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The terrestrial red mud deposits in Provence: Ongoing researches in soil science

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Framework

These researches fit into the works coordinated by the **Observatoire Hommes-Milieux (OHM)** of **Bassin Minier de Provence (BMP)** and dedicated to **vegetal covers** and **microbial communities of soils**. They aim to study the **terrestrial deposits of red muds** resulting from **past and current activities of alumina extraction**.



Despite the **red muds** have been extensively studied about their industrial recycling potentials (Klauber et al., 2011), the studies on their **environmental effects**, especially on the **biological component of soils**, are far less numerous (Lombi et al., 2002; Garau et al., 2007, 2011, 2014; Krishna et al., 2014) and, furthermore, lacking in the context of BMP. To this date, the various studies available in the literature emphasize the importance of the **soil matrix** in the **modulation of biological responses** when it is mixed with **red muds**. Therefore, this aspect is important to invest at the local scale in the prospect of a **potential use of red muds as improvement to soils** or to the **development of artificial soils for various valuations** (e.g. pollution control, remediation, rehabilitation).

Research objectives

How these industrial activities interact with terrestrial ecosystems through the soil-plant continuum?

The researches undertaken aim:

- ✓ To study the **effects of red mud inputs to soils** on their **physico-chemical and biological qualities**.
- ✓ To test their **harmlessness** on the **biological functions of soils**.
- ✓ To determine **how and to what extent** these tailings modulate the structuring of **vegetal and edaphic microbial communities** through **reciprocal functional relationships**.

Research steps

Task 1 – Overall characterization of red mud deposits at the regional scale

- Biogeochemical analyses.
- Deposit typology of various sites.
- Spatialization.
- Ecotoxicological diagnostics.

Task 2 – Effects of red mud deposits on soils: field, multi-scale and experimental approaches

- Structure and diversity of plant communities.
- Dynamic of soil microbial communities.
- Functional interactions: aboveground-belowground linkages.

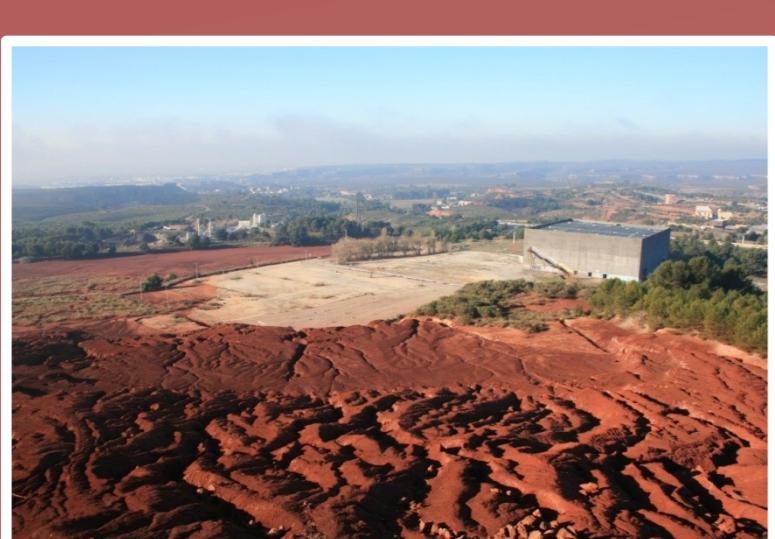
Expected results

- ✓ Acquisition of **fundamental data**.
- ✓ **Ecosystemic diagnostics**.
- ✓ To consider **valuation solutions** of past deposits.
- ✓ To recommend **management actions** of forthcoming deposits.

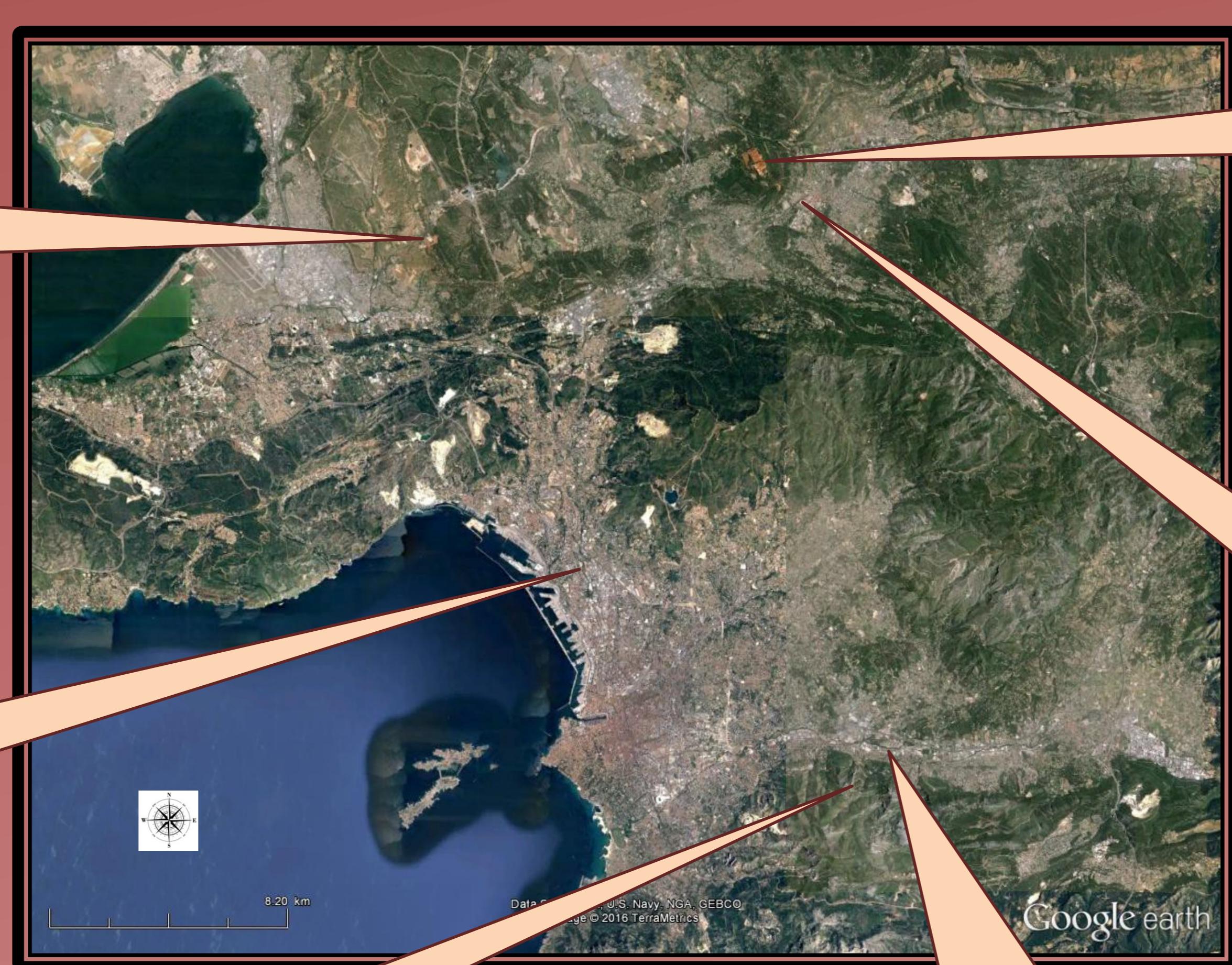


Study sites

Griffon
Township: Vitrolles
Coord.: 43° 26'27" N / 5° 18'00" E
Average alt.: 156 m
Area: 99 090 m²



La Delorme
Township: Marseille (15th district)
Coord.: 43° 20'26" N / 5° 21'52" E
Average alt.: 37 m
Area: 37 570 m²



Mange-Garri
Township: Bouc-Bel-Air
Coord.: 43° 27'58" N / 5° 25'57" E
Average alt.: 234 m
Area: 465 350 m²



La Barasse (2)
Township: Marseille (11th district)
Coord.: 43° 16'32" N / 5° 28'47" E
Average alt.: 196 m
Area: 68 700 m²



La Barasse (1)
Township: Marseille (11th district)
Coord.: 43° 17'6" N / 5° 29'35" E
Average alt.: 76 m
Area: 49 980 m²

