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multi-Risk sciEnce for resilienT commUnities undeR a changiNgclimate

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Technical references

Project Acronym	RETURN
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Deliverable No.	DV 2.3.1
Dissemination level*	PU
Work Package	WP2.3 - Monitoring & Modelling: toward a digital twin of ground instabilities effects
Task	T2.3.1 - Natural onshore and offshore field laboratories for remote and in-site monitoring of environmental forcings and deformation responses. Validation of cutting-edge sensors, technological devices, and techniques to identify and monitor precursor signals of ground instability, as well as the occurrence of ongoing deformations
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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

Version	Date	Lead contributor	Description
0.1	12/07/2023	Chiara Colombero (POLITO)	First draft
0.2	20/07/2023	Chiara Martinello (UNIPA) Giorgio Manno (UNIPA)	Critical review and proofreading
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ABSTRACT

This report summarizes the scientific research activities carried out in the period January – July 2023 by the Task 2.3.1 of the Work Package 2.3 inside the vertical spoke VS2 "Ground Instabilities" of the Extended Partnership RETURN.

The research activities of the task have been devoted to the analysis of the processes preparatory to ground instabilities. This analysis was based on the learning from on site and remote sensing monitoring data collected on already deeply studied and analyzed case studies, or Learning Examples (LEs), supplied by the partner institutions.

This learning phase had the objective of building a Rationale for preparatory processes to be used as input to the Proof of Concept (PoC). This phase has been articulated in three stages:

i) Inventory of Learning Examples (LEs);
ii) Individuation of the preparatory processes analyzed in each LE;
iii) Definition of a Rationale for each identified preparatory process based on the available LEs;

which are described in detail in the PART A of the deliverable. In particular, fifteen preparatory processes were identified from the inventory of LEs and a tool for the rationalization of each process was derived from each LE.

Beside the learning from monitoring data, also machine learning approaches are included in the statistics and discussion of this deliverable, to report in parallel about the advancements of the Task 2.3.3.

The deliverable also includes a PART B, in which the workflow and activities of WP 2.4 are summarized. WP4 followed the same three-stage approach for the analysis of trigger and multihazard processes. The LEs of the work package in which monitoring data and processing techniques are collected and applied are presented here, since no related DVs were due at this project month.

In both WPs, the analysis of the LEs led to the definition of operative tools that will be merged and organized in a Rationale of each WP (due for November 2023). The Rationale will serve as a base for the construction of the PoC in the next year of the project.