KINGDOM OF MOROCCO

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

IRON DEPOSITS
(Southern Provinces, Morocco)

KEY POINTS

- Important magnetic airborne anomalies and favourable geological context, similar to Zouerate deposits in Mauritania.
- Presence of iron mineralization with grades up to 66% Fe.

LOCATION AND INFRASTRUCTURE

The known iron deposits in the southern part of the South provinces belong to an iron district constituted of two zones:

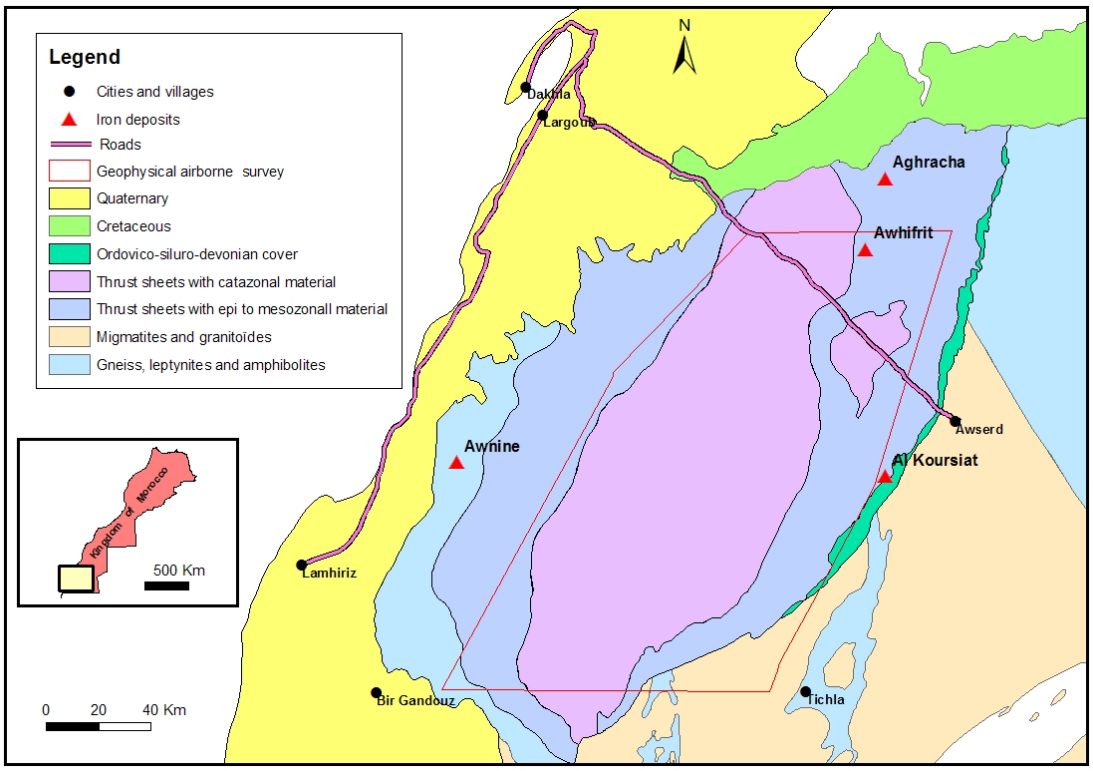
- The first is located about 300Km to the East and to the Southeast of Dakhla (Awserd sector); it is in the same geological type of the famous deposit of Koudiat Idjil in Mauritania.
- The second is located in the Bir Gandouz sector about 100 to 200km to the South of Dakhla. The two zones are accessible by the roads joining Dakhla to Awserd and Bir Gandouz.

REGIONAL GEOLOGY

The southern part of the South provinces corresponds to the Aghaylas dorsal of Archean age. It is formed of crystalline formations with abundance of gneiss, migmatites, granitoïdes and ferruginous quartzites. It constitutes the main geological units of the South provinces.

To the west of Aghaylas dorsal, essentially outcrops the Oulad Dlim thrust sheets (chain of the northern Mauritanides, Adrar Soutouf or Ma'Talla) by charnokites, carbonates and quartzites. We distinguish thrust sheets with catazonal material occupying the median part of the chain and epi to mesozonal sheets to the peripheries.

To the west of Awserd, the Archean formations are surmounted in discordance by a Paleozoic cover from Ordovician to Devonian.



Extracted from the geological map of Morocco 1/1000000 showing the location and general geological setting of irone oxides indications

LOCAL GEOLOGY

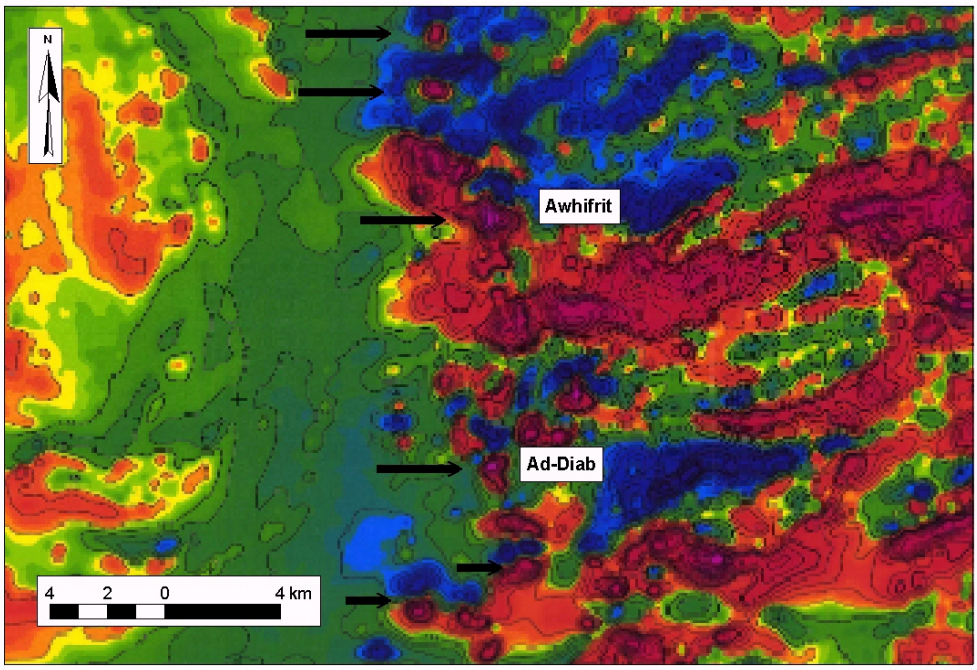
The iron sectors of the southern part of the South provinces are essentially constituted by amphibolitic shales and magnetite ferruginous quartzites of Paleoproterozoïc age. We distinguish in this zone: the El Attabia and Timgardate sector, that could constitute the extension of the Idjil deposit in Mauritania (Zouerate, Fort Gouroud) and the Aghracha sector, constituted by the showings of Awhifrit, Oum Ruesseim and Al Koursiat, as well as the Awnine formation in the Al Aggaya region.

Gleyb Awhifrit

Iron oxide quartzite

The outcrops of Awnine iron oxide formation are aligned according to the NE-SW direction on 5Km length and in a gneissic sector of archeen age. They have decametrique to hectometrique measurements with an average grade between 60 and 66% Fe. Two drill holes (385,8m) have been achieved to search the downstream extension of Awnine structure, but they only intercepted thin iron oxides that don't exceed 0.8m of thickness. The importance of the anomalies and the magnetic outlines of the sector of Awnine still show that the oxide formation can present big extents.

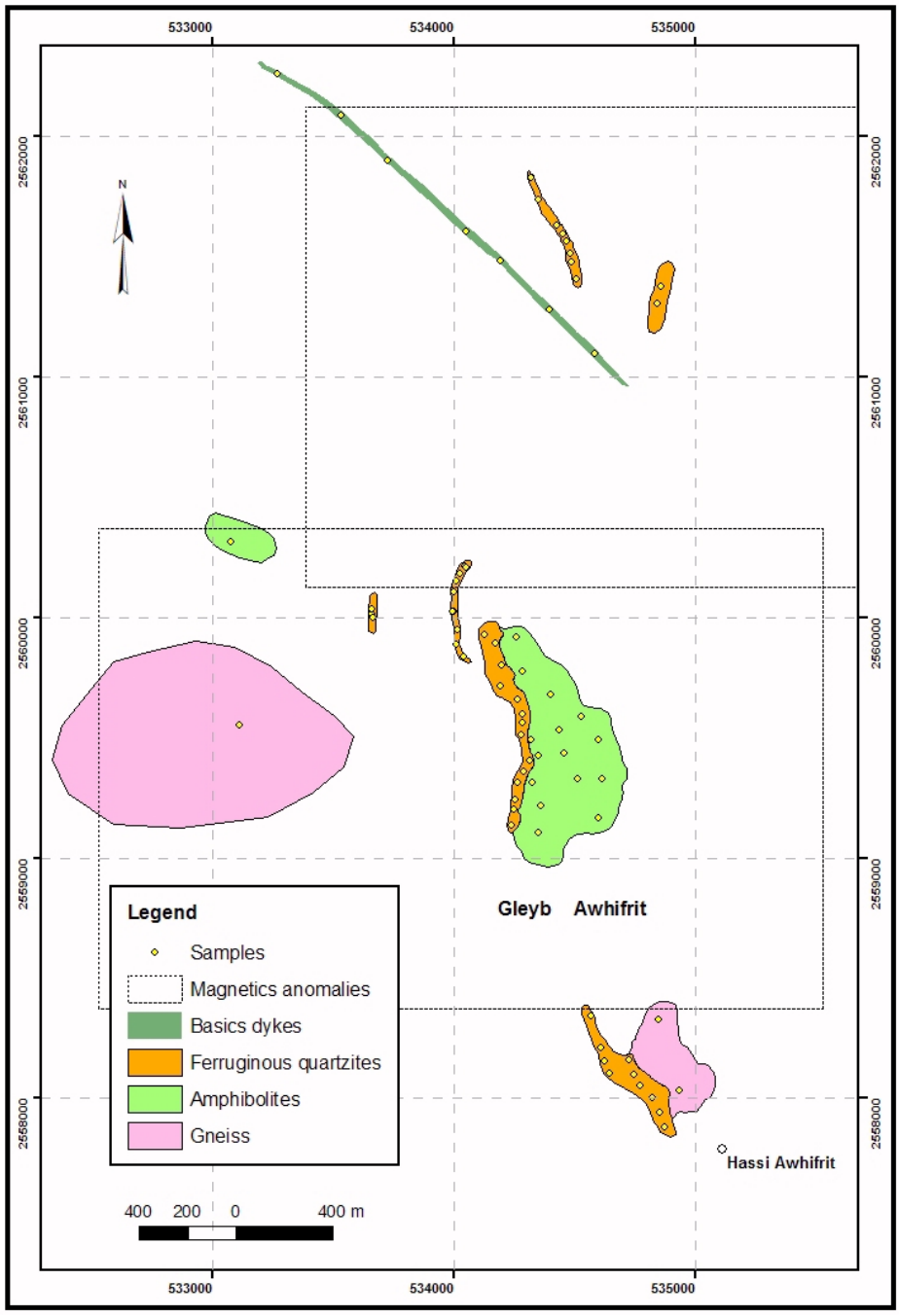
These magnetic anomalies are superimposed to bars of ferruginous quartzite of 2 to 12m in thickness.



Magnetic anomalies with iron oxide of Awhifrit sector

The ferruginous quartzite of Awhifrit is identified in a metamorphic context (meso to catazonal) with gneiss, greenish amphibolites and basic serpentinised dykes. The average grade is between 30 and 40% Fe in the ferruginous quartzite and reach 55% Fe and 13% TiO_2 in dykes of massive magmatic iron in the west and the North of Gleyb Awhifrit.

The locality of Aghracha is characterized by the presence of a massive formation of magmatic iron with magnetite, hematite and ilmenite. This formation is observed on a thickness of about 16m visible to the level of a well dating of the period of the Spanish colonization.



Geological sketch of Awhifrit

METALLOGENIC MODEL

The iron mineralization of the southern part of the South provinces is generally hosted in the banded quartzites of sedimentary origin of Proterozoïc age (Aghracha, Awhifrit). They are of itabiritic type and they probably represent the western extension of the know deposits in Mauritania (Idjil deposits).

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