DV 2.2.3 - Rationale for the quantification of parameters measuring the proneness to ground instabilities in both offshore and onshore areas

multi-Risk sciEnce for resilienT commUnities undeR a changiNgclimate

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7) Technical references

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* PU = Public

PP = Restricted to other programme participants (including the Commission Services)

RE = Restricted to a group specified by the consortium (including the Commission Services)

CO = Confidential, only for members of the consortium (including the Commission Services)

Document history

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8) ABSTRACT

This Deliverable, part of Milestone 2.2 of Spoke 2 in the Extended Partnership RETURN Project, deals with the theme "Identification of impact-oriented indicators" as outlined in the Executive Work Plan – Milestone 2.1. It summarizes the scientific research activities conducted from January to November 2023 by Task 2.2.2 ("Quantitative analysis of predisposition to ground instabilities") of Work Package 2.2 ("State of the art and knowledge base to define impact-oriented hazard indicators"). This task is a component of the vertical spoke VS2, "Ground Instabilities", and involves 57 researchers from various institutions.

The focus of WP2 is on detecting and analysing predisposing factors to ground instabilities, while WP3 and WP4 concentrate on preparatory factors, and triggering and multiple geohazards cascading scenarios (MULTI-HAZARD), respectively. These work packages collectively aim to quantify ground instabilities' effects on territories, buildings, and communities, and to develop an IT platform for the spatial and temporal analysis of these instabilities.

A significant phase within Task 2.2.2 involved defining Ground Instability categories, which were categorized initially into landslides, subsidence, liquefaction, and sinkholes. A more detailed differentiation was later made, particularly distinguishing between slow and fast types of ground instability in subaerial phenomena. These categories are detailed in Table 4.1 and have been fundamental in guiding the project's direction.

The quantification of the parameters that play a role in determining the susceptibility of ground instabilities is a quite complicate issue that has been the object of many attempts in categorizing them as a function of the capability to express them, generally in terms of qualitative vs. quantitative assessments. Actually, the topic has many variables, that change depending, in first instance, upon the typology of ground instability taken into account, and upon the geological setting of the areas under study as well. Within the framework of the RETURN Project, all the difficulties in performing a full and comprehensive analysis of the available approaches guided us toward the decision to quantify the parameters identified to measure the proneness to ground instabilities on the basis of simple criteria, based upon the logs used to extract data from them. Therefore, in this document the predisposing factors were discriminated according to being described through a qualitative log, a semi-quantitative log, and a quantitative log.