

Presentation of Geothermal Potential and the Status of Exploration in Democratic Republic of Congo

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ABSTRACT

The Democratic Republic of Congo is situated at the central Africa, crossed by the East African Rift in its Eastern Boarder.

It overflows a potentiality in geothermal resources enormous in its part East, notably in the following provinces: Katanga, Maniema, North and South Kivu and Oriental Province.

These resources were not the subject of a survey retailed in the past. Nevertheless, some among them have been identified and have been localized.

A geothermal power station was put in working in the province of Katanga in the years 1950, which is operational anymore nowadays.

Currently, there are some projects in progress. We hope that they are going to succeed for a good exploitation of these resources.

1. INTRODUCTION

The Democratic Republic of Congo is a country in Central Africa. Border countries: Angola, Burundi, Central African Republic, Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, Zambia

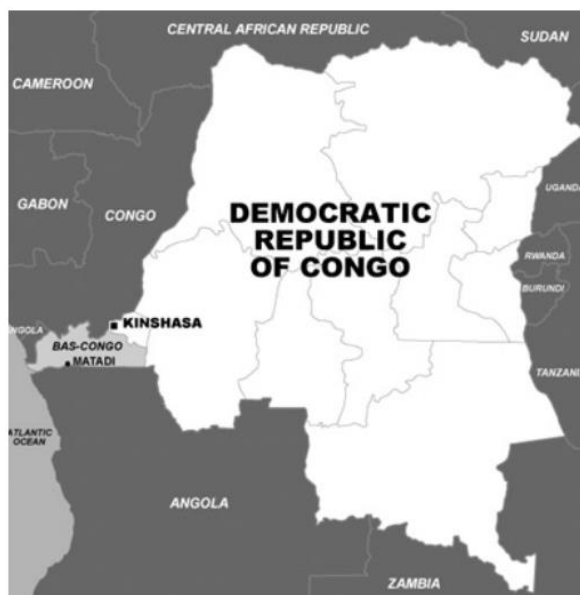


Fig.1. Map of Democratic Republic of Congo (The Civic United Front, web reference)

- Superficie :2 345 400 Km²

- Population : 70, 000, 000

- Language: French, Lingala, Swahili, Tshiluba

- Hydrography:

River Congo: 4.374 km along

Lakes: Mai-Ndombe, Tanganyika, Kivu, Eduard

In Democratic Republic of Congo, the geothermal resources have been identified in its eastern part, especially in the provinces of Katanga, Maniema, two Kivu and Oriental Province.

In the past, these sources were not subjects of any detailed survey. Nevertheless, some among them have been identified and have been localized.

A geothermal power plant was put in working in the province of Katanga.

2. THE OUTLINE OF THE GEOTHERMAL RESOURCES IDENTIFIED IN D.R.C

In D.R. Congo, the identified geothermal resources are as follows:

2.1. North Kivu and South Kivu :

Lulinga:

Temperature 80° Celsius, sulfurous, Hot Springs Nyamukangaza: Matshuza called, located about 7 km north of Uvira. Water clear, temperature of about 68 ° Celsius, hot spring of Karaya: The temperature of water is about 50°Celsius,

Masiba Tshavunda:

Temperature of water is 40°Celsius,

Masiba Ya Kalungwe:

Temperatures vary between 82° and 97°Celsius.

Sources in the grabben region of the Central African

Kaswa, Kibero and Bitagoha :

They have a temperature range of 50° to 85° Celsius.

2.2. Oriental Province:

Sources in the valley of Lualaba

They are resources whose average temperature is 60°Celsius, such as: Sulfurous geothermal resource of Pene Sipo, geothermal resources salt marshes of Lufubu and geothermal resource of Kibimbi, temperature is about 70°Celsius.

Sources in the basin of Luika

Muese and Kilenga : Clear water, temperature is about 35°Celsius.

Sources in the basin of Luama

Kitete, Kalingusi, Mwasiwagongo, Michelonde

Maloshi and Nionga : Water clear, temperature is about 45° - 84°Celsius.

Sources in the basin of Elila

Pene - Mwanga, Luganza, Lukuka, Musonguela, Itofia, Kitutu, Michelonde Tente-Tenge, Kegele and Kakungu : Temperature is about 55° - 95°Celsius.

Sources in the basin of Ulindi

Nalungwa and Midubo : the Temperature is about 40°- 50° Celsius.

Sources in the basin of Lowa

Njandu, Luwangi ,Luvungi and Mutambala: temperature is about 56 - 68° Celsius.

2.3. Maniema:

Kalo-Kola, Lukula and Kasuku – Lambo: temperature not known.

2.4. Katanga:

Tanganyika:

Hot spring (40°C to 50°C), carbonated slightly;

Upemba:

Very hot spring (70°C to 100°Celsius).

Other geothermal resources of the Katanga:

Tanta - Mukola, Kashiba, Kafungwe, Kasongo, Katapena, Pun'u, Kaniamba, Konkula, Kafumwe, **Kiabukwa**, Kafinga, Kayumba, Kiarue, Kalumbale, Kai, Mbalai, Kibimbi, Lukulu sanga, Ganza, Rutuku, Kayunga, Kahonto, Pakundi, Luiboso, Mulala, Kabila, Kasanza, Kisande - Kapindo, Samba, Lufuko, Kala, Pye, Kakonbwe, Biluwe, Lupashia, Kaswela, Ndombe - Mudilo, Kanunka, Kipia, Kiumu, May - Moto, Tumba, Mulezi, Niamalonga, Kiziba, Kilimulilu.



Fig.2: Picture of Kiabukwa power plant in Katanga (1952)

Kiabukwa Geothermal power station in Katanga, It has existed since the 1952, but is no longer functional. This power station had been presented as follows:

It has been located at 10 km of lake Bukena.

It springs to the rating of 618m. In the valley of the small Mabila River. Flow rate: 40 l/sec. very regular. Temperature to the griffin of resource: 91°C.

At the time of the establishment of the project, production of electricity was 550.000Kwh (0,5 Mwh) per year against the expected 1.400.000Kwh

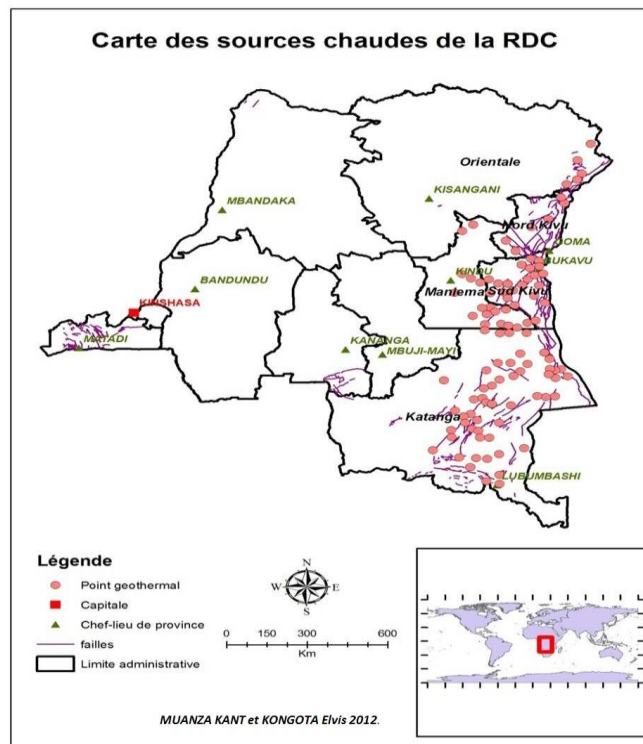


Fig.3: Illustration of the locations of geothermal resources in D.R.Congo

3. INTERPRETATIVE COMMENTARY ON THE RELATION GEOTHERMAL RESOURCES AND TECTONIC

As we know, the hot springs are related to the tectonic fractures. Manifestations appear only hot springs in the folded regions, where the old fractures were subjected to much more recent dislocations, which have created new fractures. In Province Orientale and Katanga, hydrothermal vents are the most related fractures beams that form the grabens and their extensions. Some of them seem to indicate the location of the ancient basement which breaks should be more recent.

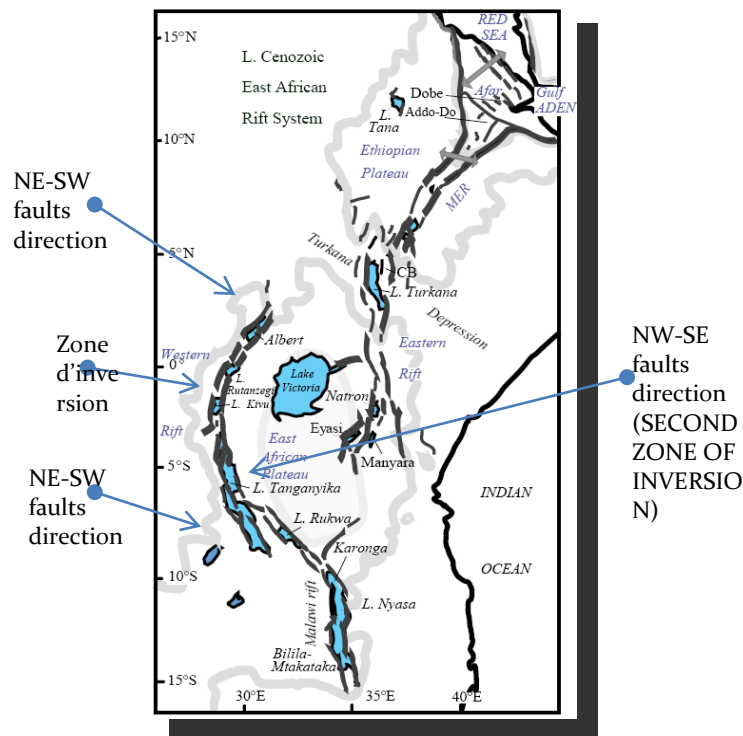


Fig.4: East African Rift presentation and accompanying faults

In Kivu, which is the elbow of the system of fractures of the graben, and where the volcanic activity and numerous geothermal resources appear,

In the Southwesterly extension of the section of breaks, oriented following the direction Lake Albert - Lake Kivu, appear the geothermal resources of the basins of the high Ulindi, the high Elila and the low Luama.

In Katanga, according to the documentation the geothermal resources group themselves according to the tracing of the big graben centers African, along the oriental fractures of the graben of Upemba and according to the field of fractures, again enough definite pain, that connects this last ditch to the graben of the region of the big lakes.

Hot sources, that are distributed thus in the whole oriental province and south zone of the Congolese basin, have the temperatures and the very various chemical compositions. The hot sources of D.R.Congo are distinctly in relation with these types of faults:

- 1° the faults directed according to North - West;
- 2° the faults directed according to North - East;
- 3° intersection of these two previous directions;
- 4° hot sources without visible relation with the known falls.

The sources of type 3 are concentrated around Bukavu and seem to be characterized by waters to very elevated temperature.

In this zone one also notes that the tectonic intensity is the biggest because of the intersection of two directions of faults.

4. CONCLUSION AND PERSPECTIVES

In spite of the observations, the Democratic Republic of Congo has a huge potential geothermal. But so far has not been a comprehensive study.

According to the documentation, Province Oriental and Katanga probably contain the majority of sources already identified.

Actually, the government is setting up a special committee for the development of geothermal energy in the DRC. Some projects are underway such as "Regional Project for Geothermal Exploration in Rwanda, Burundi and DRC (three member countries of The Economic Community of Big Lakes Countries (CEPGL)).

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