



Contribution of multi-instrumental geophysics to determine the hydromechanical functioning of a deep-seated coastal landslide (Cirque des Graves, Normandy, France)

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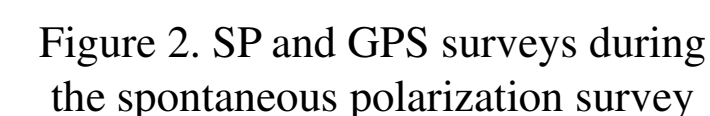
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1 GENERAL CONTEXT AND ISSUE

Figure 1. Conceptual geological and geomorphological functioning of the Cirque des Graves

2 METHODS OF INVESTIGATION & OBJECTIVES

Figure 4 – Seismic in-vehicule source on the transverse profile



SP was conducted in the **entire landslide**, while seismic and ERT investigations were **focused on a cross-section** comprising an interesting SP gradient.

3 SPONTANEOUS POLARIZATION SURVEY

Figure 5. Spontaneous polarization anomalies on the Cirque des Graves after kriging measurement points

- 1- A link exists between very fractured chalk panels and an **intensive drainage** in the east part;
- 2- The dry valley located upstream of the east part is a **preferential path** for water inflows;
- 3- On the west half of the cirque, the lowest values corresponds to a **drainage area** of surface water and springs, which **reduce infiltration** and the electrical response in surface.

4 INTERPRETATION BY SEISMIC REFRACTION

Figure 6. Interpretation of the lithostratigraphy with the help of seismic refraction (RMS error = 3.8% or 3.37ms)
The values ranges are based on Lissak (2012)

5 REFINEMENT OF THE MODEL BY ERT

Figure 7. Interpretation with the help of ERT (Iteration 4 ; RMS error = 3.7%). The values ranges are adapted from Lissak (2012)
(A) Marly mudflow at the foot of the landslide; (B) Springs nearby the seismic/ERT profile; (C) Pond at the bottom of the main scarp (water stagnation)

6 RESULT OF THE CROSS-INTERPRETATION

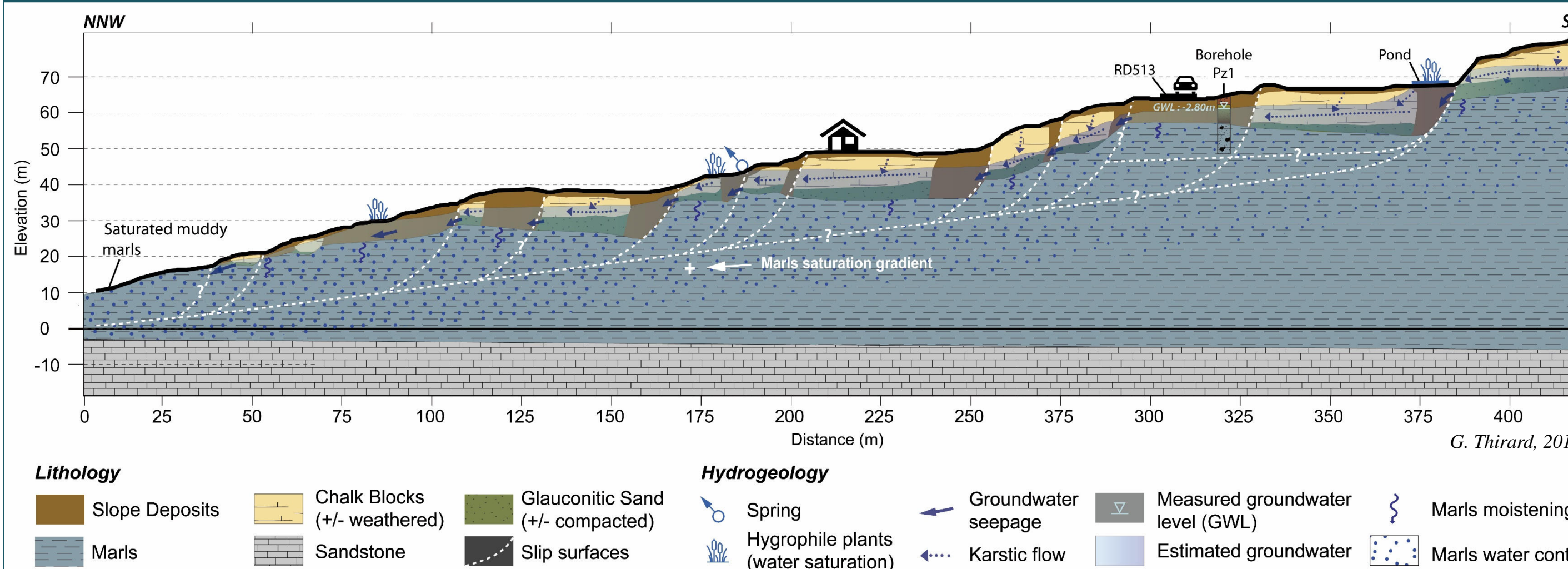


Figure 8. Hydrogeological refined interpretation from both seismic/ERT surveys

7 CONCLUSION & RESEARCH PERSPECTIVE

From these cross-geophysical data, numerical models will soon be conducted thanks to the **hydromechanical software FLAC®**, in order to confirm the hypothesis of functioning and define the **boundary conditions of reactivation** of this landslide.

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