

EGU22-10685

<https://doi.org/10.5194/egusphere-egu22-10685>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



BeSafeSlide – A Landslide early warning soft technology prototype to improve community resilience and adaptation to environmental change

Sérgio C. Oliveira^{1,5}, José L. Zêzere^{1,5}, Ricardo M. Trigo², Fernando Marques², Alexandre Tavares³, Rui Marques⁴, Alexandre M. Ramos², and Raquel Melo^{1,6}

¹Centre for Geographical Studies, Institute of Geography and Spatial Planning (IGOT), University of Lisbon, Lisbon, Portugal

²Faculdade de Ciências, Departamento de Geologia e Instituto Dom Luiz, Universidade de Lisboa

³Centre for Social Studies, Earth Sciences Department, Universidade de Coimbra, Portugal

⁴Centro de Informação e Vigilância Sismovulcânica dos Açores, Instituto de Investigação em Vulcanologia e Avaliação de Riscos, Açores

⁵Associated Laboratory TERRA

⁶School of Science and Technology, University of Évora

As observed worldwide during the last decades, landslides are one of the deadliest natural hazards in mainland Portugal and Azores archipelago being responsible for significant direct and indirect societal and economic losses, justifying the implementation of a landslide early warning system at the regional scale.

The BeSafeSlide project aims to develop and implement a soft technology/low-cost prototype for precipitation-triggered landslide early warning system (LEWS) in Portugal. We plan it to allow be adaptable to a changing climate and a changing land use by working with different climate scenarios. Future changes on regional rainfall patterns due to climate change were evaluated in the LEWS for 2071-2100 period, considering two emission scenarios: RCP 4.5 and RCP 8.5. To evaluate future exposure trends and effects in risk analysis, simulations of changes in land use, by the end of the 21th century, will be carried out. The uncertainty of future projections will be addressed by developing a set of different scenarios.

The LEWS prototype for Portugal is sustained on different types of regional rainfall thresholds for landslide occurrence based on daily/hourly rainfall series available for each BeSafeSlide study area. The proposed prototype aims at integrating 3-day rainfall forecasts on rainfall thresholds monitoring and on dynamic physically based susceptibility models, to anticipate changes in hydrological conditions and consequently on the spatio-temporal occurrence of landslides. Special attention is given to two different types of rainfall-triggered landslide events, recognized as responsible for shallow and deep-seated landslides occurrence on natural slopes, which are permanently monitored within the regional early warning system in hotspot risk areas: (i) landslide events associated to intense, short-duration rainfall periods; and (ii) landslide events associated to long-lasting rainfall periods.

The LEWS main goals are to provide information to civil protection services to anticipate and manage people's evacuation from landslide prone areas and to ensure the maintenance and operability of regional transport, energy and communications networks and the safeguarding of people's lives. Although the LEWS is being developed within the framework of Portugal we expect to be applicable in different settings. The application of the LEWS will define warning communication procedures, assess response capacity of stakeholders and develop social capacity practices, to reduce vulnerability and mitigate risk, providing a reduction of affected people, economic losses and critical infrastructures/basic services disruptions.

Acknowledgments: This work was financed by national funds through FCT (Foundation for Science and Technology, I. P.), in the framework of the project BeSafeSlide – Landslide early warning soft technology prototype to improve community resilience and adaptation to environmental change (PTDC/GES-AMB/30052/2017), and the Research Unit UIDB/00295/2020 and UIDP/00295/2020.