ACADEMIA EUROPAEA

The Academy of Europe

FROM KNOWLEDGE TO ACTION APPLICATION

Title: Probing the connections between deep earth processes and surface movements: what we can learn from remote sensing for mitigating natural and anthropogenic hazards?

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Other investigators: Dr. Istvan Bozsó (HUN-REN EPSS), post-doc

Category: From Science to Society

Problem (max. 50 words):

Measuring surface displacements caused by natural hazards, such as landslides, and around critical infrastructure (e.g. dams) can in principle be an effective monitoring method. Although, the InSAR remote sensing method has demonstrated in recent year a great potential, it is so far not fully utilized.

Unmet Need (max. 50 words):

InSAR can only provide reliable displacement information from areas where so-called coherent scatterers are found. HUN-REN EPSS has developed artificial scatterers in an ESA project that can be installed on the field, at a low cost, to provide such objects. Our technology needs further dissemination to professionals, researchers and authorities.

Project Description (max. 200 words):

We will share our expertise in monitoring surface movements with stake holders to enhance understanding of consequences of natural hazards and human activities. As part of the TOPO-EUROPE project (Cloetingh et al., 2023) of the International Lithosphere Program coordinated by EPSS, we focus on observing, reconstructing, and modelling Europe's recent and ongoing tectonic and topographical changes. We will inform the public on applications of InSAR for monitoring surface movements such as landslides, collapses connected either to natural processes (earthquakes, H2, CO2 degassing) or to human activity (mining, geothermal energy utilization). We will organize a public lecture at the forthcoming TOPO-EUROPE meeting in Sopron., advertised through local media, social media and websites of our institute. Through its strategic location, the venue serves as an ideal platform to connect frontier science, academia and citizens in central and eastern Europe. Regular updates will be provided on new information from research localities susceptible to geohazards in the Carpathian-Pannonian system. This earthquake prone region is also a hot spot for geothermal energy extraction in Europe.

Hypothesis (25 words):

Can InSAR detect long-term high-resolution surface movements with special reflectors to mitigate geohazards and to monitor underground anthropogenic activity?

Implication for Practice (50 words):

Providing data and quantitative scenarios to civil protection authorities for natural and anthropogenic hazards.

Implication for Research (50 words):

Bridging deep Earth and surface processes and assessing their impact on continental topography, geo-energy and Earth environment.