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Special issue

EPOS a Research Infrastructure in solid Earth: open science and innovation

Preface

This special issue of Annals of Geophysics is dedicated to present and discuss a research infrastructure whose goal is integrating and providing access to solid Earth science data, research products and services as well as promoting physical access to research facilities. This research infrastructure is the European Plate Observing System (EPOS, www.epos-eu.org). The idea of the special issue was matured considering the centrality of research infrastructures in the research process, promoting open science and enabling new forms of research and collaborations by providing solutions to share and distribute data and scientific products. Research infrastructures play a key role in establishing and consolidating interactions between research organizations and academia to govern and manage virtual access to scientific data and physical access to research facilities. Moreover, by providing access to scientific data, products, and information they represent a collaborative framework to foster innovation directly contributing to scientific progress and education in specific scientific domains.

The EPOS research infrastructure resulted to be an excellent candidate for the special issue because of its mission to establish and maintain sustainable and long-term access to research data, services, and facilities for the whole solid Earth science domain. Moreover, EPOS has integrated the diverse national research infrastructures under a common federated framework, thus ensuring a pan-European dimension and a global perspective for its challenge to long-term sustainability. Managing research infrastructures is, indeed, a key challenge to tackle for many research organizations both at national and international level. Sharing the experiences of a pan-European infrastructure like EPOS is certainly of interest for scientists, data providers, as well as for those committed to operate services for science and society.

The special issue contains several papers aimed at presenting the general aspects of the EPOS research infrastructure, such as its architecture focusing on the adopted solutions for the sustainable operation of the EPOS services and the FAIR[1] data management, together with other specific papers describing the data and service provision of the different research communities participating to the EPOS integration plan. Overall, the special issue offers both a description of the EPOS research infrastructure and a presentation of the contents of its delivery framework. In other words, these articles allow readers to understand the EPOS architecture and the adopted solutions to operate its delivery framework; likewise, they describe the data and service provision to users and stakeholders, fostering the aware usage of the services to access, analyse, process, and use both individual and aggregated data sets. The special issue is divided in two volumes of Annals of Geophysics, namely volumes 2 and 3 of the journal, published in April and June 2022, respectively.

The papers included in this special issue of Annals of Geophysics dedicated to the EPOS research infrastructure also represent an interesting contribution to show and discuss how different research communities belonging to solid Earth science have joined resources, skills and experiences to foster the culture of data sharing coherently with FAIR data management, thus contributing to open science. The special issue allows readers to understand the governance of the data lifecycle coordinated by the thematic communities (TCS), in charge of ensuring quality control and the adoption of shared standards for data and metadata, which have been established in EPOS for this specific

1 FAIR acronym stands for Findable, Accessible, Interoperable, Re-usable.

reason. The thematic communities integrate and make available both data that are already accessible through community services and data that would not be available without the new services established in EPOS. It is important to emphasize that in EPOS the scientific community is the key enabler of innovation in data management and interoperability, effectively supporting open science. This makes the special issue of relevance for a broad readership.

In our opinion, there are several reasons for publishing a special issue dedicated to the EPOS research infrastructure, from discovering the contents of the EPOS data and service provision to understanding the new challenges to be tackled for the sustainable operation of a research infrastructure and management of data and scientific products. In this framework, the special issue can be a further contribution to foster multi-disciplinary research in solid Earth science and cross-disciplinary investigations in environmental science. The special issue represents an effective presentation of the EPOS science case described through the multidisciplinary contents of its delivery framework, spanning from seismology, geodesy, geology, volcanology, and geomagnetism to the chemistry and physics governing the Earth's dynamics.

As guest editors of this special issue, we have appreciated the motivated and enthusiastic approach shown by the EPOS community in sharing their experiences and promoting in the culture of data sharing and open science.

List of papers in the first volume of the Special Issue

Cocco, M., C. Freda, K. Atakan, D. Bailo, K. Saleh Contell, O. Lange, J. Michalek (2022). The EPOS Research Infrastructure: a federated approach to integrate solid Earth science data and services, Ann. Geophys., this volume.

Saleh Contell, K., K. Karlzén, M. Cocco, H. A. Pedersen, K. Atakan, D. Bailo, O. Lange, D. Mercurio, G. Maracchia, A. Sangianantoni, D. Piras, M. Fredella and C. Freda (2022). Long-term sustainability of a distributed RI: the EPOS case, Ann. Geophys., this volume.

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