جامعة الحسن الثاني بالدار البيضاء

UNIVERSITÉ HASSAN II DE CASABLANCA

Sustainability of mining projects in Morocco

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UNFC 2009…., 18- 22 August 2015, Luxor, Egypt

PLAN

1. Mineral sector in Morocco
2. Water resources in Morocco
3. Social Project (Managem)
4. Green city/ Polytechnic university of Benguerir (OCP)
5. What about UNFC 2009?

MINE SPECIFICITIES IN MOROCCO

1. Attractive geology,
2. Recent mining law (Project 33-13),
3. Easy access to the information,
4. Available infrastructures,
5. Political stability, safety of investment.

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MINING MOROCCO

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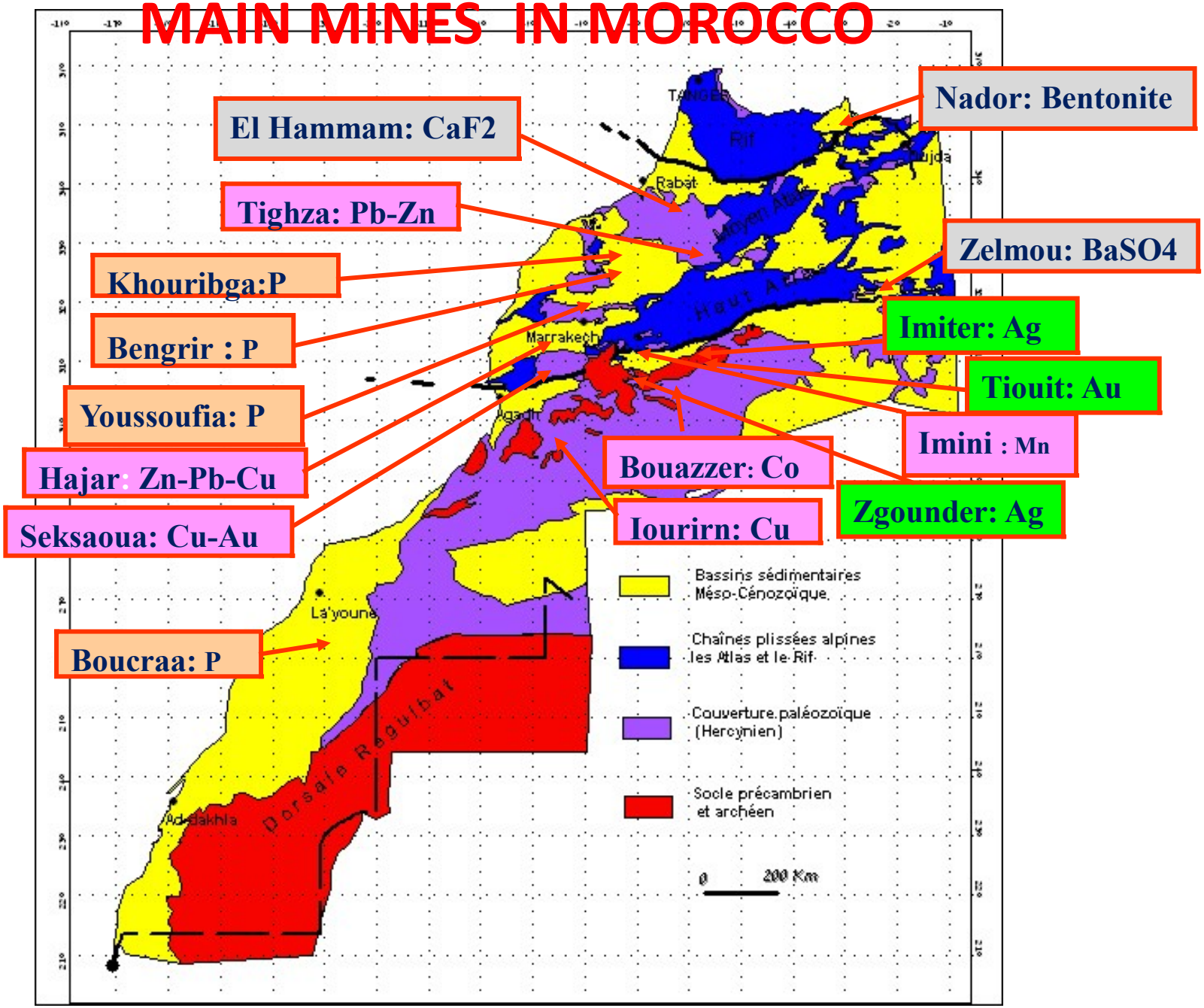
MAIN MINES IN MOROCCO



SOME DATA (2013)

- 10% of GDP
- Production: 28,8 Mill T (26,4 MT Phosphates)
- Sales revenue: 52 Bill Dhs
- Investissements: 22,9 Bill Dhs
- 40.175 jobs

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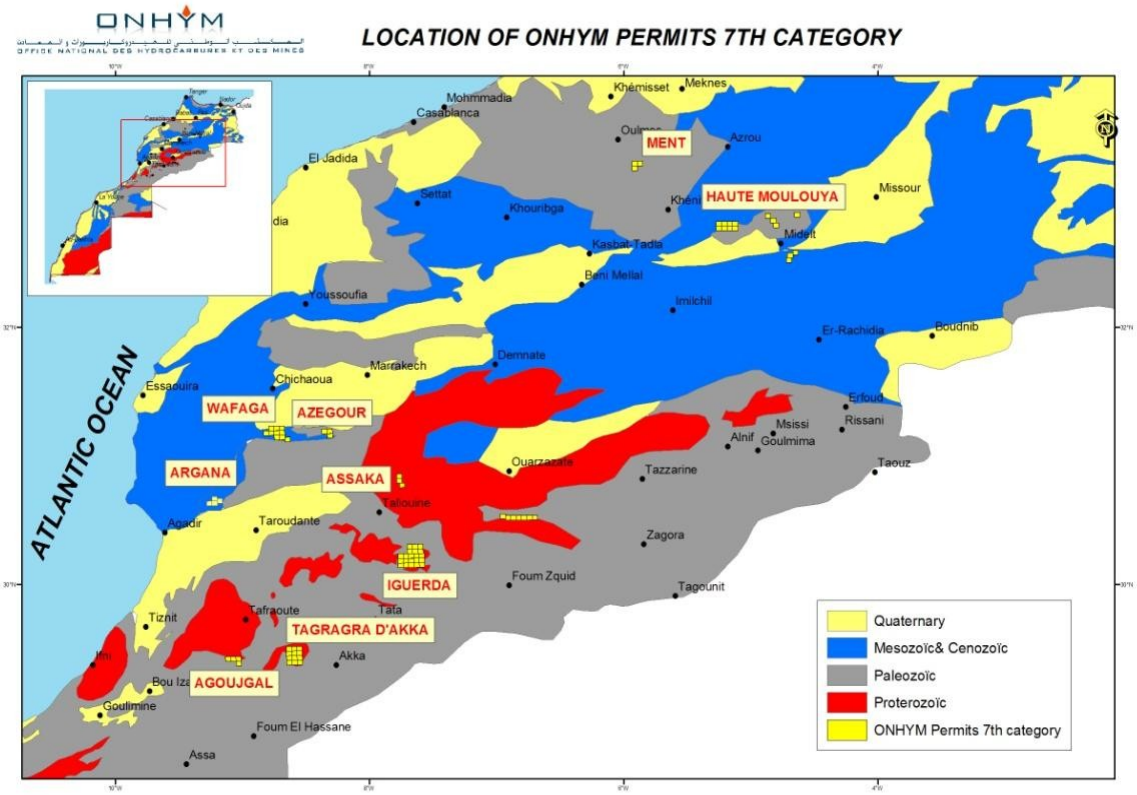
Positioning (2013)

PRODUCT	PRODUCTION (x KT)	RANK (/Africa)
Phosphates	26 400	1
Barytine	1 094	1
Arsenic	9	1
Silver	0,170	1
Zinc	91	2
Lead	39	2
Cobalt	20,3	3
Fluorine	81,2	4

Uranium Prospects

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

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 occurence, Geological resources are estimated to 1.53 tonnes of uranium and 58.4 tonnes of copper.

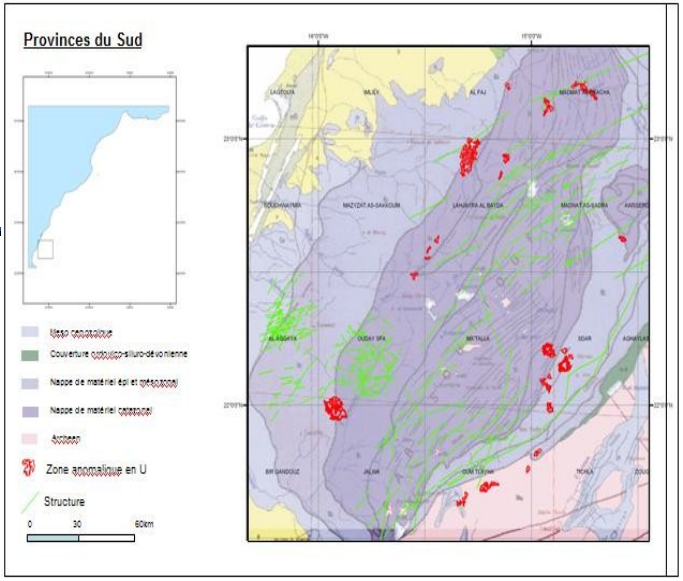
SOUTH PROVINCES

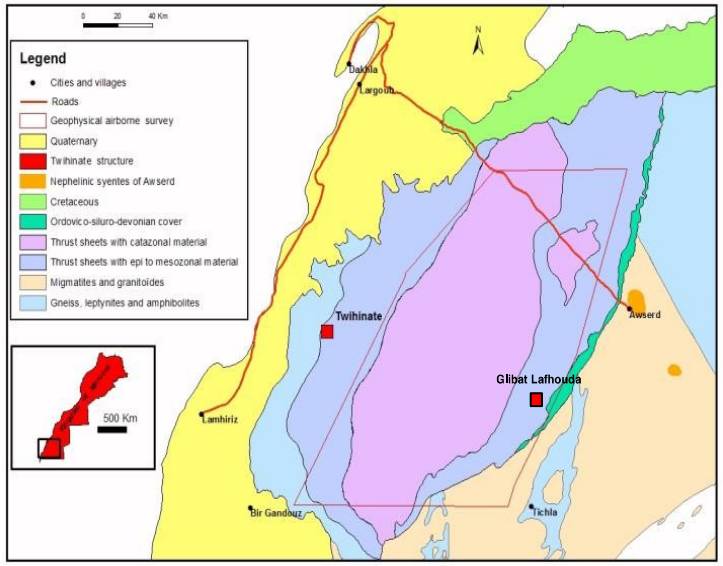
The South provinces are almost-unexplored for uranium, and present good perspectives for uranium occurrences in the coastal basin as well as in the Precambrian basement. Two airborne geophysical campaigns by magnetrometry and spectrometry were carried out in 2002 and 2004.

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

The acquisition and interpretation of magnetic and radiometric data alllowed establishing different geophysical maps that gave a clear lithostructural idea of the sector and served of support for the geological controls of the identified ground radiometric and magnetic anomalies.

Several uranium indications have already been identified in 2006 and 2007; Glibat Lafhouda and Twihinate associated with carbonatite complexes. These volcanic structures present high grades in niobium, tantalum, uranium and light rare earths present in iron oxides and in carbonatite. The resources of Glibat Lafhouda are evaluated to 49 million tonnes at 0.4% U_3O_8 and 508 Nb_2O_5 and those of Twihinate to 346 million tonnes at 0.36% Nb_2O_5 and 250 ppm U_3O_8.





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

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WATER RESOURCES

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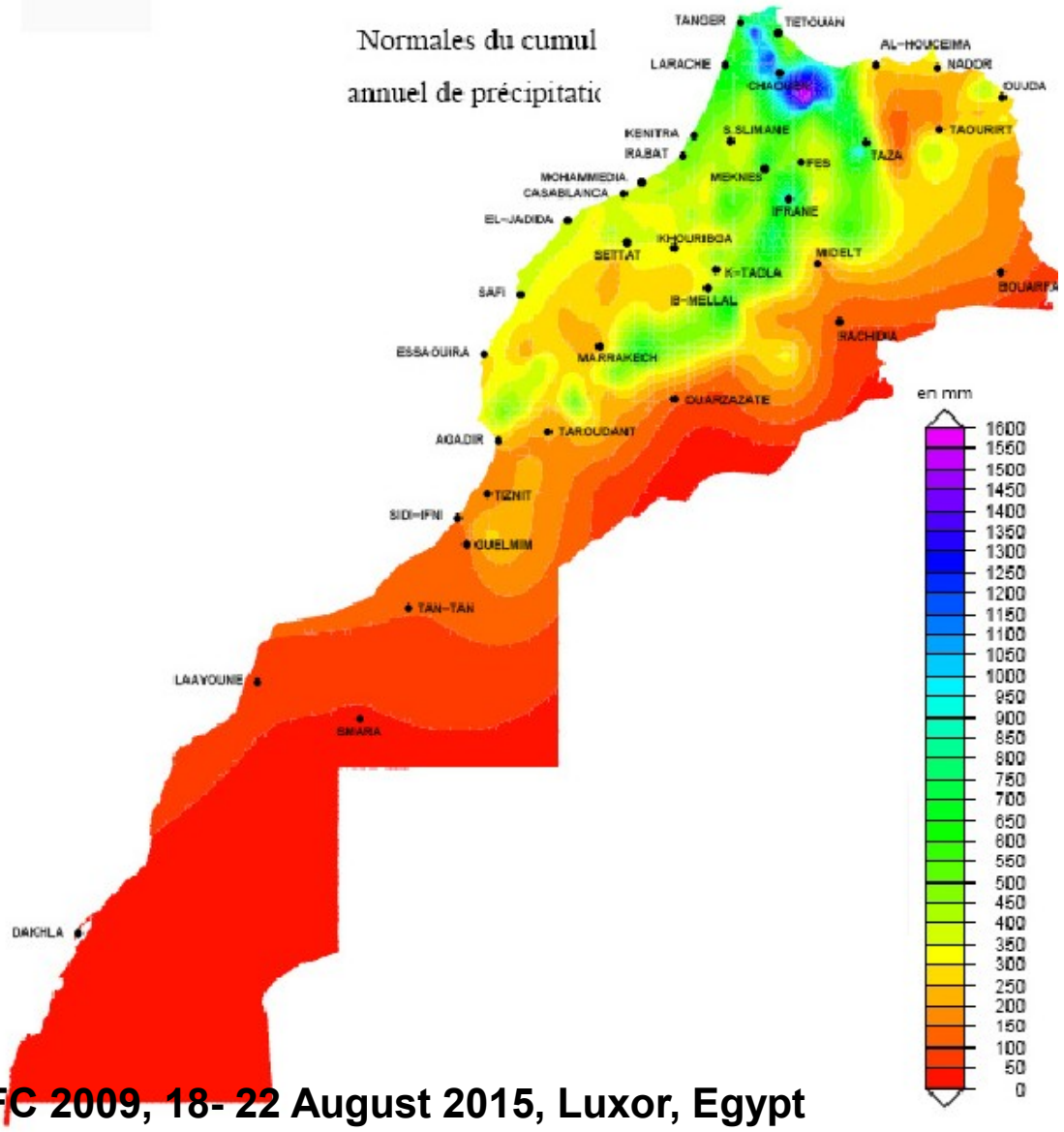
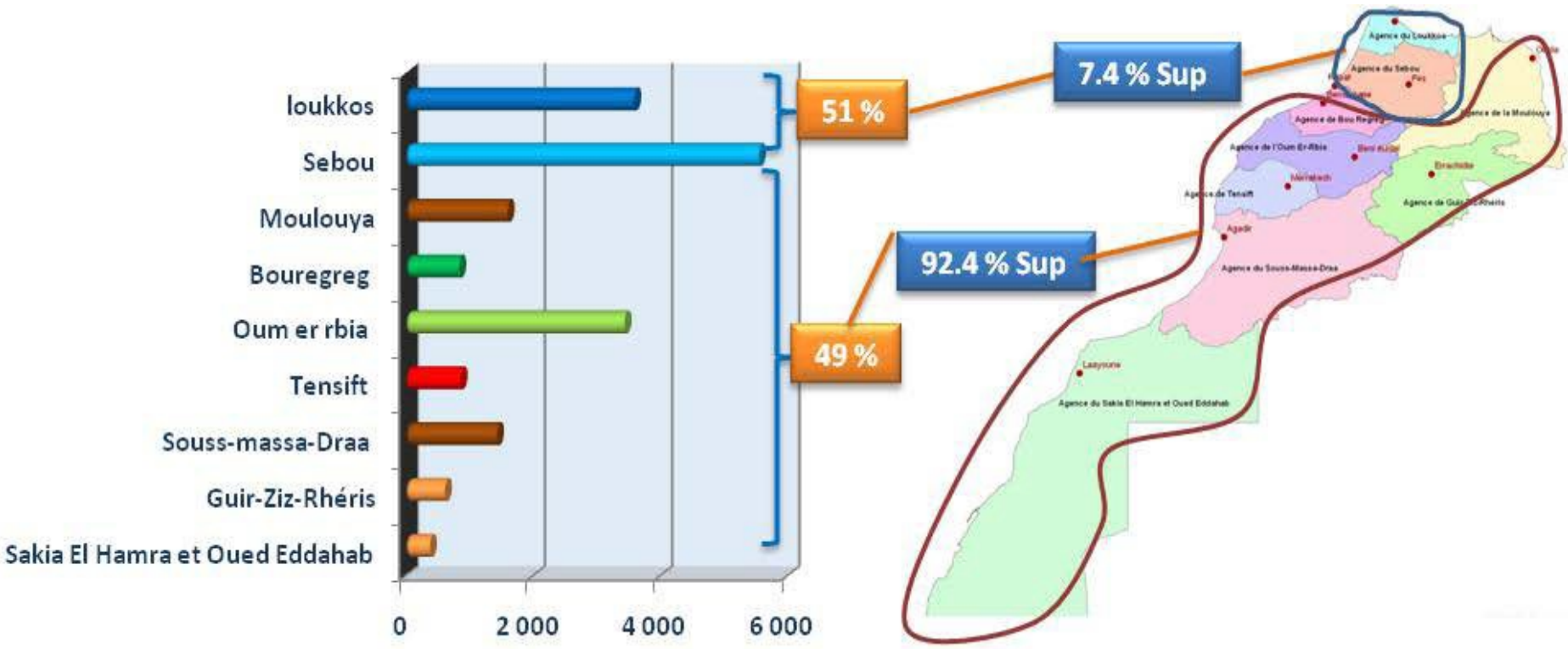
HYDROLOGICAL CONTEXT OF MOROCCO

1. Temporal irregularity
   - Total :140 Billions m^3 (variable 1 à 5)
   - Concentred in time: 20 days(Nov.-Feb.)
2. Spatial irregularity
3. Impact of climate change

LACK OF RAINFALL



SPATIAL IREGULARITY



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Imiter Silver Mine

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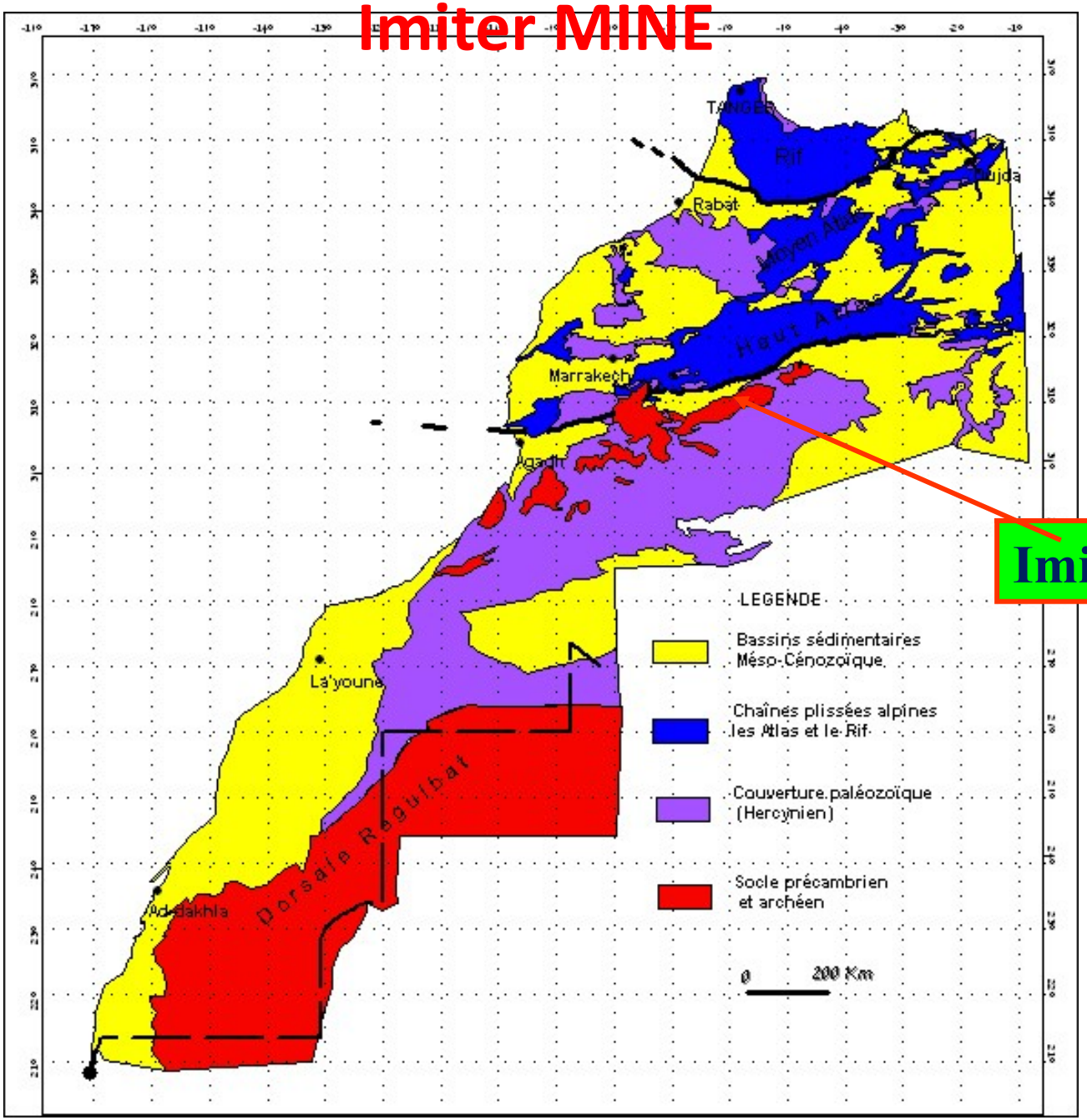
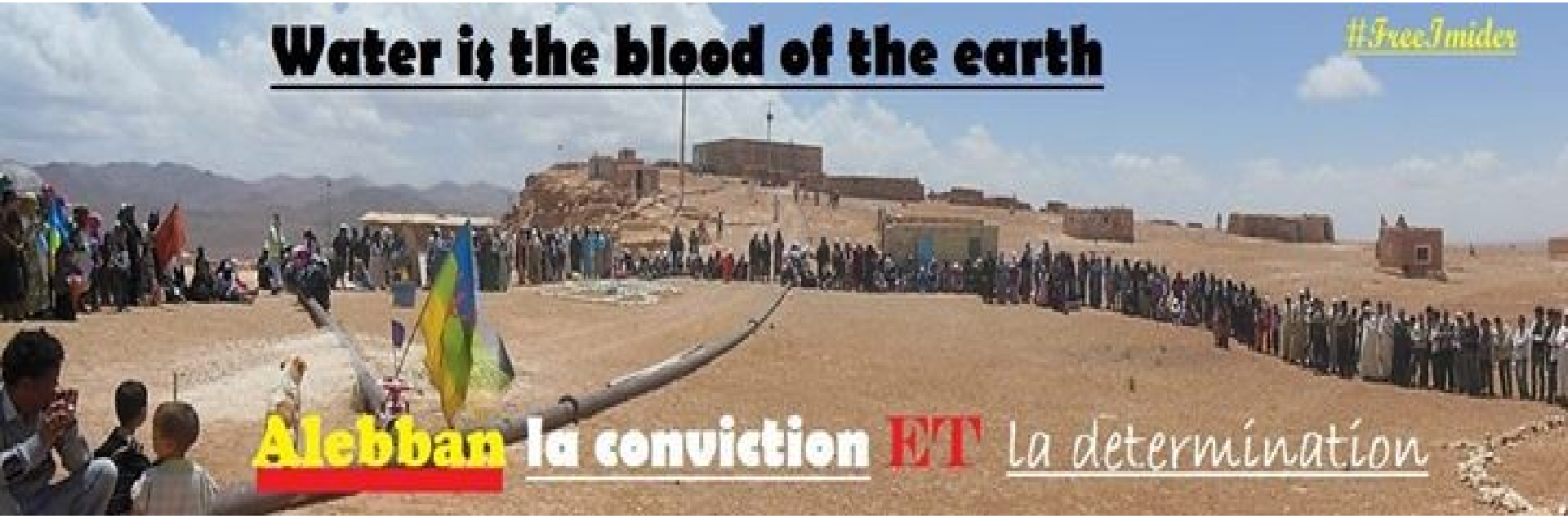
Imiter MINE


Rif
Rabat
Marrakech
Agadir
La'youne
Ad-dakhla
Dorsale Reguibat
LEGENDE
Bassins sédimentaires Méso-Cénozoïque
Chaînes plissées alpines les Atlas et le Rif
Couverture paléozoïque (Hercynien)
Socle précambrien et archéen
0
200 Km
Imiter: Ag

La population de La Commune d'Imider
Engagée dans un Sit-in pour Réclamer
leurs Droits Légitimes


Water is the blood of the earth
#FreeImider
Alebban la conviction ET la détermination

Mining in Morocco ←→ Public Acceptance

- **Water Ressources**
- **Jobs**
- **……..**

→ SDGs (2015- 2030)

+ Human Rights

17 Goals, handreds targets

→ **UNFC 2009**

CONCEPT :
Construction and development of a new town project oriented towards education, innovation, environment and sustainable development

LOCATION :
Near to the city of Benguerir

AREA : 1 000 ha

TARGET POPULATION :
100 000 inhabitant

MOHAMED VI POLYTECHNIC UNNIVERITY

Mohammed VI Polytechnic University

- flagship of the Benguerir green city, Mohammed VI Polytechnic University was designed to foster 3 major components:
  - Support education,
  - R&D,
  - Business incubators,

    → to promote economic development and added value, linked to R&D.

- The first stage of Mohammed VI Polytechnic University consisted of EMINES (School of Industrial Management) in partnership with MINES Paris → to host up to 650 engineering, executive education, and PhD students.
- The second stage is currently under construction and will host research centers and R&D laboratories in the mining industry. The opening is planned for 2014.

The following stages will focus on creating multiple partnerships with world-class institutions, universities and R&D centers.-

CONCLUSION

- **No mining without local development**

→ What is the benefit to local population ?

- UNFC 2009 → Networking:
  - National : différentes institutions
  - Regional: Experience & Expertise Exchange
- Reporting (weaknesses)
- Link with SDG's → Goals & Indicators

Thank you for your attention