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Sources of chemistry of the albian water under arid conditions. Application to the western regions of the Algerian Sahara.

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Abstract

The study has been carried out in the zones of Tout, Gourara and Tidilket that are stretching on the two Algerian biggest states in the south (Adrar and Tamanraset). This zone is known by its hyper-arid climate and sediments heterogeneity of its formations. This later has one of the biggest aquifer in Africa ascribed to the Albian. It is recognized by Continental intercalary and fossil aquifer as well that is weakly renewable. The aquifer is wildly subjected by an overexploitation in order to satisfy the needs of the agglomerations in water. From hydro chemical point of view, the interaction water-rock is the responsible factor about the mineralization of waters. The objective of the present study is to highlight again the influence of the lithology on the chemistry of the Albian water, which was rarely studied in an arid context of Sahara.

Moreover, our contribution focuses on the hydrogeochemical approach in order to put in evidence the chemistry acquirement mechanism of waters that is contained in aquifer's formations.

The results reflect that the influence of the aquifer matrix rich in particles, evaporates, carbonates, silicates and fluorine provide the aquifer with waters relatively mineralized, rough and with contents in fluorine that exceed the admitted norms by the WHO.

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Key words: Arid climate - Continental Intercalary – Non-renewable resource – Hydrochemistry – Geochemistry.

1. Introduction.

The study area situated in southern west of the country, it occupies the middle of the Sahara in more than 1200 km from the capital Algiers. It is limited, between the meridians: 3°14' E and 1° 22' W and the parallels: 26° 28' and 30° 19' North.

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The total surface is more than 190000 Km^2 divided into 03 very distinct regions: The Gourara - The Touat and The Tidikelt known commonly by the term country of the foggaras (draining galleries).

The desert climate type of the Sahara is characterized by weak temperatures in winter, however high in summer periods. Sometimes the minimal temperatures reach the 06°C and even less from December to February. Whereas the maximal is (more than 45°C) recorded in the month of August. Thus, even though the precipitations are not so considered (2 to 10 mm on average), they are often stormy, especially in to the north and northeast of the study area.

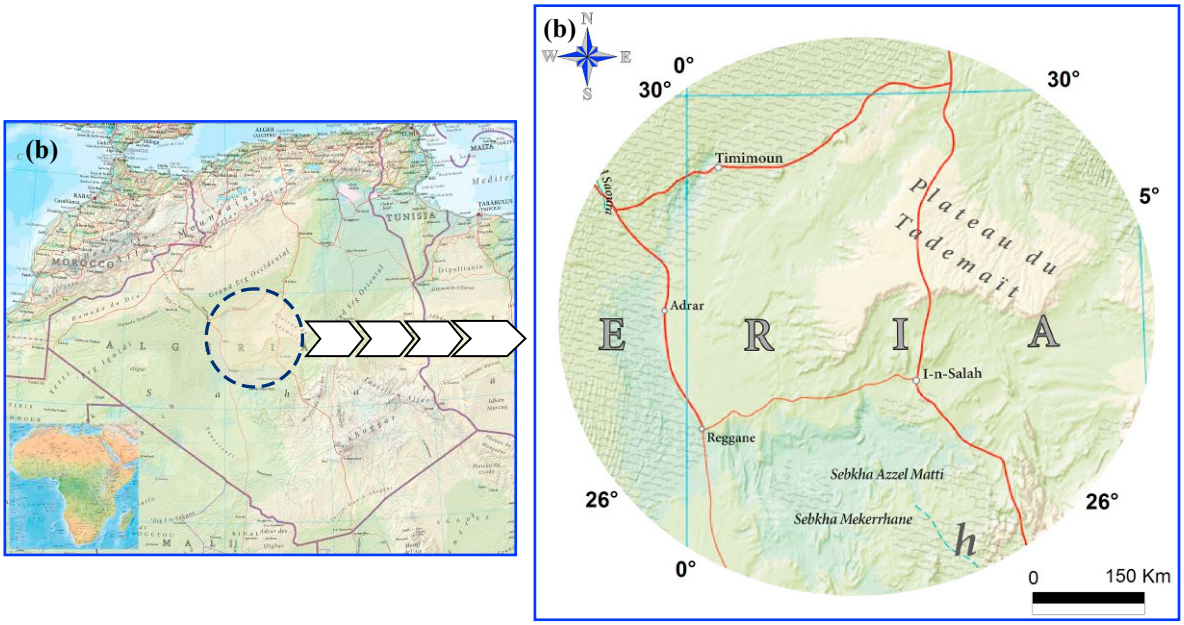

Fig.1. Localization of Algeria in Africa (a) follow-up of the map of Algeria emerging from the position of the study area (b).

However, during the last years there was an overexploitation of water that may due to the demographic increases accompanied by a fast urban and agriculture extension alike. This can be interpreted by the existence of 7000 points of water exploitation points in terms of boreholes, traditional wells and foggaras.

the unceasingly increases that is associated to an hyper arid and dry climate, alongside an insignificant refill of the order 3,55m3/s according to water resources survey in the Septentrional Sahara (1972) leads to the deterioration of the waters chemical quality of the aquifer and the gradual disappearance of its artesianism.

In conjunction to this, it seems useful to conduct to a survey on the basis of an analytic data base of 450 samples of water, that relating to the hydrogeochemical aspect to the interactions water-rocks.

2. Geology and hydrogeology of the survey zone.

Geologically the study region is part of the secondary western basin of the platform that spreads from the Saharan Atlas to the north till Hamada of Tinhert to the South, and Touat – Gourara in to the west.

Taking into account the correlative geological sections established by the O.S.S. (2005), the stratigraphy of the region can be defined from the most recent (Quaternary) to the oldest (Paleozoic) whose formations correspond to eight major geological units reorganized according to the following scale:

1- Quaternary	3- Turonian	5- Continental Intercalary	7- Trias
2- Continental Terminal	4- Cenomanian	6- Jurassic	8- Paleozoic