

Interactive comment on “Prospecting for safe (low fluoride) groundwater in the eastern African Rift: a multidisciplinary approach in the Arumeru District (northern Tanzania)” by G. Ghiglieri et al.

Anonymous Referee #1

Received and published: 15 March 2010

Scientific Significance: Does the manuscript represent a substantial contribution to scientific progress within the scope of Hydrology and Earth System Sciences (substantial new concepts, ideas, methods, or data)?

This paper represents an interesting contribution related to the geophysical characterization of hydrogeology of a semi arid region in Africa, concretely in the Rift Valley in Tanzania.

This paper represents also a contribution about the hydrogeology and the water quality of the Rift Valley in Tanzania related to high F contents due to the alkaline volcanism.

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The goals are: found the main F source, found possible aquifers spared by F infiltration and the best way to exploit eventual safe groundwater.

Even though one of the goals is to find the source of fluorine, unfortunately the paper only presents quantitative datum of fluorine and no data of classical hydrochemistry or water isotopes.

The manuscript represents a contribution on the role of F in groundwater in Tanzania, but hydrochemical data are insufficient (only F content is analysed).

Scientific Quality: Is the scientific approach and applied methods valid? Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)?

For the hydrogeological and geophysical point of view the paper is OK but for the geochemical point of view the conclusions are not supported. Hydrogeological flow system in this area is governed by the high level of heterogeneity inherent to their geological evolution. Their study requires a large-scale approach to determine the origin of the flow systems; that is, the location of all the recharge zones with water isotopes, the water rock interaction with the hydrochemistry of major constituent in water (sulphate, chlorine, sodium, calcium, etc), etc. Water chemistry should permits, not only to characterize waters and confirm the relation between F content and the water/rock ratio; it also should permits to point out the existence of processes as mixing. Mixing processes should be an interesting point in order to found possible aquifers with safe groundwater.

Presentation Quality: Are the scientific results and conclusions presented in a clear, concise, and well-structured way (number and quality of figures/tables, appropriate use of English language)? Yes Presentation of Figs. 2, 5, 6 and table 1 → the letter size is too small. !!

1. Does the paper address relevant scientific questions within the scope of HESS? Yes

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2. Does the paper present novel concepts, ideas, tools, or data? Yes for the hydrogeological and geophysical data but not for the geochemical data.
3. Are substantial conclusions reached? More less.
4. Are the scientific methods and assumptions valid and clearly outlined? Not for the hydrochemistry.
5. Are the results sufficient to support the interpretations and conclusions? Not for the hydrochemistry. For example: The authors said (page 7336) that "recharge occurs by direct infiltration (rainfall),", but no hydrochemical data supports this conclusion. Water isotopes, Cl/Br ratio or other hydrochemical parameters are needed.
6. Does the title clearly reflect the contents of the paper? Multidisciplinary approach may be not correct because no hydrochemistry are presented.
7. Does the abstract provide a concise and complete summary? Yes
8. Is the overall presentation well structured and clear? Yes
9. Is the language fluent and precise? Yes
11. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Fig 2, 5, 6 and table 1 have a letter size too small.
12. Are the number and quality of references appropriate? Yes

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 7321, 2009.