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multi-Risk sciEnce for resilienT commUnities undeR a changiNgclimate

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1. Technical references

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* PU = Public

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

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Document history

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2. ABSTRACT

This document provides a summary of the main activities carried out within Task 2.4.2 of WP4. Specifically, this deliverable 2.4.3 summarizes the results of the activities dedicated to rationalization for trigger-based multiple geohazards severity mapping and zoning, with the main aim of defining tools that can address issues related to triggering of different types of ground instabilities in hilly and mountain areas, and the associated run out, also in the view of possible multiple geohazards that may characterize a certain portion of a territory. The research activities have been articulated in several phases.

1. First phase of analysis and rationalization of LEs preliminarily proposed by the different Partners.

Each LE has been independently checked by a "transversal" working group of WP4 and the relevant information has been summarized. The processes that involve the hilly-mountainous areas, hence pertaining to the T 2.4.2, are Landslides, characterized by both slow and rapid kinematics; only few LEs deal with different processes, such as Erosion and Fluvial Dynamics. 5 LEs directly deal with run-out assessment of rapid landslides.

2. Revision, withdrawal and integration of the proposed LEs in relation to their actual suitability for the purposes of the Task.

The final count of the LEs can be summarized as: i) n. 11 LEs not suitable for the WP4/T 2.4.2 and withdrawn by the Authors; ii) n. 15 LEs usable for the tools rationalization process, ii) n. 5 newly presented LEs. upon completion of the review and recall activities, the number of Learning Examples (LE) included in Task 2.4.2 is equal to 20. Furthermore, for each of the 20 LEs selected for the Task purpose, as a preparatory phase for the rationalization process, the following information has been extracted: type of kinematics; category of ground instability (GI); involved material; trigger category; scale of validity; analysis log; run out assessment.

3. Extraction from each LE of one or more working tools useful for analyzing trigger processes and returning GI scenarios.

The approach selected to accomplish this operation was to identify, for each LE, all the working tools explicitly or implicitly contained therein, defining the working tool as a specific procedure (or set of procedures) capable of providing an output relative to one of the following issues of interest in this task. In order to ensure better integration with the results provided by the WPs dealing with the predisposing factors (WP 2.2) and the preparatory processes (WP 2.3) for a certain ground instability, the identification of the tools followed a tree pattern based primarily on the kinematic and category of ground instabilities, secondarily on the category of trigger factors and, lastly, on the type of output provided in relation to the issues of interest of the task. Then, a total of 43 working tools dedicated to a specific issue of interest of the task were extracted from the 20 LEs. The kinematics covered by the tools are evenly distributed between slow (19 tools) and rapid ground instabilities (26 tools). Considering the macro-categories of ground instabilities, most of the tools are devoted to landslide phenomena (39 tools). Rainfall is the most considered forcing (24 tools), although numerous tools concern ground instabilities triggered by seismic phenomena (11 tools).

4. Construction of "tool chains" as a sequence of tools that can lead to the assessment of expected impact scenarios for different GIs.

Each trigger / multihazard / scenario generation (e.g., runout assessment in case of landslides) tool has been framed in a logical structure, conceived as a hierarchical tree rooted in the different GI categories and increasingly branched off according to additional criteria (kinematic, GI type, trigger category, run-out assessment). Based on the hints provided by such a hierarchical tree structure, a conceptual workflow has been proposed (and implemented by means of exemplifications), addressed to the systematization of the individual tools extracted in the different WPs and useful, in concatenation, to return scenarios resulting from GI processes, thus starting from the predisposing factors, passing - where necessary - through the preparatory processes and, finally, taking into account the triggering factors.