

Research engineer or post-doctoral fellow in Combined approach to the factors responsible for the "cliff recession" hazard and regional mapping

12-month fixed-term contract starting January 1^{er} 2024

General context

The position is related to the regional project DEFHY3GEO (Detection and Study of Fracturing through Hydrological, Geomorphodynamic, Geological, and Geophysical approaches) funded by the Normandy Region (RIN Tremplin) for three years (January 1, 2022 to December 31, 2024). This DEFHY3GEO project concerns the study of risks associated with coastal erosion in the context of cliffs and aims to develop a strategy for the detection and study of fracturing for a better definition of the hazard mapping of the coastline retreat. The research project coordinated by Cerema-Rouen involves four research structures (UMR IDEES-Caen, UMR M2C-Rouen, LMI EA 3226-INSA-Rouen, and ENDSUM/Cerema-Rouen) and mobilizes various specialties of natural sciences (geophysics, geology, geomorphology, climatology, hydrology, signal processing, mathematical modeling and numerical simulation, image processing...). It also benefits from other national and international partners (BRGM-Orléans, Earth Sciences Institute of the University of Lausanne (UNIL). Two cliff sites are located in Normandy: chalky cliffs of Sainte-Marguerite-sur-Mer (76) and clay-marly cliffs of Vaches Noires at Villers-sur-Mer (14).

The position is particularly relevant to WP3 "*Evaluation, modeling and mapping of the hazard in order to define areas of high susceptibility and hazard zoning*" and its task 3.2 "*Combined approach to the factors responsible for the "cliff recession" hazard and regional mapping*".

Cliff recession is the result of a combination of marine and continental erosion factors and processes that interact in time and space. The correlation between marine and subaerial forcing and the triggering of gravity movements is still imperfect. One of the key scientific factors behind this state of affairs is the lack of knowledge about water circulation in the carbonate massif, and in particular the pore pressures exerted, or the evolution of "fatigue" in the rock face, which can be expressed through the evolution of micro-cracking in the cliff face. It is precisely this knowledge that the proposed project aims to provide. Based on the results of the project and other programs (ANR Ricochet (2017-2021), RIN Normandie SelinE (2018-2021)), the aim is to provide answers as to the factors responsible for triggering mass movements, but also to determine the respective share of each forcing factor in triggering mass movements.

Missions

The central objective of this Post-doct or IR is to mobilize all the monitoring of gravity movements carried out over several years in various research programs, as well as in the INSU ILICO "DynaLit" monitoring of several fast-receding cliff sites in Normandy.

The engineer or post-doctoral fellow will be responsible for:

- Correlate the dates of collected gravity movements with forcing factors considered preponderant in the literature (wave action, precipitation, variations in the water table, freeze/thaw alternation, etc.);
- Based on the results of the project and other programs, provide answers as to the factors responsible for triggering mass movements;
- Determine the respective share of each forcing factor in triggering mass movements;
- Transpose the knowledge acquired at monitoring sites, in particular on massif fracturing, to the entire cliff coast of Normandy;
- Produce a scalable cliff recession hazard map for the carbonate cliffs of Normandy;
- Be proactive in exchanges with partners (especially other researchers, engineers and post-docs involved in project tasks);
- Valorize results in the form of high-level scientific articles;
- Keep abreast of the latest developments in your field;
- Participate in project follow-up actions.

Contract duration:

12 months

Reporting relationship:

Reporting to: Stéphane Costa, Director of UMR IDEES-Caen Géophen .

Functional attachment: Stéphane Costa and Olivier Maquaire, scientific supervisors UMR IDEES-Caen Géophen and Cyrille Fauchard, scientific co-supervisor.

Internal relations:

Within UMR IDEES-Caen Géophen

Within UMR IDEES: all colleagues and staff at the three sites (Caen, Le Havre and Rouen)

External relations:

The work will be carried out in close collaboration with the ENDSUM Cerema group and research director Cyrille Fauchard (scientific co-supervisor).

Other project partners: INSA Rouen Mathematics Laboratory, M2C Rouen, Institut des Sciences de la Terre de l'Université de Lausanne (UNIL)

Skills:

Knowledge

- Very good knowledge of coastal geomorphology;
- Structural knowledge (carbonate domain) ;
- Knowledge of data processing (Matlab, ArcGis or similar) ;
- Excellent ability to write scientific articles in English and French.

Know-how

- Ability to work in a project team and network;
- Ability to develop methodologies ;
- Know how to mobilize resources and optimize their use;
- Ability to analyze, summarize and write in English and French;
- Make proposals.

Soft skills

- Sense of responsibility and team spirit;
- Thoroughness and organizational skills;
- Sense of initiative, innovative spirit.

Conditions and constraints:

Materials

Personal office;

Provision of a computer.

Schedules and seasonality:

No specific seasonal time constraints.

Special conditions:

Occasional travel to DEFHY3GEO project sites (Sainte-Marguerite-sur-Mer and Villers-sur-Mer) with schedules dependent on tides and/or climatic phenomena triggering gravity movements

Salaries:

Monthly: €2,815 gross

Annual over 12 months: €35,126 gross

Contacts:

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How to apply :

By **Friday, October 20, 2023** at the latest, send a CV, covering letter and photocopies of diplomas to the above contacts, together with any individual work (research dissertation, report, scientific article, etc.).