OSCARS
Open Science Clusters' Action for Research & Society

Funded Project

HOMEROS - Harmonising Observations from Multi-hazard Environments in Research for Open Science

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What problem(s) are you going to solve?

- The HOMEROS project aims to advance multi-hazard assessment methodologies to meet scientific, technical, and societal needs in the fields of seismology, geodesy, and geology, and demonstrate the benefits of Open Science (OS) practices. To ensure a comprehensive analysis, the project will explore the challenges associated with standardizing research processes when combining interoperable services from diverse resources related to essential geohazard variables.
- HOMEROS aims to advance multi-hazard assessment and provide the scientific knowledge necessary to enhance disaster preparedness, bridging current gaps in the research process with open, transparent, and FAIR practices and incorporating new open research outputs.

What are you planning to do to solve the problem?

- HOMEROS aims to showcase the advantages of the streamlined FAIRness of seismological and geodetic data provided and/or supported by relevant RIs in the Solid Earth and Environmental community.
- HOMEROS will ensure that research outputs (e.g. data products, software, research results) are widely available for use in diverse scientific disciplines, while also seeking to normalise the currently fragmented approach to multi-hazard assessment in Earth Sciences. Utilizing ENVRI, EPOS and other services (e.g. those offered by the EOSC federation and nodes, Copernicus etc.), the project will apply robust quality assurance practices to the collected data, while identifying possible data coverage gaps in the study regions.

What will be the results and how do you plan to make them available to the broader community?

- Big data in seismology is necessary to improve earthquake location and detect weak seismic events, which is crucial in imaging faults in greater detail and developing more accurate seismic hazard models. Sharing open seismological data enables researchers worldwide to access and analyze information collected from seismic networks. The increased accessibility accelerates scientific discovery by allowing researchers to explore new hypotheses, validate findings, and conduct comparative studies more efficiently. HOMEROS will provide open access seismic data products and analyses to foster interdisciplinary research.

What will be the results and how do you plan to make them available to the broader community?

- • HOMEROS will investigate the data coverage (e.g. offered by ENVRI and EPOS services) and with data quality controls will contribute significantly to the improvement of geohazard datasets and products, and increase their exposure to stakeholders.
- • Hazard models, which HOMEROS aims to serve, are requisites in evaluating seismic risk. Other than the profound benefits in a purely academic interest in the effects of natural disasters, actors from industry and government are highly interested in accurate risk evaluations, for securing their assets and infrastructure.

What will be the results and how do you plan to make them available to the broader community?

- • In HOMEROS, the partners will increase the number of permanent GPS/GNSS stations through the expansion of the Hermes network of the Aristotle University (AUTh) with the provision of an existing permanent station that operates in the area, providing additional data with a high observation rate such as 1sec (which until nowadays is not available), an element that constitutes important parameter in combination with seismological data. The installation and the (meta)data requirements of additional stations will be investigated, using e.g. low-cost sensors and collocating them with seismographs.
- To be added

RESULTS – HOMEROS

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What will be the results and how do you plan to make them available to the broader community?

- • The synergy between high-rate GNSS and Interferometric SAR (InSAR) data can provide the means for real-time monitoring of ground deformation, leading to a better understanding of hazard mechanisms. In combination with seismology, this type of next-generation geodetic monitoring is the first stop towards building more detailed and accurate seismotectonic models that explain how tectonics cause destructive earthquakes.
- • Inventories of historical landslide events and floods are paramount for hazard assessment, which can facilitate the identification of safe-zones and improve land-use planning. HOMEROS will contribute significantly by collecting the requirements for open access inventories, and delivering prototypes (that can later be used in GIS applications or as templates for other inventories) for the geographical areas studied in this project.

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What will be the results and how do you plan to make them available to the broader community?

- •Following the FAIR principles and using tools (e.g. Jupyter Notebooks) and services supported by the ENVRIs, HOMEROS will focus on the transparency and reproducibility in natural hazards research, making data, methods, and findings properly documented and openly available to the scientific community. Facilitating the validation and replication of results (including the long-tail research) by other scientists enhances the reliability and trustworthiness of research outcomes, leading to more robust conclusions and advancing the understanding of seismic processes and hazards.

What will be the results and how do you plan to make them available to the broader community?

- • Open access data and e-science services stimulate innovation and foster the development of new technologies and applications especially in scientific fields that are usually considered as "traditional". Innovation in earthquake monitoring, early warning systems, hazard assessment, disaster resilience technologies, improvements in disaster preparedness and response to minimize the impact of natural disasters on societies, are only some of the fields benefited by open data science nowadays.
- • Openly available educational materials and outreach programs empower individuals and communities to learn about natural disasters. By promoting public awareness and knowledge of natural hazards, OS enhances community resilience and preparedness. HOMEROS will deliver training module(s) on open access platforms (e.g. from OpenAIRE and ENVRI) and dissemination material via the OSCARS, ENVRI and EOSC communication channels.

TEAM

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Harmonizing **O**bservations from **M**ulti–hazard **E**nvironments in **R**esearch for **O**pen **S**cience

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