE MUGAMANGI

UNIVERSITY OF NAIROBI LIBRARY

A Dissertation Submitted in Partial Fulfillment of Requirements for a Master of Science Degree in Hydrogeology and Water Resources Management at the University of Nairobi, College of Biological and Physical Sciences, Faculty of Science, Department of Geology.



2003

ABSTRACT.

This dissertation presents results on the movement of subsurface water through the crystalline rocks of Lugari-Chekalini area as controlled by the nature of the aquifers and the paths available for the water to flow. The study was aimed at investigating the conduits for water flow as controlled by the rock structure resulting from the contact between the Archean and Proterozoic-Palaeozoic groups of rocks. The impact of the geology and geological structures on the groundwater flow was established through a detailed field survey and statistical analysis.

Both theoretical and empirical methods were applied to define the groundwater flow patterns despite lack of hydraulic head data. Spring elevation head and discharge rates collected from a number of protected springs formed the data sets that were analyzed using contouring techniques to obtain flow lines from the water contour lines. The major faults bounding various geological units were delineated using photogeological and ground truthing studies and then merged onto the water contour maps. Correlation between the observed spring discharge rates and their closeness to the faults proved the results of a fault interpreted on the water contour map. The westerly groundwater flow in the area was inverted to various directions by geological structures. Flow models constructed along several traverses on the hydrogeological map showed that, the fault controls water flow with exceptional concentration and movement of water attributed to other factors like topography, folds and geological contacts.

Topographic controls indirectly relate geological structures to the water flow, since the observed landforms are a result of geological structures.