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ACTING ON THE VEGETATION TO REDUCE THE RISKS RELATED TO MINING WASTE DEPOSITS: ECOTECHNOLOGICAL APPROACH ON THE LIGNITE WASTE HEAP OF "LE DEFENS" (OHM BASSIN MINIER DE PROVENCE)

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ACTING ON THE VEGETATION TO REDUCE THE RISKS RELATED TO MINING WASTE DEPOSITS: ECOTECHNOLOGICAL APPROACH ON THE LIGNITE WASTE HEAP OF "LE DEFENS" (OHM BASSIN MINIER DE PROVENCE)

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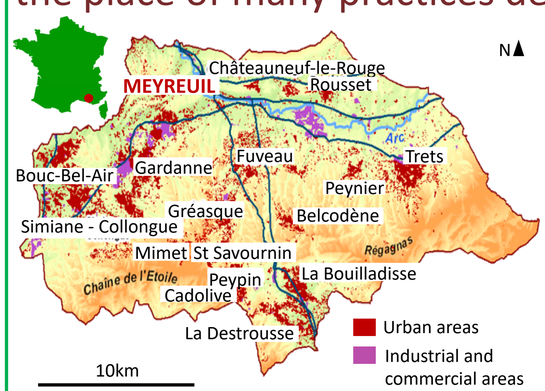
CONTEXT

The lignite waste heap named "Le Défens", located on the territory of the **OHM Bassin Minier de Provence**, is subject to hazards related to this mining waste deposit characteristics: **superficial landslide hazard**, non-negligible **fire risk** and **risk of contamination transfer** by substrate and water erosion. However, today it is **accessible to the public** and is the place of many practices despite the potential dangers.



Territory of the Bassin minier de Provence

https://www.ohm-provence.org/spip.php?rubrique5

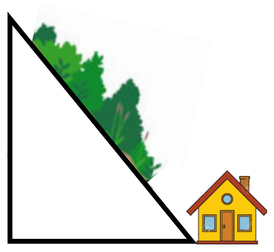
Aerial view of the lignite waste heap of "Le Défens" (Meyreuil)

Google Earth screenshot with the contours of the heap in red

A lignite waste heap completely integrated in the local landscape

OBJECTIVE

The objective of this study was to analyze the **effect of the various types of vegetation** present on the heap on the **quality and the stability of the substrate of the heap slopes**, **on the fire risk** and to **assess the quality of the runoff water** on the lignite waste heap in order to recommend the most appropriate ecotechnological actions to **limit the environmental risks**.



Soil stabilization

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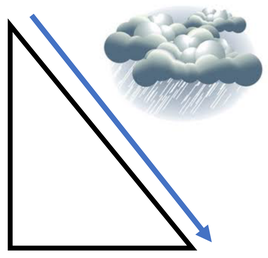
Potential phytostabilization of the slopes?



Runoff

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Potential transfer of elements in runoff?

Fire

↓

Most adapted vegetation to lower flammability?

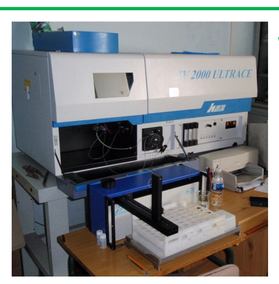
METHODOLOGY

Soil and sediment physico-chemical analysis

- Soil pH, conductivity and temperature
- Metal and metalloid composition
- Granulometry
- Organic carbon and nitrogen content

Soil and sediment biological analysis

- Microbial activity
- Root density /g soil
- Sulphito-reducing bacteria detection



Water analysis

- Lixiviation assay
- Cations and anions analysis

Vegetation analysis

- Plant cover and vegetation height
- Relative water content of soil, litter and plants
- Dominant biological type

MAIN RESULTS

- Poor substrate quality despite a relatively homogeneous vegetation cover
- Presence of an erosion facies = preferential paths of water flow but low transfer of substrate element to water runoff
- Soil and plant water contents, vegetation composition and structure may alter fire risk

ENVIRONMENTAL MANAGEMENT RECOMMENDATIONS

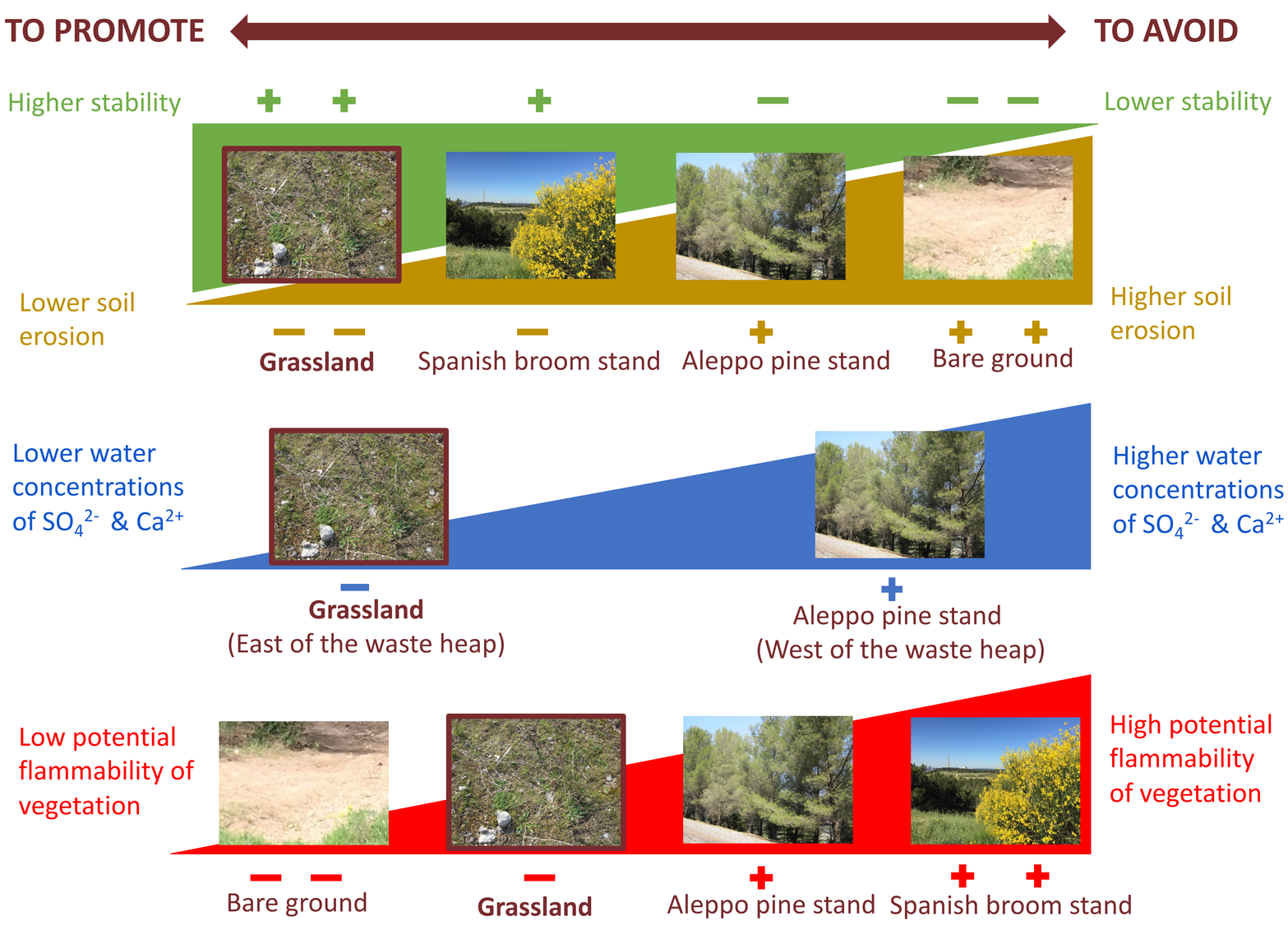
Grassland seemed to be the **most appropriate vegetation** type to reduce:

- Superficial landslide and substrate water erosion thanks to its dense and relatively homogeneous vegetation cover
- Fire risk due to its water retention capacity and its biological type diversity

The **use of pioneer local, nurse and engineer herbaceous plant species** could be an interesting solution to **stabilize the unvegetated slopes of the heap**.

The gradual conversion of the Aleppo pine stand to a **non-coniferous woody stand** with grassland under tree canopy could **limit the risks of fire spread and landslides**.

Moreover the **strict respect of regulation** of access to the heap without all-terrain vehicles may **limit soil erosion and potential ion transfer**.



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