

Analysis of Aquifer Productivity in the Mbouda Area (West Cameroon)

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Abstract : Located in the western region of Cameroon, in the BAMBOUTOS department, the city of Mbouda belongs to the Pan-African basement. The water resources exploited in this region consist of surface water and groundwater from weathered and fractured aquifers within the same basement. To study the factors determining the productivity of aquifers in the Mbouda area, we adopted a methodology based on collecting data from boreholes drilled in the region, identifying different types of rocks, analyzing structures, and conducting geophysical surveys in the field. The results obtained allowed us to distinguish two main types of rocks: metamorphic rocks composed of amphibolites and migmatitic gneisses and igneous rocks, namely granodiorites and granites. Several types of structures were also observed, including planar structures (foliation and schistosity), folded structures (folds), and brittle structures (fractures and lineaments). A structural synthesis combines all these elements into three major phases of deformation. Phase D1 is characterized by foliation and schistosity, phase D2 is marked by shear planes and phase D3 is characterized by open and sealed fractures. The analysis of structures (fractures in outcrops, Landsat lineaments, subsurface structures) shows a predominance of ENE-WSW and WNW-ESE directions. Through electrical surveys and borehole data, we were able to identify the sequence of different geological formations. Four geo-electric layers were identified, each with a different electrical conductivity: conductive, semi-resistive, or resistive. The last conductive layer is considered a potentially aquiferous zone. The flow rates of the boreholes ranged from 2.6 to 12 m³/h, classified as moderate to high according to the CIEH classification. The boreholes were mainly located in basalts, which are mineralogically rich in ferromagnesian minerals. This mineral composition contributes to their high productivity as they are more likely to be weathered. The boreholes were positioned along linear structures or at their intersections.

Keywords : Mbouda, Pan-African basement, productivity, west-Cameroon

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