1400 years of man-environment interactions and soil evolution in the Saint-Mont mountain (Remiremont, Vosges)

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To cite this version:
Anne Poszwa, Axelle Grzesznik, Anne Gebhardt, Arthur Agat, Philippe Even, et al.. 1400 years of man-environment interactions and soil evolution in the Saint-Mont mountain (Remiremont, Vosges). Historical Ecology for the future - International conference in historical ecology, May 2021, METZ, France. 2021. hal-03236655

HAL Id: hal-03236655
https://hal.univ-lorraine.fr/hal-03236655
Submitted on 26 May 2021

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Remains suggest human presence for at least 1400 years:

- At the Pont des Fees, French (Grzesznik, 2019).
- Monumental enclosure dry-stones walls of unknown age.
- The « Point des Fees » - An enigmatic structure.

Objectives

To investigate traces of ancient anthropic activities in soils and landscapes, on areas where archaeological structures have not yet been detected.

Material and methods

Joint work involving soil scientists, archaeologists, geographers, geologists and computer scientists.

Approaches from the landscape to the microscopic scales.

Archaeological data

Software tools to extract and analyse geometric structures in LiDAR data.

Field prospections / rocks and soils description and sampling, forestic surveys.

Studies along gradients from highly to poorly human impacted areas.

1. Soils not clearly disturbed

- Far from any known archaeological remains, two main types of soils develop on granite:
  - Humic aliorths (ROH) carbonatic structure (ROH).
  - Organic horizon (4 in the organomineral horizon) and desaturated horizon (S/T/15%).

Strongly acidified vegetation

Reference soils not affected by ancient activities

- Undisturbed soils associated to ancient walls:
  - Physico-chemical characteristics close to those of reference soils.
  - Low human activity?

2. Highly anthropised soils on platform S

Anthropisation (AP) = Transformed on a man made terrace = Anthropised with a pristic horizon (HBM).

- Weakly mineralised structure
- Neutral to basic pH
- Physiological anomalies = sapran landscape, soil homogenisation.
- Anthropogenic ants:
  - Typical from burned fields
  - Mineralised soil.
- Weathered materials component.
  - No organic, nor anthropogenic = natural soil mineral horizon.

Black unit (0.1m thick) very rich in organic matter.
Almost neutral pH (pH = 7.566) in the organomineral horizon and saturated soils (5.9/5H%).
Acidline to neutraline vegetation

Clues of long term tillage and regular manure inputs

3. Other evidence of ancient human influence on soils?

Detection of some anomalies:
- Light when pH is between 4 and 5
- More significant when pH is > 5
- Easily related to the long-lasting human occupation on the summit.
- More surprising on some western or southern platforms:

⇒ Leads for future archaeological studies.

Conclusion and perspectives

- Our results confirm:
  - A very strong imprint of historical human activities on soils close to the summit part of the massif.
  - An heritage on the western slope mainly from natural glacial and pedogenetic processes.
  - Possible other human activities on some western or southern platforms.

We hypothesize that the weak anomalies are due to older and/or different human activities than those that took place at the top of Saint-Mont (like breeding).

Other analyses are being acquired and interpreted on soils, rocks and LiDAR images.