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Landslide Hazard Information System for Landslide Disaster Risk Financing: Earth Observation and Modelling Products for Near-Real-Time Assessment

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The frequency and impact of disasters rise at the global scale, calling for effective disaster risk management and innovative risk financing solutions. Disaster Risk Financing (DRF) can increase the ability of national and local governments, homeowners, businesses, agricultural producers, and low-income populations to respond more quickly and resiliently to disasters by strengthening public financial management and promoting market-based disaster risk financing. For landslide events, the usage of DRF products is not yet extensive, mainly due to challenges in capturing the appropriate destabilization factors and triggers, as well as forecasting the physical properties of a landslide event (such as its type, location, size, number of people affected, and/or exposed infrastructure). The availability and quality of satellite EO derived data on rainfall that triggers landslides (Global Precipitation Measurement mission / GPM) and observations of the landslides themselves (Copernicus Sentinel radar and multispectral sensors, very high resolution -VHR-optical sensors) greatly improved in recent years. In the same time, effective models are refined and support near-real time landslide hazard assessment (e.g. Landslide Hazard Assessment for Situational Awareness / LHASA; Flow path assessment of gravitational hazards at a Regional scale / FLOW-R).

The objective of this work is to present the prototype platform LANDSLIDE HAZARD INFORMATION SYSTEM (LHIS) which aims to support landslide DRF priorities using Earth Observation data and models. The functions of the platform are to be able to anticipate, forecast and respond to

incipient landslide events (in Near-Real Time, NRT) by providing estimates of parameters suitable for parametric insurance calculations, including landslide inventories, susceptibility and hazard maps, potential damages and costs analyses. The LHis prototype is accessible on the GEP / Geohazards Exploitation Platform allowing easy access, processing and visualization of EO-derived products. The prototype consists of three modular components with respectively: 1) a Landslide Detection component to create Landslide Inventories, 2) a Landslide Hazard Assessment component using global and national geospatial datasets leading to Landslide Susceptibility Maps, Scenario-based Hazard Maps and NRT Rainfall-based Hazard Maps, and 3) Landslide Impact Assessment component combining landslide hazard maps with population and infrastructure datasets to derive Landslide Exposure Maps and Landslide Impact Index. The landslide detection module is based on the analysis of time series of optical and SAR data; the landslide hazard and impact assessment modules are based on the LHASA, FLOW-R and PDI models.

The information system is being developed and tested in Morocco in collaboration with the solidarity fund against catastrophic events (FSEC) and the World Bank for two contrasting use cases in the Rif area (North Morocco) and the Safi area (Central Morocco) exposed to various landslide situations occurring in different environmental and climatic contexts.