USING LINEAR DISCHARGE FOR ASSESSING OF THE FISSURED LAYER PROPERTIES OF INTRUSIVE ROCK AQUIFERS IN DIVO-OUME REGION (COTE D'IVOIRE)

DOUAGUI, G.A.(1), TAGNON, O.B.(1), BAKA, D.(2) , OULARE, S.(2)

(1) Unité de Formation et de Recherches des Sciences et Gestion de l'Environnement, Université Nangui Abrogoua, Laboratoire Géosciences et Environnement, Abidjan, Côte d'Ivoire
douaguiaristide.sge@univ-na.ci; taberouess@gmail.com
(2) Unité de Formation et de Recherches des Sciences de la Terre et des Ressources Minières, Université Félix Houphouët Boigny, Laboratoire Sciences et Techniques de l'Eau et de l'Environnement, Abidjan, Côte d'Ivoire, dervingb@gmail.com

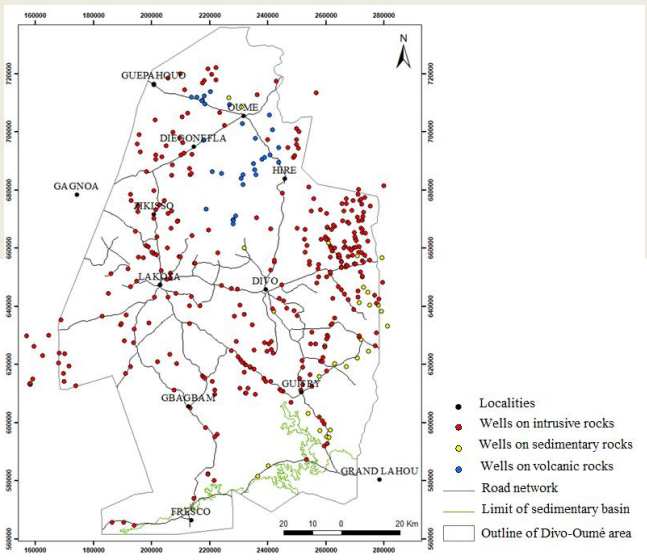

Figure 2. Spatial distribution map of the boreholes in the database

INTRODUCTION

In Côte d'Ivoire, despite the fact that 97.5% of the territory are comprised of crystalline and rocks, studies of the behavior of fractured and fissured aquifers are rare in several areas. Divo-Oumé area which is located in an environment of granite and volcano-sedimentary rocks is densely populated and intensely agricultural. The pressure on environment and on water resources is still tremendous. The quantity and quality of groundwater, the main source of drinking water are threatened. Several campaigns for supplying water by drilling, have registered significant failure rate (Tagnon et al., 2018). However, very few hydrogeological studies have been conducted in the region.

The objective of this study is to assess the thickness and the productivity of the fissured-fractured layers associated with the different hard-rock aquifer lithologies for Divo-Oumé area.

1. MATERIALS AND METHODS

✓ *Study area*

- 12 500 km^2
- located in the southern part of Côte d'Ivoire, between longitudes 5 ° and 6 ° West and latitudes 5 ° and 6 ° 40' North
- The climate consists of 4 seasons (long dry season from November to February; long rainy season from March to June; short dry) season between July and August and finally; short rainy season from September to October
- The geological formations of the area mainly belong to Paleoproterozoic

✓ *Data collection :* 380 boreholes in intrusives rocks
The parameters taken into account are rock type, borehole depth (m), thickness of saprolite, water table and borehole discharge *Q* (m^3.h^{-1})

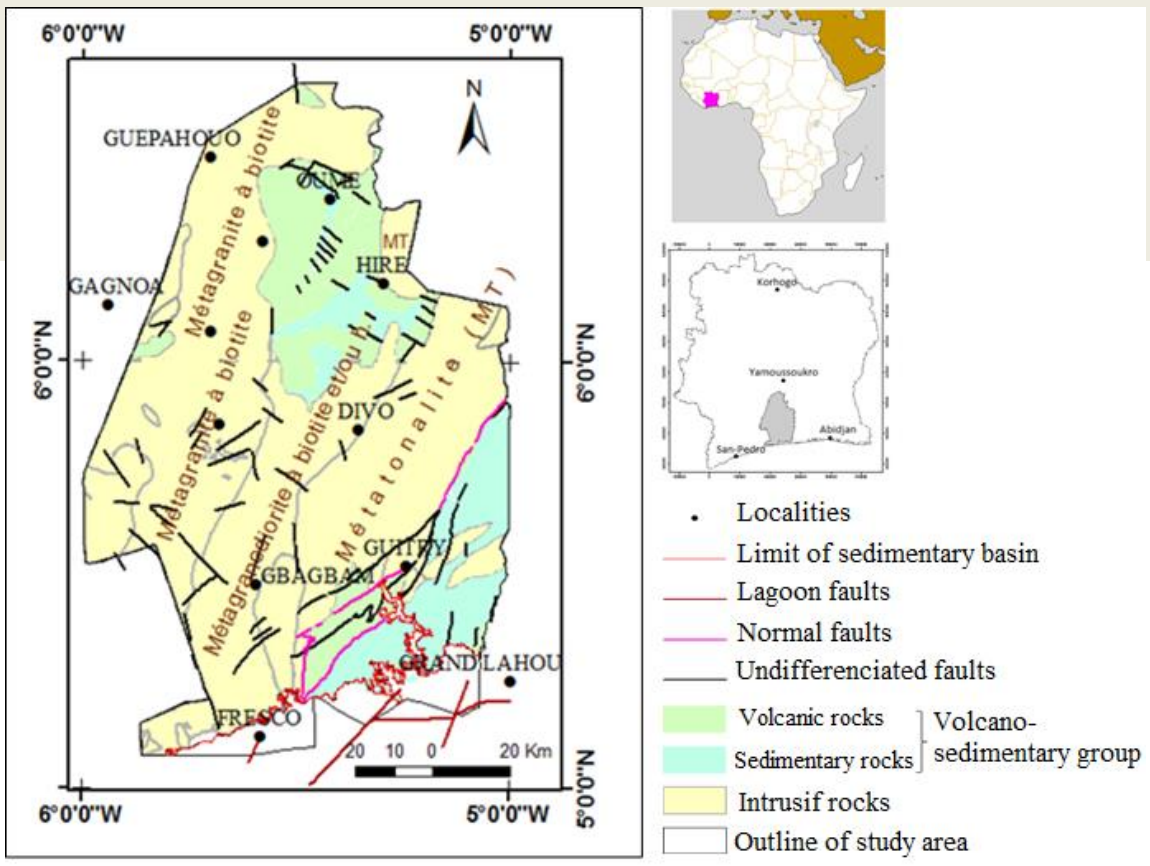

Figure 1. Location and geological map of the Divo-Oumé area.

✓ *The evaluation of the thickness and the productivity of the fissured layers is based on a statistical analysis of the borehole database*
The cumulative percentage of linear discharge for each lithology is estimated as follows

$$P_q(L) = \sum_{l=Lmin}^{l=L} qi(l) / \sum_{l=Lmin}^{l=Lmax} qi(l)$$

2. RESULTS

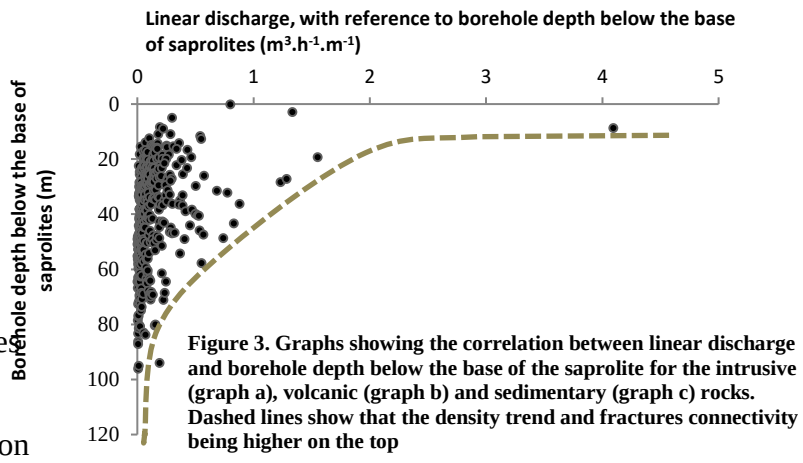

Figure 3. Graphs showing the correlation between linear discharge and borehole depth below the base of the saprolite for the intrusive (graph a), volcanic (graph b) and sedimentary (graph c) rocks. Dashed lines show that the density trend and fractures connectivity being higher on the top

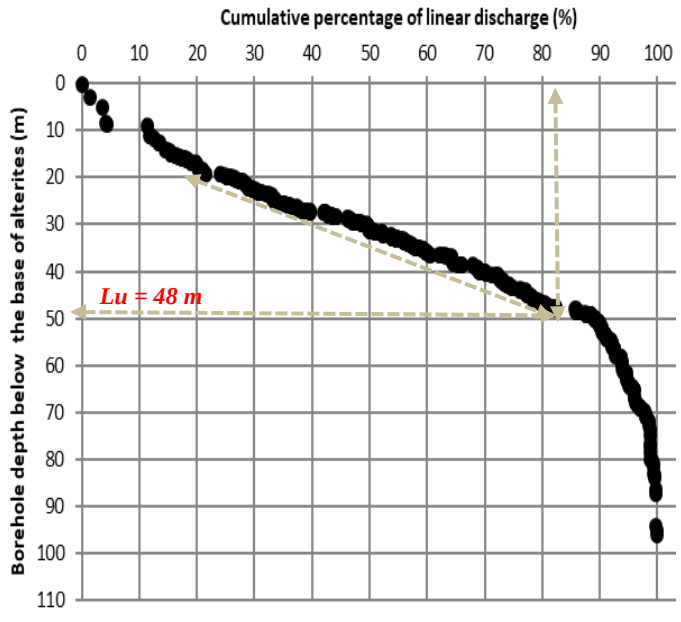

Figure4. Statistical evaluation of fissured layers depth in intrusive rocks

3. CONCLUSION

The linear discharge vertical distribution from saprolite basis within intrusive rocks has shown a decrease of discharge with depth. This highlights the fact that fractures and fissures density and connectivity in fissured layers are higher on top and decrease downward as well. Within intrusive rocks, conductive fractures and fissures are up to 48 m below saprolites with a discharge of 9.54 m^3.h^{-1}.

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