Gis-based Datasets Of Mineral Resources Maps - A Valuable Exploration Tool For Discovering Potential Ore Deposits In Greece

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Sustainable Development In The Minerals Industry
6th International Conference
Milos Island, Greece 30 June – 3 July, 2013
- ProMine project
  - Structure of the databases (Mineral Database & Anthropogenic Concentration Database)
  - Greek Mineral Database
  - Mineral Commodities & Critical Raw Materials
  - Metallogenetic districts based on PROMINE classification
  - “Hot” metallic commodities for Greece
  - Greek Anthropogenic Concentration Database
  - Mining waste deposits in Greece upon PROMINE classification
Nano-particle products from new mineral resources in Europe

Total budget: 17 M €
Requested EU contribution 11 M €
28 partners*
11 EU countries
2009-2013

Sound and objective driven INDUSTRIAL project with huge exploitation potential
THE FLAGSHIP project of the European mineral industry in the area of mineral supply for the high added value products

*Greek partners involved: IGME, Hellas Gold, Grecian Magnesite
PROMINE project

Objectives

• develop a Pan-EU GIS data management and visualization system for mineral resources

• develop the first ever 3D/ 4D mineral exploration geomodels in Fennoscandian shield (Sweden), Forsudetic belt (Poland-Germany), Iberian pyrite belt (Portugal and Spain), Hellenic belt (Greece)

• calculate the volumes of potentially strategic metals

• develop five new, high value, mineral-based (nano) products

• develop modern eco-efficient mineral processing and metal recovery methods
Methodology

Using existing and new data of Greece territory, a multi-layer Geographical Information System was created. The system includes databases on mineral deposits, and anthropogenic / mining and metallurgical residues along with relevant geological, structural, geochemical, geophysical layers and other information from a diverse range of sources.

The GIS multi-layer information system.

Interconnecting evaluation of MD and AC databases.
Mineral Database

General Information

Deposit

The Perama gold deposit discovered in 1995 by the company "Thrace Gold Mines".
Mineralization / Rocks

Economy
Mineral Database

Perama Hill is a high sulphidation deposit hosted by tertiary sandstones (Lescuyer, J.L., et al., 2003) and is located on the east margin of Petrople gold province. Gold mineralisation is associated with a series of veins (+1.5m) to narrow (few cm) milky quartz-vein sets and stockwork veining in the rhyolite-sillieite. Gold is micronized and also found disseminated in the surrounding altered (oxide mineralisation), epithermal sandstones (Lescuyer, J.L., et al., 2003).

After Michael C. 2004 Perama gold deposit occurs at the intersection of N-S and NW trending epithermal zones. These structures represent the higher grade “feeder” system. After Lescuyer, J.L., et al., 2003 the Perama Hill deposit is “mushroom-shaped” oxide ore with 700m length (N-S) and up to 120m depth sandstone-filled depression. Beneath the oxide ore the deposit contains sulphide mineralisation by pyrite-arsenopyrite breccia.

Open pit outline
0.4 to 1 strip ratio

[Diagram showing PERAMA HILL GOLD PROJECT and SECTION 17450]
Total database inputs

310 Mineral Deposit Records
Mineral Commodities & Critical Raw Materials

Main Metallic Commodities of Greece
Source: IGME project reports / Promine database

Critical Raw Materials in Greece
Source: IGME project reports / Promine database
Metallogenetic districts based on PROMINE classification
“Hot” metallic commodities for Greece
Anthropogenic Database
### Anthropogenic concentrations database

<table>
<thead>
<tr>
<th>Element</th>
<th>Concentration</th>
<th>Date</th>
<th>Accuracy</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe</td>
<td>100 ppm</td>
<td>1/1/2021</td>
<td>95%</td>
<td>1.00</td>
</tr>
<tr>
<td>Ni</td>
<td>50 ppm</td>
<td>2/1/2021</td>
<td>90%</td>
<td>0.50</td>
</tr>
<tr>
<td>Cu</td>
<td>100 ppm</td>
<td>3/1/2021</td>
<td>95%</td>
<td>1.00</td>
</tr>
<tr>
<td>Zn</td>
<td>50 ppm</td>
<td>4/1/2021</td>
<td>90%</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**Other elements:**
- Al
- Ca
- Mg

**Receptor:**
- Groundwater
- Soil
- Plants

**WEB sources:**
- Council
- Observation

**Contact:**
- brgm
- ProMine

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**Abbreviations:**
- brgm: Bureau de Recherches Géologiques et Minières
- ProMine: Platform for Mineral Exploration

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**Hellas Gold: Collective Limited**
### Total AC database inputs

<table>
<thead>
<tr>
<th>TYPE OF WASTE</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Red muds&quot; from bauxite processing (Bayer)</td>
<td>2</td>
</tr>
<tr>
<td>Barren overburden</td>
<td>12</td>
</tr>
<tr>
<td>Cobbing waste</td>
<td>1</td>
</tr>
<tr>
<td>Flotation tailings</td>
<td>15</td>
</tr>
<tr>
<td>Flue dust (pyrometallurgical, electrochemical processes)</td>
<td>1</td>
</tr>
<tr>
<td>Magnetic-separation tailings (heavy minerals from glass sand)</td>
<td>2</td>
</tr>
<tr>
<td>Matte (intermediate product)</td>
<td>3</td>
</tr>
<tr>
<td>Mine products and waste</td>
<td>10</td>
</tr>
<tr>
<td>Mine waste dump</td>
<td>57</td>
</tr>
<tr>
<td>Ore processing wastes</td>
<td>8</td>
</tr>
<tr>
<td>Ore stockpiles unprocessed</td>
<td>5</td>
</tr>
<tr>
<td>Refining plant tailings</td>
<td>1</td>
</tr>
<tr>
<td>Roasting residues (pyrometallurgy)</td>
<td>2</td>
</tr>
<tr>
<td>Run-of-mine ore</td>
<td>8</td>
</tr>
<tr>
<td>Slag</td>
<td>38</td>
</tr>
<tr>
<td>Smelter waste</td>
<td>1</td>
</tr>
<tr>
<td>Treatment waste (metallurgical residues &amp; slags, etc.)</td>
<td>2</td>
</tr>
<tr>
<td>Wash tailings</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>173</strong></td>
</tr>
</tbody>
</table>

127 Anthropogenic Concentration Records
Mining waste deposits in Greece upon PROMINE classification

St. Phillip
PREDICTIVE MODELLING
PROMINE Portal

http://ptrarc.gtk.fi/ProMine/default.aspx
PROMINE Portal

Southeastern Europe – The Balkans

Place a text here to briefly present the belt district, its general geological description, mining activity and history. A short description of the work done within the framework of PROMINE should be presented, with list of available 3D/2D models and some basic information on each of them.

Data download

Link to public access data
Link to restricted access data (login and password required)

Screen Coords: X = 997, Y = 3
Map Coords: X = 26.377, Y = 71.767
Thank you for your attention

thes.igme.gr
www.igme.gr
www.hellas-gold.com

In memory of
Gabor Gaal