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PEPP
Programme Eau Potable pour la Population des Grands Lacs

Géosciences pour une Terre durable brgm

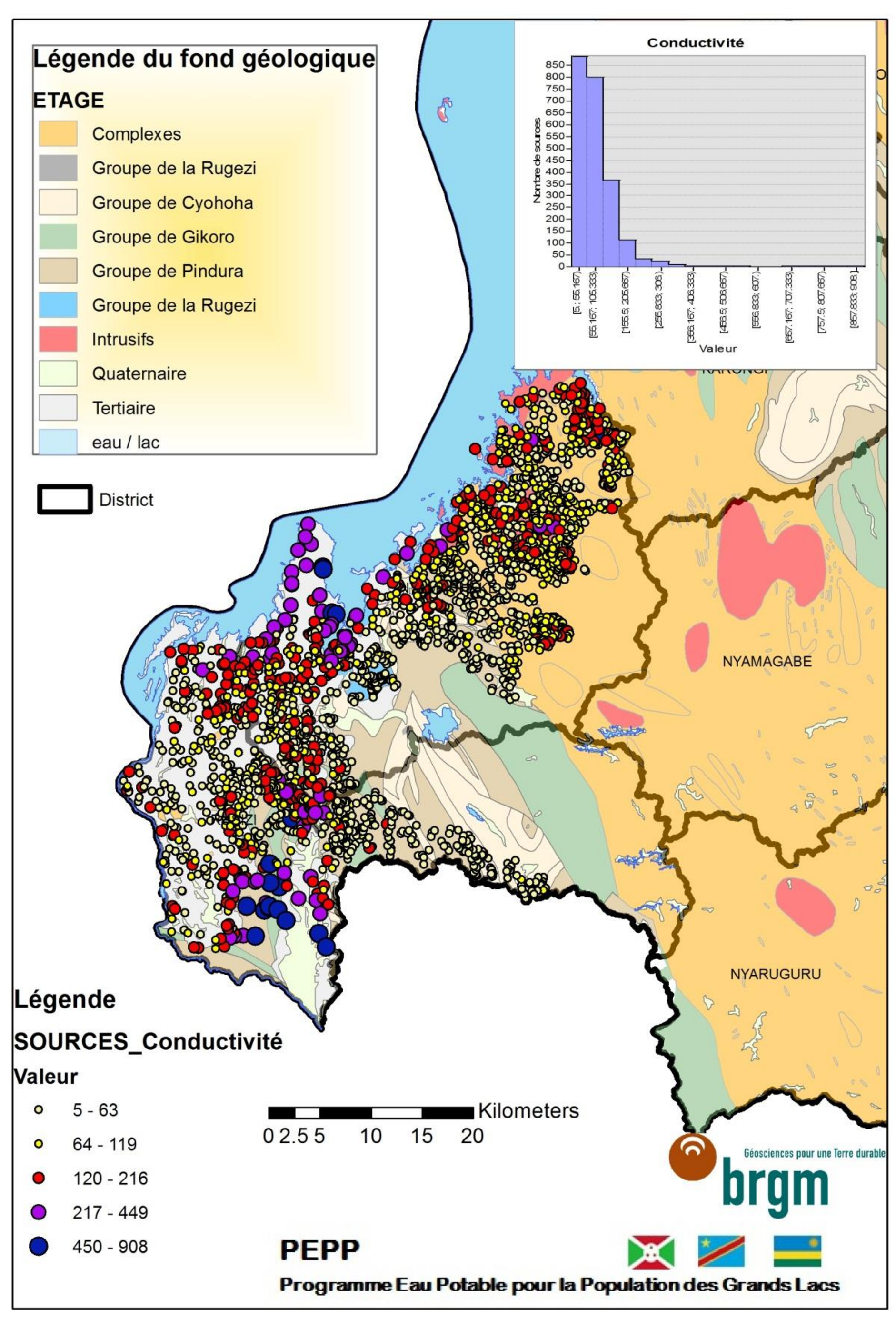
Typology of springs in south-western Rwanda .

Drinking water supply projects of rural people are at the heart of programs to support sectorial policies in many African countries, but such projects face the weakness of available information on water resources . A typology of water points is a prerequisite . An example is given with the springs of two provinces in south-western Rwanda.

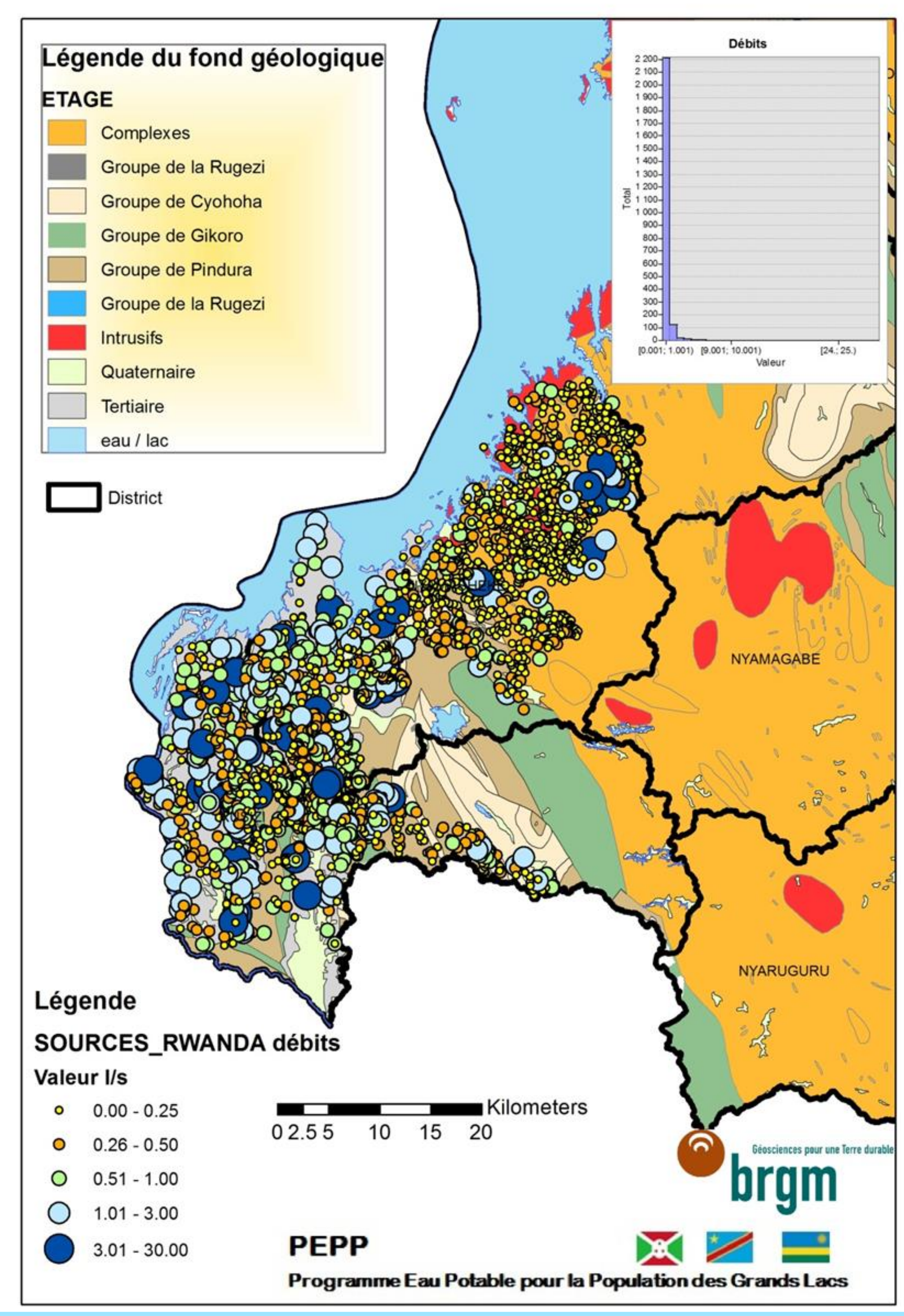
The PEPP program (Safe Drinking Water for the Population) is being conducted by Swiss TPH (Swiss Tropical and Public Health Institute) in cooperation with SKAT Consulting to implement a water supply project in the Great Lakes Region. The Swiss funded project is aiming to implement decentralized water services. Local partners include the Water Ministries and their services for rural water supply as well as the local governments (districts, communes). Between August 2013 and July 2014 an exhaustive survey of springs, which constitutes the sole groundwater resource (no wells), was conducted in the inhabited areas of Rusizi and Nyamasheke districts of Rwanda. Four investigators walked the ground and raised precisely the GPS coordinates, flow, conductivity. They estimated the pH with pH paper and for sources exceeding 1L/ s, they realized some chemical quality measurements (chlorides, nitrates), using a portable kit in situ measurements. The information collected also concerns the management, utilization and environment of the water point. They are supplemented by photos and comments. All the validated information is then entered into a custom-built database for the project. This tool is extremely useful because the number of identified sources (2400) could not be handled otherwise.

The synthesis carried out from the inventory of 2400 springs brings up several characteristics:

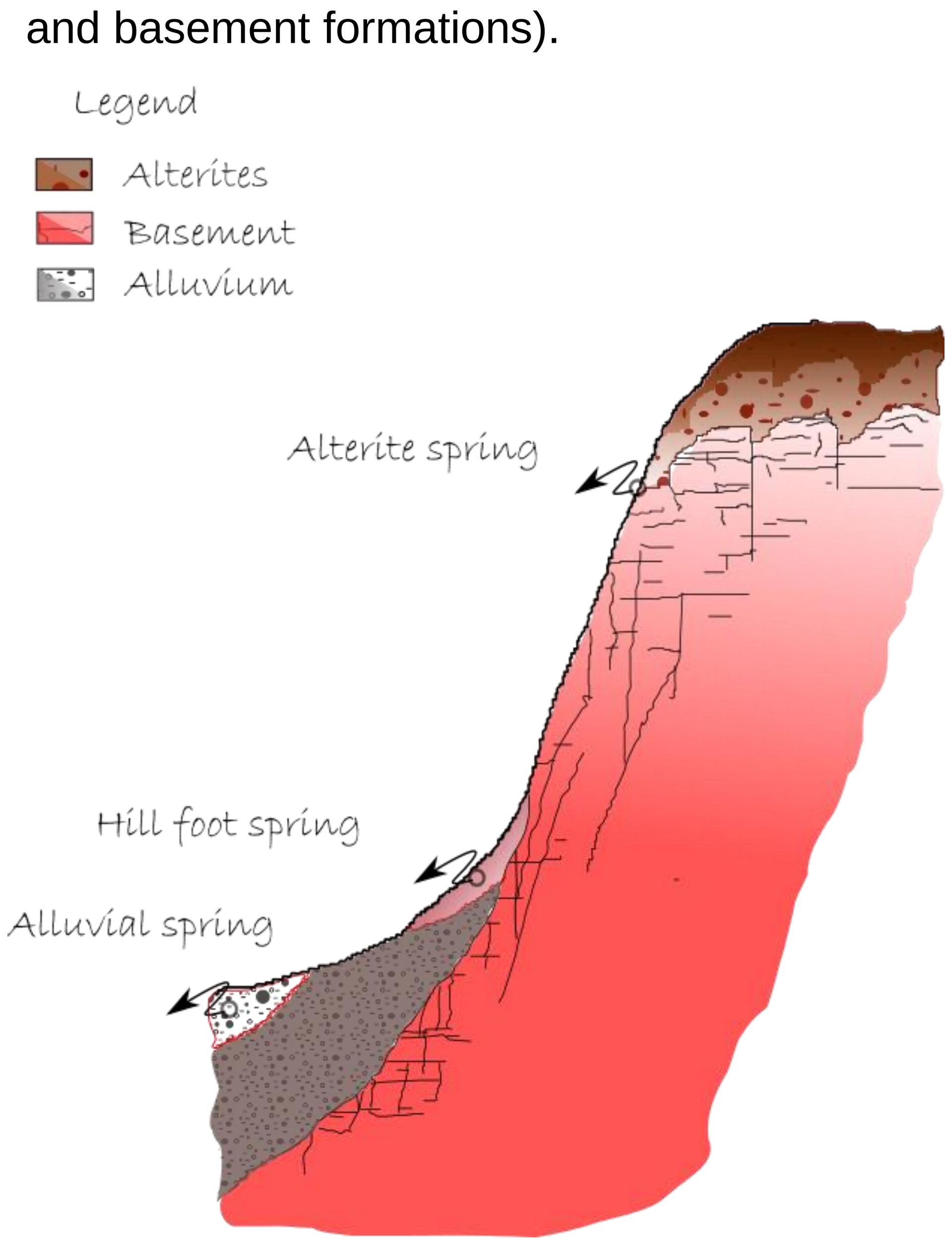
- ✓ Conductivities are low (71 % of the measured sources have a conductivity of less than 100 µS / cm). They are higher in the valleys (>300 µS/cm) as a consequence of a longer residence time and probably more impact from agricultural activities.
- ✓ pH are generally acid (mean value of 5.8) but higher in the valleys of the western area (basalts).
- ✓ Temperature is correlated with elevation. Some springs are thermal springs (volcanism).
- ✓ Discharge was measured during the dry season. However, only one measurement per spring gives a limited information. 89% of the springs have a discharge lesser than 1L/s.
- ✓ Analysis of flow rates, conductivity and pH of the springs shows that the geological substratum exerts a contrasted influence (between volcanic, alluvial and basement formations).



Conductivity µS/cm

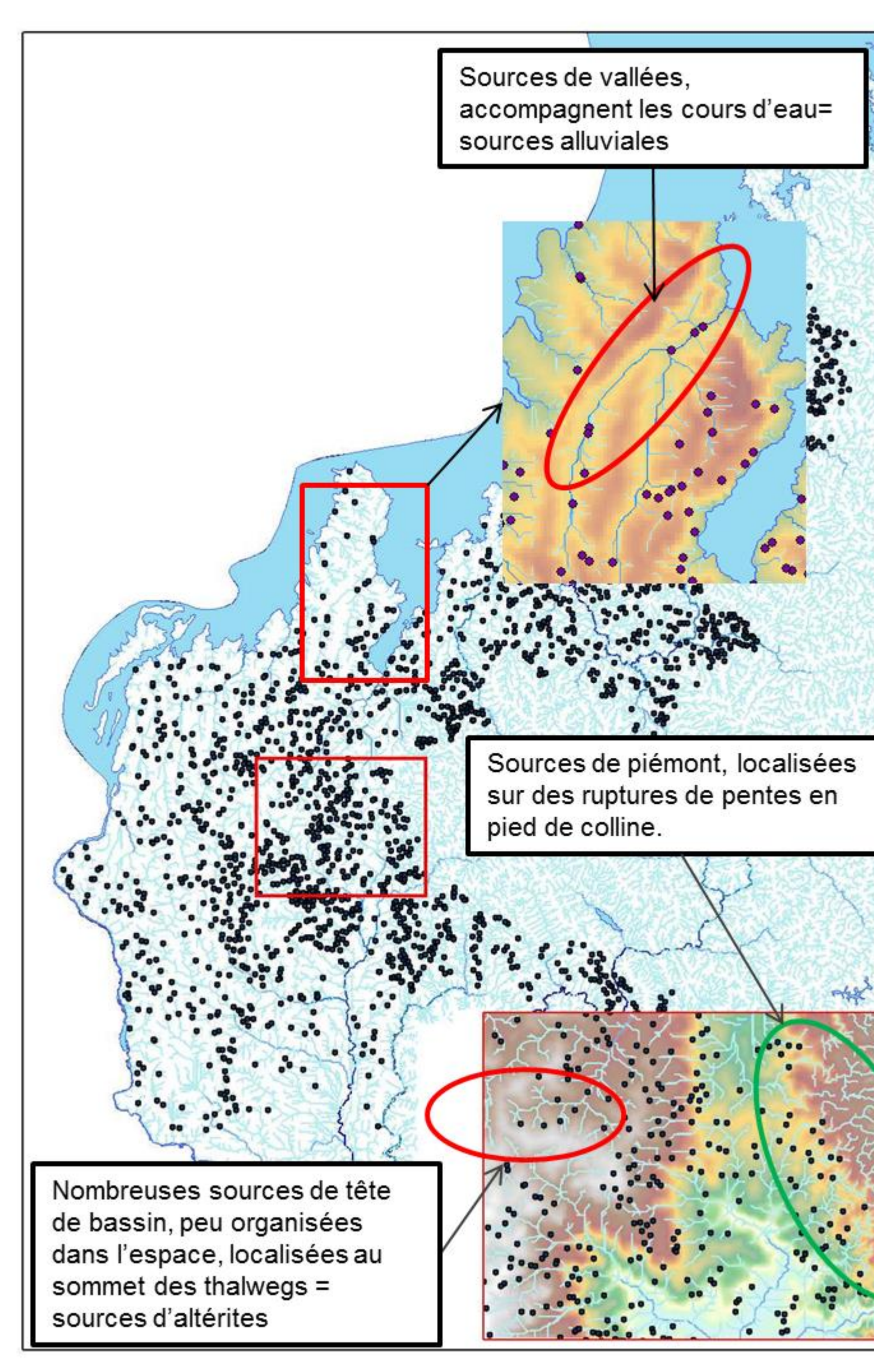


Spring discharge (l/s)



The geomorphological analysis of the position of the springs relative to the terrain led to propose the following typology:

- ✓ - Alterite springs: In catchment head, near the top of the hills. Springs with low discharge and generally low conductivity.
- ✓ - Hill foot springs: At the bottom of the hill, where the slope changes, these sources drain the cracked area and the deep regolith infiltration.
- ✓ - Alluvial springs: nearby river beds, in the axis of the valleys draining the main sources of these alluvial valleys. The conductivities are higher there and anthropic activities may have more impact.



Authors

Gutierrez A.[1], Mardhel V.[2], Lavalade J.L.[3], avec la collaboration de Meilhac A.[4], Ahononga F.[5]

(1) BRGM – BP6009 – 45370 Orléans ; a.gutierrez@brgm.fr; (2) BRGM - Ester, 87280 Limoges ; v.mardhel@brgm.fr ;(3) SKAT – Bujumbura. Actuellement à ANTEA, 29 Av. Aristide Briand ; 94110 Arcueil ; (4) Retraité (BRGM/ANTEA) ; (5) SKAT – Bujumbura - Burundi

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