

ARNICA - Assessment of Risks on transportation Networks resulting from slope Instability and Climate change in the Alps

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The **ARNICA project** focuses on a **probabilistic assessment of slope hazards** related to debris flows and landslides and their **impacts on transportation networks** in the **context of future climatic change**. We will tackle this issue through 5 work packages that focus on current and future climate scenarios, their impacts on the occurrence (frequency), run-out and spread of debris flows and landslides in **three vulnerable Alpine regions located in France, Italy, and Switzerland**, and a quantification of their consequences on national and trans-border transportation corridors from various hypotheses of frequentations by cars and trains or interruption of transportation corridors at the regional level. New approaches adapted to the operational needs of local and regional authorities and facilitated solutions for end-users will be proposed. This project involves four partners with different specialties including geomorphology, risk assessment, hydrometeorology and climate modeling. Occurrence probabilistic models and susceptibility maps will be provided based on data bases constructed from direct observations and

historical testimonies. Different climatic scenarios will be defined from downscaled output ensemble GCM techniques for three distinct periods (1960-2000, 2030-2060 and 2070-2100). In a subsequent step and based on the data on past events, their triggers and the occurrence of future precipitation events, the vulnerability of transportation networks to these slope processes will be documented. Direct and indirect costs of the dysfunction of national and trans-border road network analysis will be conducted to provide risk analysis and to quantify the risk of accidents (damage, fatalities). Help tools based on graph theory are proposed to local and regional authorities in charge of national network regulation. Tests of interruptions considering different socio-economic scenarios will be suggested to estimate costs and best solutions. The **dissemination of the results will be assured through the direct involvement of the technical services in charge of land-use planning during the database construction phase and the diffusion of a film intended for the local authorities.**

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