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HYDROGEOLOGY AND CHEMISTRY SYNTHESIS OF THE DEEP BORING OF THE TOWNSHIP OF ABOMEY-CALAVI

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ABSTRACT: *In the setting of the backing of the food in drinking water of the population of the cities of Abomey-Calavi, Sèmè and Cotonou biggest city of Benin, the General Direction of water (DG-Water) and the Society Nationnale of the Waters of Benin (SONEB) achieved many boring in the township of Abomey-Calavi. It is the biggest field of intensive catchment of Benin; but whose hydrogeology and chemistry is known little. During the year 2013, we sampled these boring and studied the hydrogeology of the township of Abomey-Calavi. These deep boring of about hundred meter on average, permit to appropriate water in the aquifer of the continental terminal. It is an aquifer of the sands (end to coarse) of wills and gravels with of the argil - sandy levels (red lateritic, gaudy, black or colorful). We mobilized water from 77 boring. The averages of the results of analyses by precinct permitted to make a synthesis of hydrogeology and hydrochemistry of the township of Abomey-Calavi. The water of boring of the township of Abomey-Calavi are possesses one feature chlorinated sodic potassic or bicarbonated sodic potassic.*

KEYWORDS: Hydrochemistry, hydrogeology, Abomey-Calavi, Benin.

MATERIAL AND METHODS

Setting of Survey

The township of Abomey-Calavi is situated in the South part of Republic of Benin in the department of the Atlantic, between the latitudes 6°20'23.4 " and 6°42'6.6 " North and the longitudes 2°14'13.8 " and 2°25'7.8 " East. The township of Abomey-Calavi has a damaged relief. The main characteristic features are: a gritty strip with coastal cords and a tray of earth of rod and depressions. The precipitations are raised relatively. They reach 100 mm of rain on average per month, either 1,200 mm per year. The setting of survey spreads on two big types of geological formations: The quaternary formations that are sandy deposits of the coastal cord, of the deposits lagoon made of clays and sand and deposits constituted alluvium of sand and clays. The tertiary formations as for them are essentially constituted of clay and sand of the continental terminal. One distinguishes three deep aquifer layers.

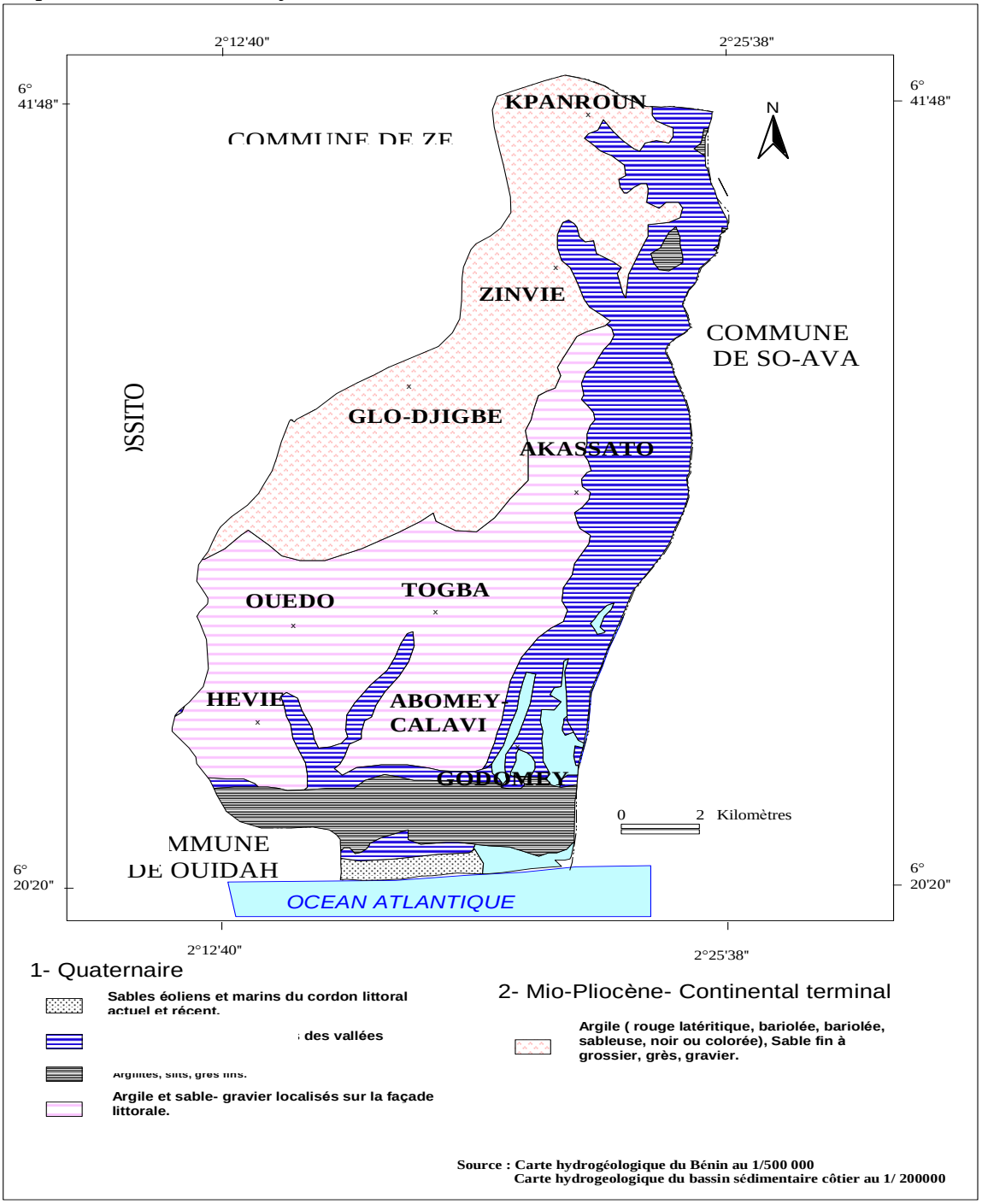
- The aquifer layer of the continental terminal to 120 m of depth;
- The aquifer layer of the Paleocene to 350 m of depth;
- The aquifer layer of the mastrichien to 1,500 m of depth.

It is in the layer of the continental terminal that is appropriated water by the hydraulic boring.

Sampling and Method of Analysis

All the boring of the DG-Eau existing in the township of Abomey-Calavi before the starting of this survey in January 2013 have been sampled to have a general picture of the watertable of the continental terminal. We did to the total sixty ten seven withdrawals to the level of sixty ten seven boring for the physical and chemical analyses. We analyzed the survey has

been led on sixty ten seven samples of water coming from the seventeen seven boring in the township of Abomey-Calavi. The following parameters were moderate: TDS, color, toughness, pH, electric Conductivity, temperature, alkalinity, calcium, magnesium, sodium, potassium, total iron, ammonium, bicarbonate, chloride, sulphate, nitrate, nitrite, phosphate and turbidity. The methods of analysis of the samples of waters are the conductivity, the spectrophotometry and by the pH-metric. The diagram of Schoeller and Berkaloff presented under binary diagram shape used by Bensaoula and al in 2005 to study to determine facies of the waters of boring of Zouia in Algeria, has been used at the time of the present survey for interpret the results of analyses.



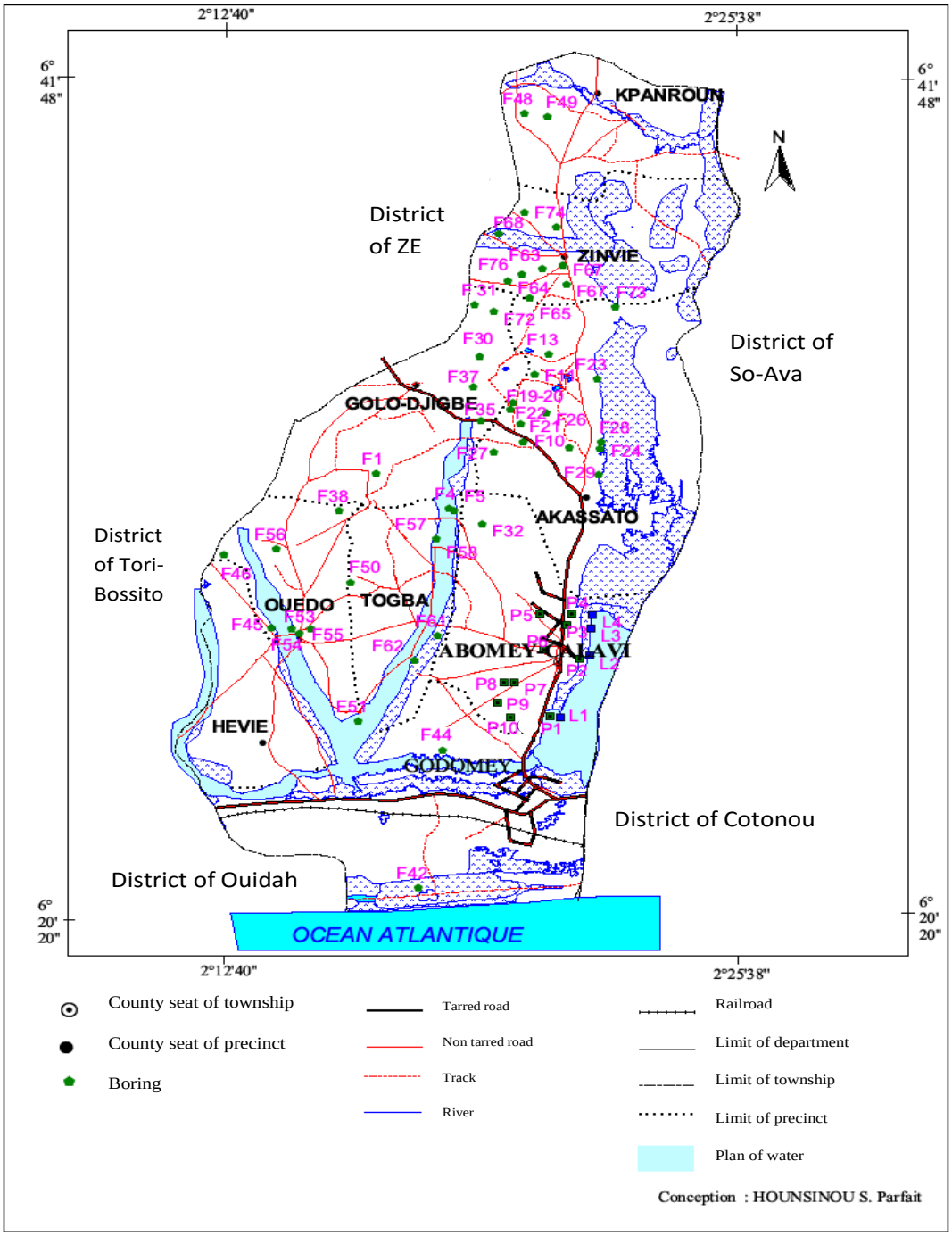
Picture1: (Wind and marine sands of the present and recent coastal cord. bomey-Calavi.

Argilo-sandy alluviums of the interior valleys of the streams

argilitex, siltx, thin wills.

Clay and sand - gravel localized on the facade litorale

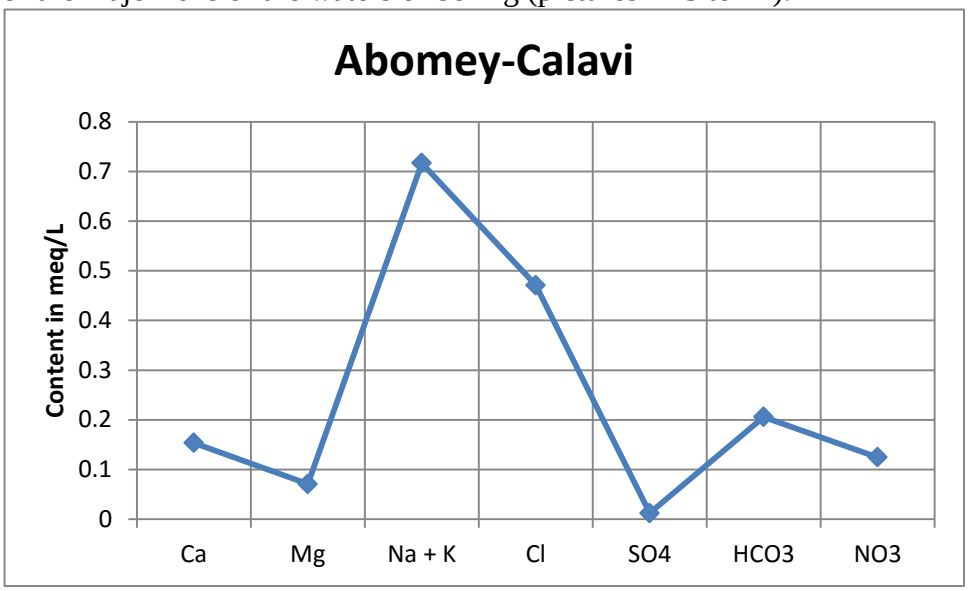
Clay (red latéritique, gaudy, sandblasting machine, black or colorful), sand end to coarse, wills, gravel.



Picture 2: Sites of withdrawal of waters of boring.

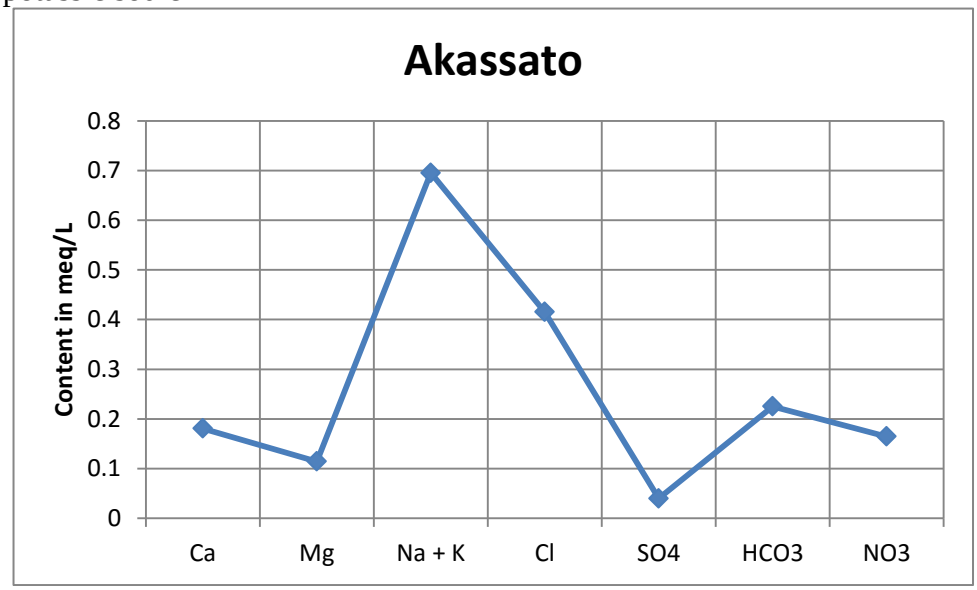
RESULTS AND ANALYSES

We have interpret the results from the representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring (pictures n° 3 to 12).



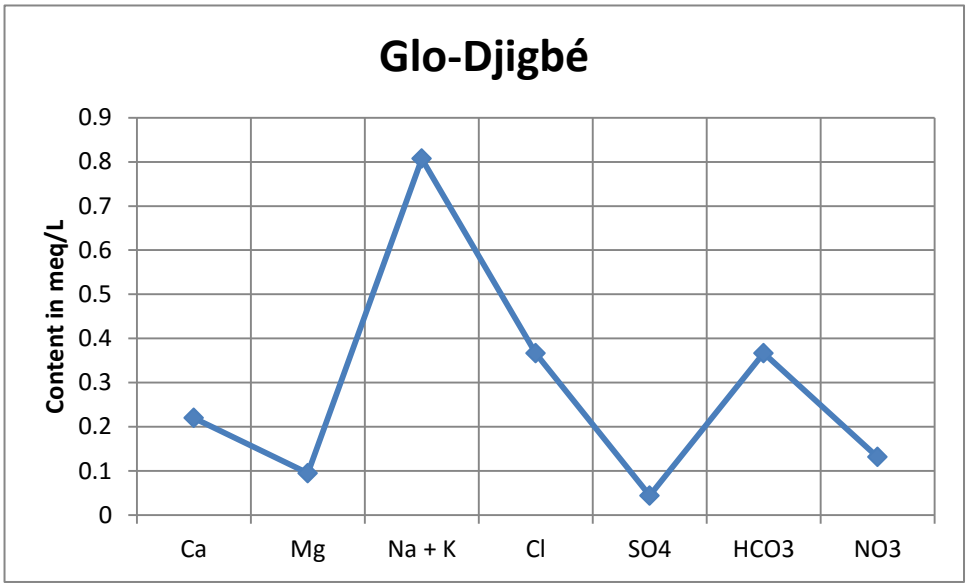
Picture 3: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of the precinct of Abomey-Calavi.

The water of boring of the precinct of Abomey-Calavi possesses one feature chlorinated potassic sodic



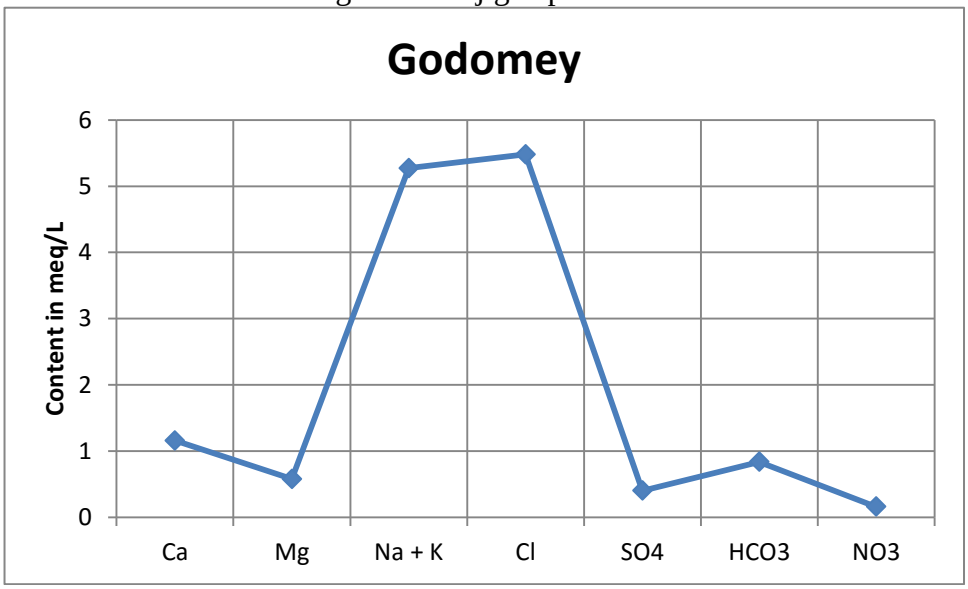
Picture 4: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of Akassato.

The water of boring of akassato possesses one feature chlorinated sodic potassic.



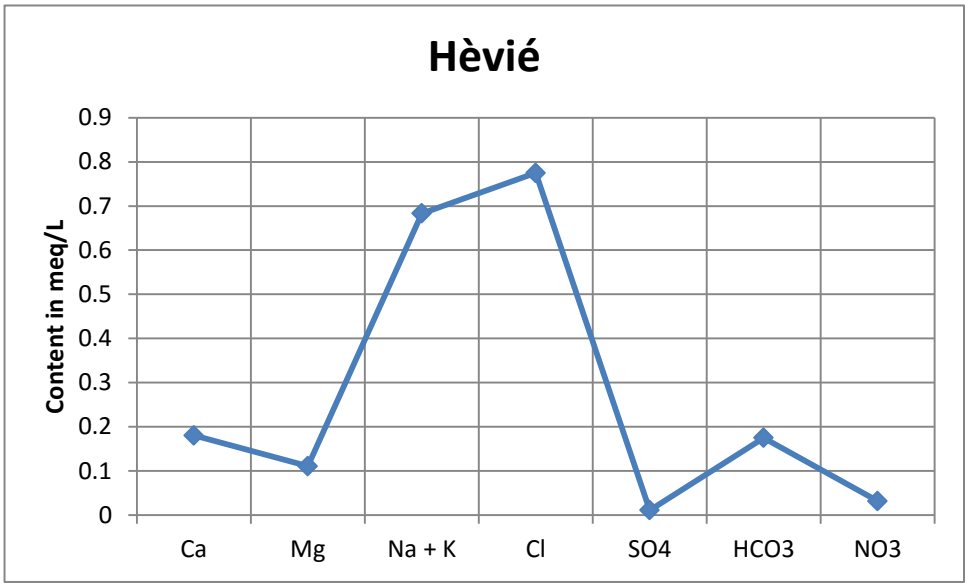
Picture 5: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of Glo-Djigbé.

The water of boring of Glo-Djigbé possesses one feature bicarbonated sodic potassic.



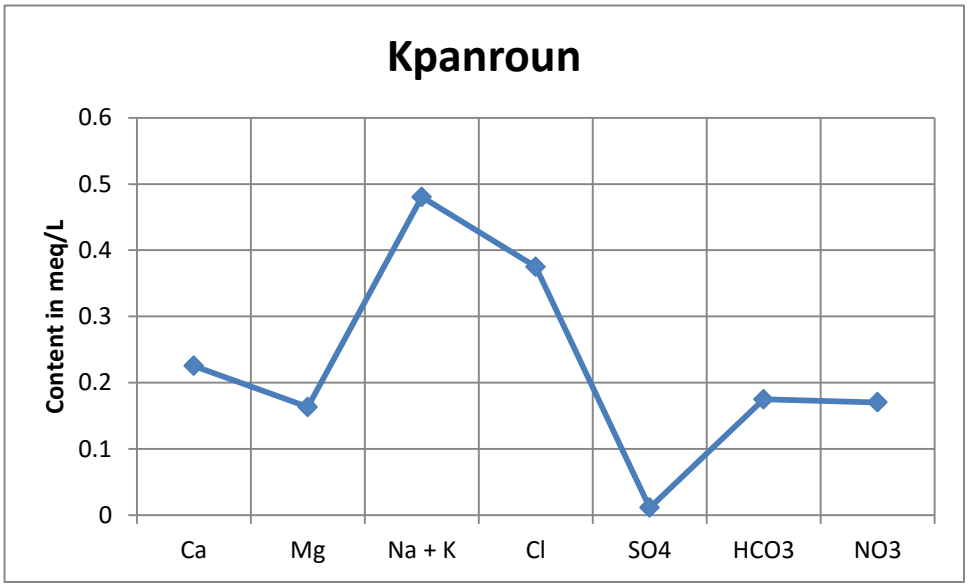
Picture 6: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of Godomey.

The water of boring of Godomey has one feature chlorinated sodic potassic.



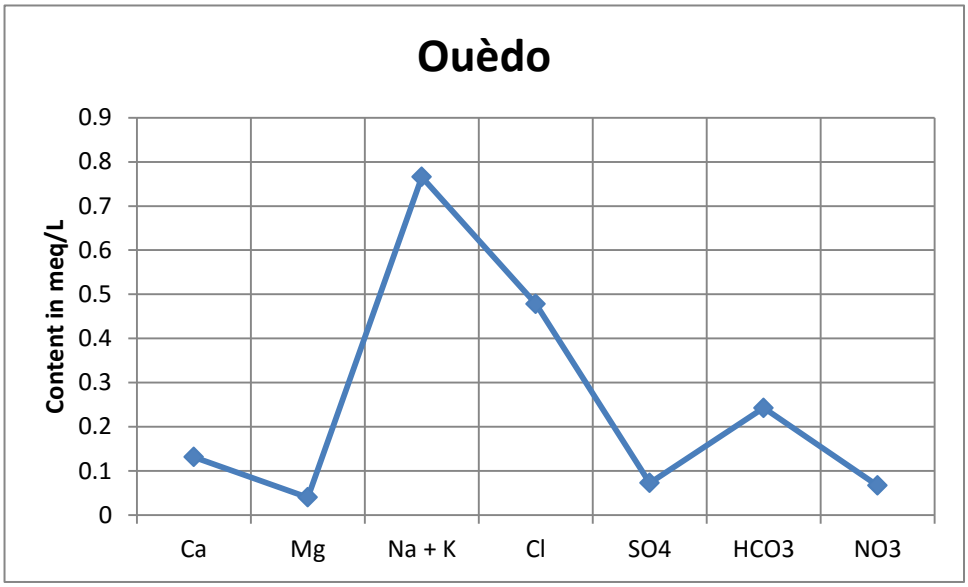
Picture 7: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of Hèvié.

The water of boring of Hèvié has one feature chlorinated sodic potassic.



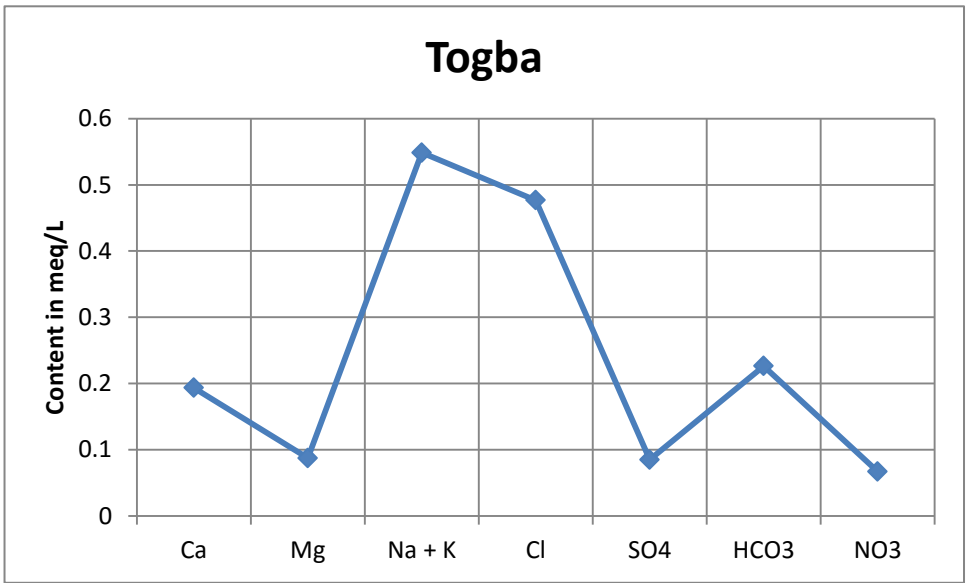
Picture 8: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of Kpanroun.

The water of boring of Kpanroun has one feature chlorinated sodic potassic.



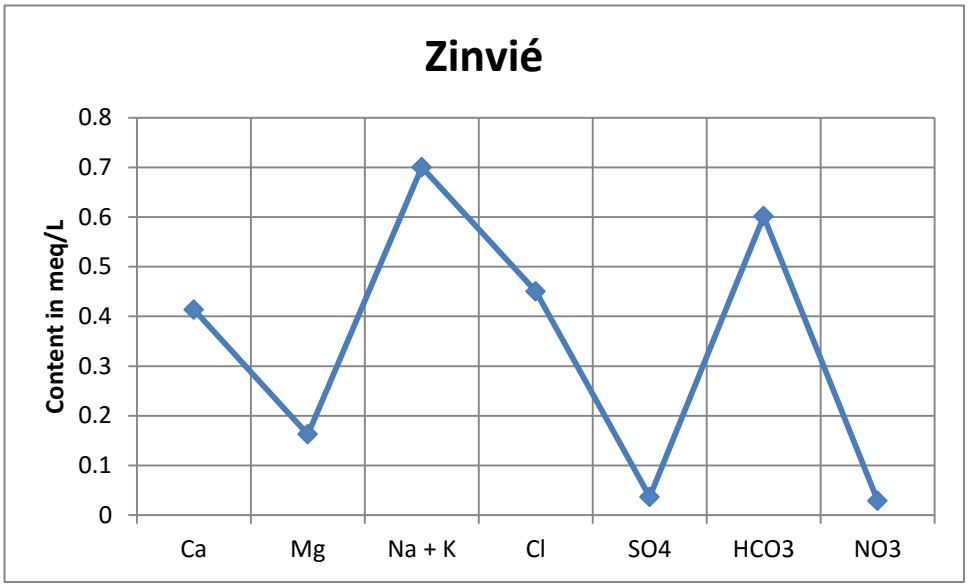
Picture 9: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of Ouèdo.

The water of boring of Ouèdo possesses one feature chlorinated sodic potassic.



Picture 10: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of Togba.

The water of boring of Togba possesses one feature chlorinated sodic potassic.



Picture 11: Representation, on diagram of Schoeller and Berkaloff, of the major ions of the waters of boring of Zinvié.

T
he water of boring of Zinvié possesses one feature bicarbonated sodic potassic.

Waters captured by the studied boring can be classified in two categories: The waters that possess one feature chlorinated sodic potassic and waters to feature bicarbonated sodic potassic.

The waters of boring to feature chlorinated sodic potassic that concerns the precincts of Abomey-Calavi, Akassato, Godomey, Hèvié, Kpanroun, Ouèdo and Togba. The boring of Abomey-Calavi, Akassato, Godomey, Hèvié, Ouèdo and Togba of by their proximity in relation to the Atlantic Ocean undergo an influence of this last that justifies feature chlorinated of their waters. Kpanroun is the precinct of the township of Abomey-Calavi, most distant of the sea but, the water of boring of Kpanroun to chlorinated one feature. It is due to a washing probable of formations geological salt marsh. But the water of boring of the precinct of Kpanroun, the waters of boring of touts the precincts of the township of Abomey-Calavi that are distant of the sea, possess one feature bicarbonated.

CONCLUSION

To the light of the physical and chemical analysis results, it appears that waters captured by the boring are of feature chemical either bicarbonated is chlorinated. The waters of boring of the precincts near of the sea undergo the influence of this last and possess chlorinated one feature. Feature of the water of boring of the precincts moved away of the sea is due to a washing probable of formations geological bicarbonated or saline. It would be notably interesting to value the extent of the navy intrusion in the underground waters of the township of Abomey-Calavi. New investigations are led in order to be able to delimit the navy intrusion and the underground water salinization in the township of Abomey-Calavi.

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