

KINGDOM OF MOROCCO



المكتب الوطني للهيدروكاربورات و المعادن
OFFICE NATIONAL DES HYDROCARBURES ET DES MINES

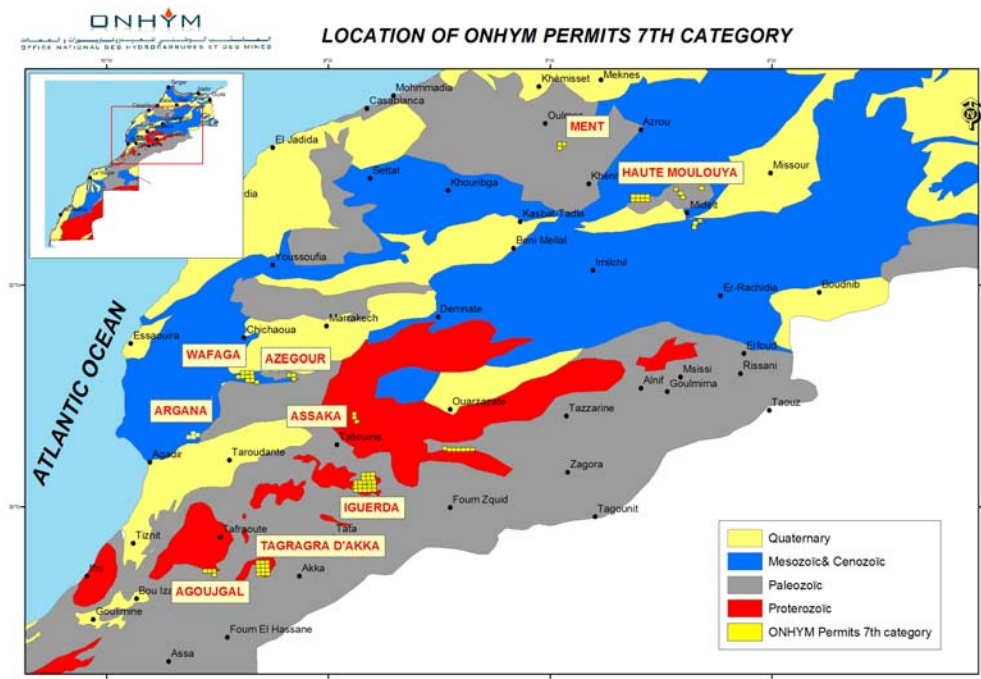
URANIUM PROSPECTS IN MOROCCO

KEY POINTS

- Uranium shows inventoried in all terrains in Morocco, from Precambrian to Quaternary.
- Shows of vein type and related in Precambrian (Anti-Atlas) and Hercynian inliers (Western High-Atlas, Jebilet, Rehamna, Central Morocco, Haute Moulouya and oriental north of Morocco).
- Shows of sedimentary differentiation in Infracambrian (Agoujgal), Triassic (Argana, Haute Moulouya) and Cretaceous formations (Wafagga, Assaka Ijdi).
- Uranium-Thorium shows with rare earths in the carbonatite massif of Tamazeght in the High-Atlas of Midelt.
- Several airborne anomalies of uranium and thorium identified in the southern provinces where the ground control has been initiated.
- Several foreign societies in negotiations with ONHYM for the conclusion of research agreements.

MINING PERMITS

ONHYM has more than 80 research permits of 7th category distributed on the main uranium shows identified in Morocco.



Location map of the main prospects of uranium

EXPLORATION HISTORY

Uranium exploration in Morocco began in the late 1940s and was carried out by the French CEA (Commissariat à l'Energie Atomique) and SOMAREM, a joint venture between the CEA and the Moroccan BRPM. At that time, brannerite was known to be present at the Bou Azzer cobalt mine and pitchblende in the molybdenum deposit of Azegour and in phosphates. Numerous showings were discovered, some of them were explored in detail but no economic deposit was found.

Uranium exploration history can be summarized as follows:

- 1946-1953 - French CEA (Commissariat à l'Energie Atomique) carried out several exploration programs on phosphate and coal basins, Hercynian granites and selected mines. They discovered uranium mineralization at Azegour and in the Bou Azzer cobalt deposit.
- 1953-1956 – French-American SOMAREM (Société Marocaine de Recherches et d'Etudes Minières) investigated hydrothermal uranium mineralisations.
- 1970-1983 – Fairly important exploration programs were carried out by BRPM with the assistance of IAEA, the Soviet Technoexport, Japanese, and local companies.

MAIN URANIUM OCCURRENCES

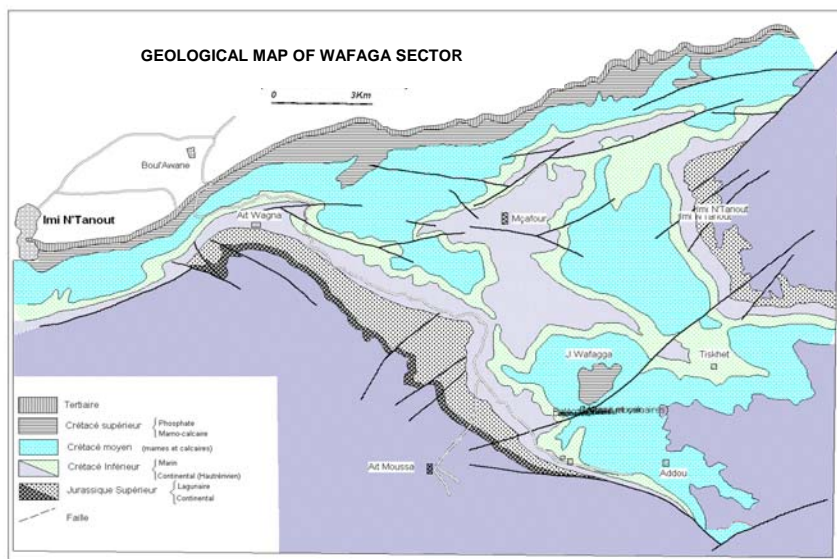
The indications of uranium have been identified in practically all terrains in Morocco, from Precambrian to Quaternary. They are essentially of vein type and related in Precambrian (Anti-Atlas) and Hercynian inliers (Western High-Atlas, Jebilet, Rehamna, Central Morocco, Haute Moulouya and oriental north of Morocco).

The shows of sedimentary concentration in sandstones are located in Infracambrian (Agoujgal), Triassic (Argana, Haute Moulouya) and Cretaceous formations (Wafagga, Assaka Ijdi). Finally, uranium-thorium shows with rare earths are identified in the carbonatite massif of Tamazeght in the High-Atlas of Midelt. Some radioactive anomalies are identified in alteration horizons of Bou Mia granite of and in calcretes in Tazenakht inlier.

WAFAGGA

The Wafagga uranium occurrence is located 90km SW of Marrakech. The sector is covered by Cretaceous formations (from Hauterivien to Maestrichtien) and the radioactive anomalies and uranium shows interest the Hauterivien.

The sector had been explored from 1977 to 1982. Exploration consisted in radiometric and Tracketch measurements, percussion and rotary drilling, diamond drilling, and underground workings. Detailed work demonstrated that the mineralization was likely as the roll front type and provided a basis for a preliminary resource estimation of 500 tonnes at 700 ppm U_3O_8 .



Geological map of Wafaga sector

TAMAZEGHT

The alkali complex of Tamazeght is located about 10 kilometres to the south-east of Midelt.

In the pegmatite veins of the alkali complex of Tamazeght, the resources of uranium are estimated to 1 ton at 0.05% U to depths of 25m; (500 veins of which 5% present a strong radioactivity), resources could reach up 100 tons metal for depths of 25m. Resources in rare earths of the massif are estimated to 43 Mt at 0.41% in rare earths, (Ce, La, Nd, Eu, Ga, Sa, Pr), 700 ppm Nb, 300 ppm Th and 1% F.

ASSAKA

The Assaka sector is located on the west flank of the Precambrian massif of Sirwa, about 260km to the north-west of Agadir.

The systematic exploration for uranium in the Sirwa region, mainly in the sector of Zgounder-Assaka, started in 1971, where strong radioactivity anomalies were found during a silver exploration programs. The geological work discovered several uranium occurrences as autunite and black minerals of uranium carried by Tertiary tuffs and trachytes.

MENT: MARQUIS VEIN

The Ment region is located in the central Hercynian massif, about thirty kilometres to the north of Khénifra and has been explored for uranium since 1953. The Marquis vein consists of a quartz vein with sulphides (pyrite, chalcopyrite, and barite). The pyrite alters to oxides that provide some traps for uranium.

TAGRAGRA OF AKKA

The Precambrian inlier of Tagragra of Akka, located to 260 km to the south-east of Agadir, contains shows of uranium of which the main is Tioualous. This show represented by a doleritic dike hosted in the Precambrian granites of Akka. Radioactivity reading vary between 1500 and 12500c/s.

IGUERDA

The uranium shows of Iguerda are located about 100 kilometres to the southwest of Warzazat. They are associated with episyenites that show an abnormal radioactivity.

ARGANA

The Argana corridor is located between Imi n'Tanout and Amskroud and contains uranium mineralisation related to copper in Permo-Triassic sandstones. The highest concentration of uranium has been noted on Amlal and Talborjt shows. In the upper part of Amlal occurrence, Geological resources are estimated to 1.53 tonnes of uranium and 58.4 tonnes of copper.

SOUTH PROVINCES

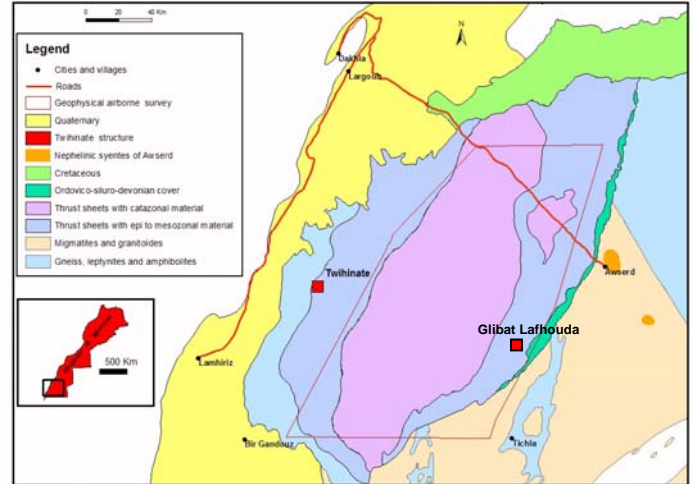
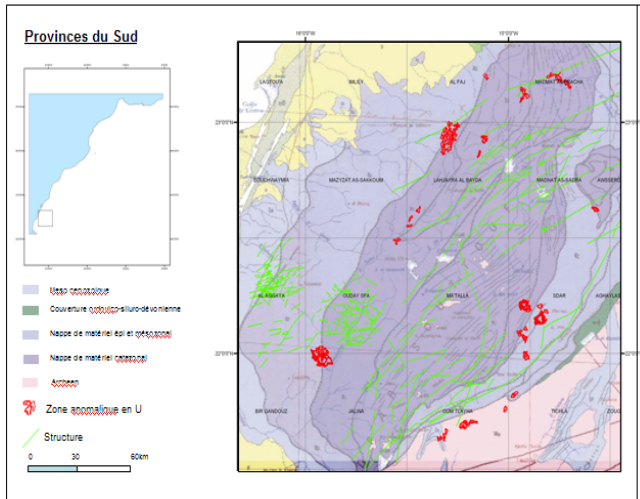
The South provinces are almost-unexplored for uranium, and present good perspectives for uranium occurrences in the coastal basin as well as in the Precambrian basement. Two airborne geophysical campaigns by magnetometry and spectrometry were carried out in 2002 and 2004.

- In 2002, ONHYM conducted an airborne geophysical survey by magnetometry and gamma-ray spectrometry on an area of 20852 km², covering the Proterozoic formations of Adrar Souttouf massif.

The acquisition and the interpretation of the magnetic and radiometric data allowed establishing different geophysical maps that gave a clear lithostructural idea of the sector and served of support for the geological controls undertaken in 2003.

Several uranium indications have already been identified; Glibat Lafhouda and Twihinata associated with carbonatite complexes. These volcanic structures present high grades in niobium, tantalum, uranium and light rare earths present in iron oxides.

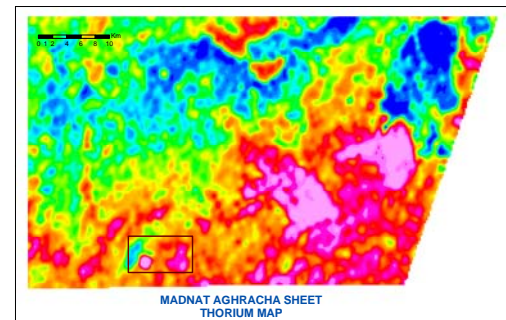
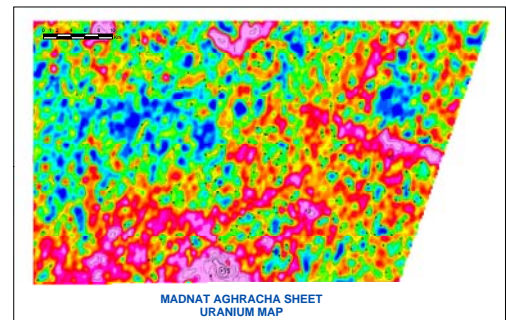
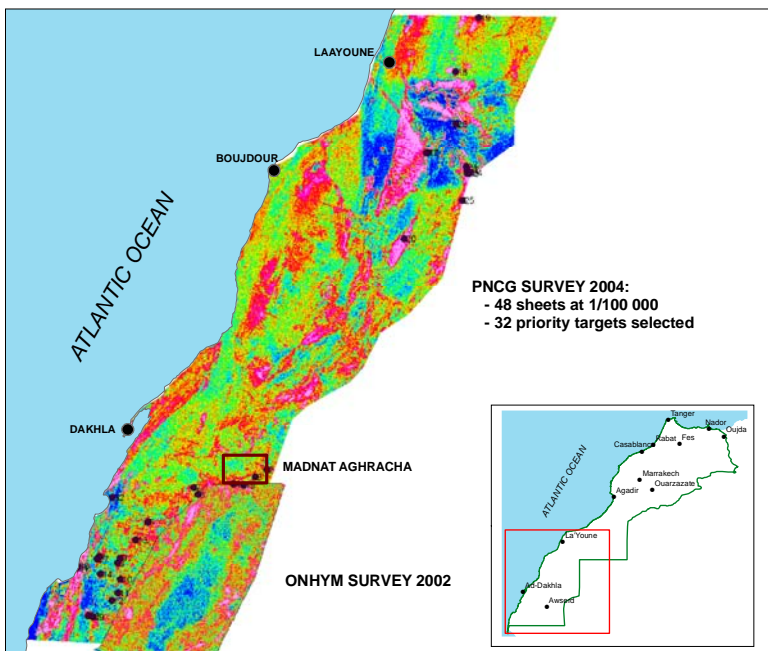
The drilling results in Glibat Lafhouda have grades of uranium that vary between 312 and 1261 ppm U₃O₈ on thickness ranging between 29 and 56 m.



Extract from the geological map of Morocco 1/1 000 000 showing the location, the general geological setting, and uranium airborne anomalies

Other similar anomalies are under study in the area.

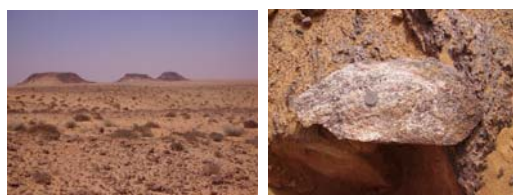
- An airborne geophysical survey by magnetometry and spectrometry was carried out in 2004 in the coastal basin of Laâyoune - Dakhla under the National Program of Geological Mapping (PNCG).



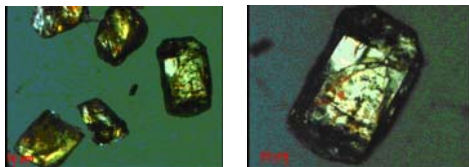
Airborne geophysical surveys: uranium map

Several anomalies of uranium and thorium have been identified by these surveys in both the coastal basin and in the basement (Proterozoic and Paleozoic formations).

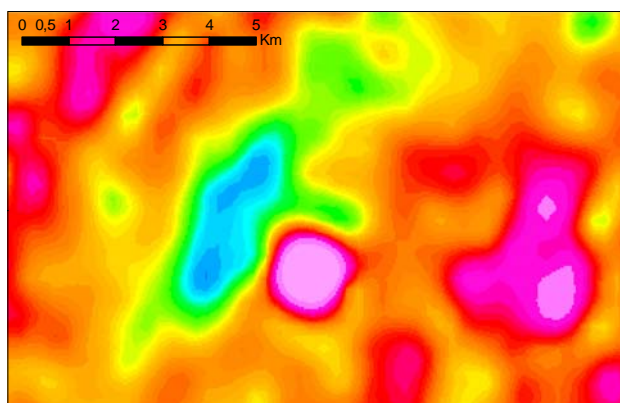
The first ground control work has started in 2008 on the topographic sheet of Madanat Aghracha on a radiometric (U, Th) anomaly. The scintillometry survey showed significant radioactive anomalies (up to 6000 c/s) in the carbonatites of Lachariyat sector. The first results of chemical analysis showed uranium grades with a maximum of 225 ppm; radiometric anomalies detected could be explained by the presence of monazite identified in samples with high radiometry.



CARBONATITES OF LACHARIYAT SECTOR



MONAZITE (POLARIZED LIGHT)



THORIUM ANOMALY OF LACHARIYAT SECTOR

The Bou Craa basin, like the other Cretaceous - Eocene basins of the Northern provinces, is a potential target for the exploration for uranium. The interpretation of the radiometric survey has identified several uranium anomalies that will be controlled in ground.

OTHER INDICATIONS

Several other uranium indications are identified in various localities in Morocco; the antimony mine of Mguedh, the Oulmès and Zaer granites of in the central massif, Rehamna, Jebilets, Tichka granite, the Tifnoute valley, the Sirwa massif, Jbel Saghro and Zenaga.

PERSPECTIVES

- . - Large geographical and stratigraphical distribution of uranium occurrences presenting several different types.
- . - Interest demonstrated by several foreign companies for more thorough prospecting in some promising zones.
- . - Good opportunities for discoveries of new deposits of uranium-thorium in the southern provinces.

For further information, please contact:

Mme Amina BENKHADRA

General Director

5, Avenue Moulay Hassan- BP 99 - Rabat,

Morocco

Tel. : + 212 37 23 98 98 – Fax : + 212 37 70 94 11

E-mail : benkhadra@onhym.com

Site web : www.onhym.com