

# HYDROGEOCHEMISTRY OF FLUORIDE AND SALINIZATION MECHANISM OF GROUNDWATER IN THE SINGIDA REGION, CENTRAL TANZANIA.

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## Basic research questions included:

- What are the processes controlling fluoride occurrence in groundwater in fractured basement aquifers?
- How is the fluoride concentration related to depths of wells and boreholes?
- What is the relationship between the fluoride concentration and the geomorphology of the study area?
- What are the nature and the controls of the overall chemical character of groundwater in this area?
- What are the mechanisms responsible for groundwater salinization in semi-arid areas and fractured basement aquifers?

Fig 1.0 Location and Geology of the study area:

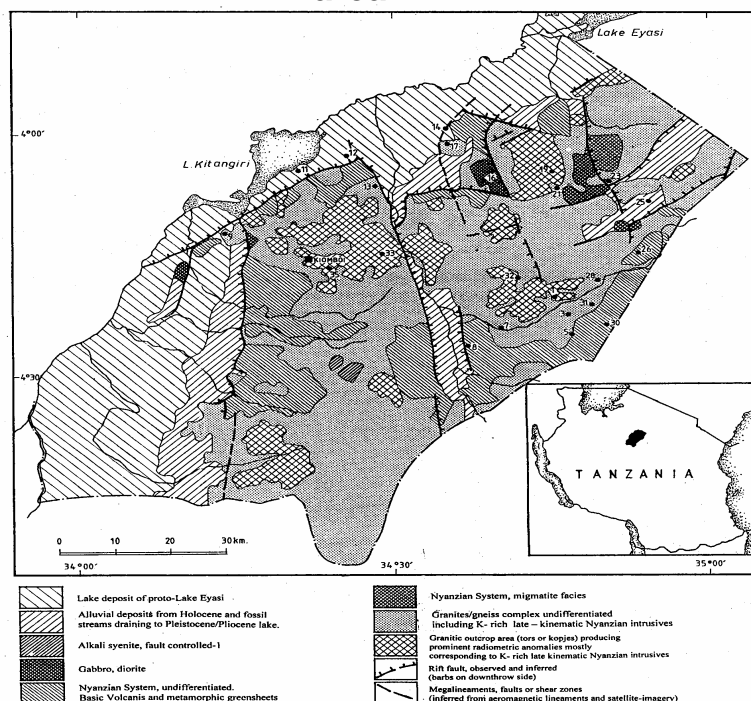
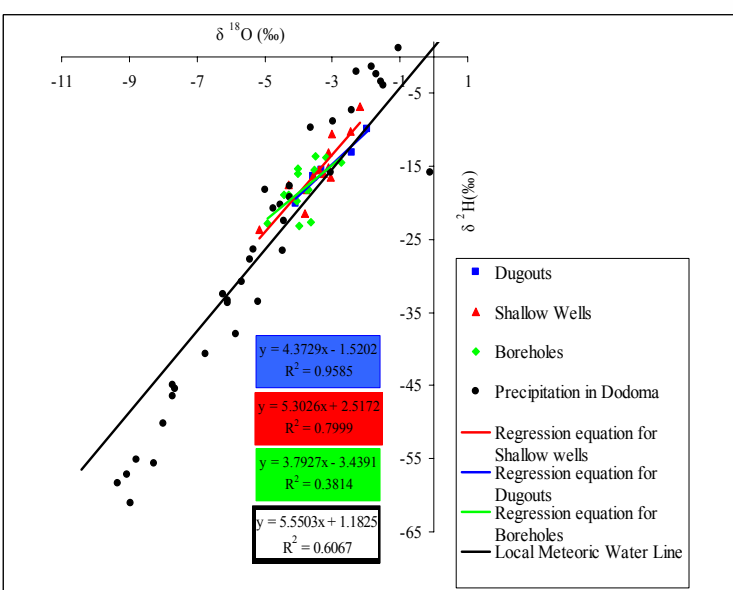


Fig. 2.0 Relationship between  $\delta^{18}\text{O}$  and D :



## Conclusions:

- Factors for high fluoride groundwater include;
- Leaching of surface and near surface soil salts
  - Subsurface evaporation process
  - Fluoride concentrations decreases with depth
  - Heterogeneity of basement aquifers results in spatial variability of fluoride values

## Key references:

- FRANT MS. AND ROSS JW (1966) Electrode for Sensing Fluoride Ion Activity in Solution. *Science*: **10**:1153-1154
- FUGE R (1988) Sources of Halogens in the Environment, influences in the human and animal health. *Environ. Geochem. Health*. **10**(2): 51 – 61
- FUGE R (1977) On the behaviour of Fluorine and Chlorine in the magmatic differentiation. *Contribution to the Mineralogy and Petrology*. **61** : 245 – 249

**Methodology.** Water samples were collected from dugouts, shallow wells, deep wells, rainfall and streams. ICP for major cations and chromatograph for major anions Varian mass spectrometer for stable isotopes. XY plots along with statistical analysis for data analysis were used.

Fig. 3.0 Variation of Fluoride concentration with Depth:

