



## **The FAIRness horizon: from principles to practice, the EPOS experience in solid Earth science**

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Earth scientists have a long lasting tradition in data acquisition, collection, quality-control and standardization. They are also the key actors for feeding and implementing metadata and services for qualification, storage and accessibility. Research infrastructures, in turn, provide facilities and resources to ensure the data management and interoperability through e-science innovation. Integrating research infrastructures is strategic to tackle the challenge of long-term sustainability from a technical, legal, governance and financial point of view.

The European Plate Observing System (EPOS, [www.epos-eu.org](http://www.epos-eu.org)) is a long-term plan for the integration of research infrastructures for solid Earth science in Europe. By improving and facilitating the integration, access, use, and re-use of solid Earth science data, data products, services and facilities, EPOS is developing a holistic, sustainable, multidisciplinary research platform to provide coordinated access to harmonized and quality controlled data from diverse Earth science disciplines, together with tools for their use in analysis and modelling. The EPOS mission is to create a single, distributed, sustainable, research infrastructure that integrates the diverse European research infrastructures for solid Earth under a common framework. EPOS, relying on new e-science solutions, gives open access to solid Earth data enabling a step change in multidisciplinary scientific research in many, diverse solid Earth disciplines.

The Open Science agenda contains the ambition to make FAIR (Findable, Accessible, Interoperable and Re-usable) data sharing the default for scientific research by 2020. In this framework, data FAIRness is considered a necessary target for research infrastructures in different scientific domains and at global level. To this goal, FAIR guiding principles for research data have been recently proposed to the scientific communities as the new horizon for sharing data. The FAIR principles create the conditions to foster data sharing and improve data stewardship, provided that several normative, organizational and ethical issues are addressed. While waiting for the establishment of these normative, organizational and ethical conditions to apply FAIR principles, the research infrastructures have the responsibility to respond to these expectations and fill the current existing gap between FAIR principles and viable practice for FAIRness. However, turning FAIR principles into practice requires an enormous amount of human and technological resources and skills in a timeline that does not necessarily correspond to the expectations of the authorities promoting FAIRness.

Here we present the EPOS approach and IT solutions to make solid Earth science data FAIR, coherently with data management plans shared with the scientific communities participating to the integration plan. We will discuss the EPOS time-oriented roadmap for the implementation of FAIR data in terms of technical, normative and ethical dimensions. We emphasize the importance of adopting a co-design approach joining skills and experiences of domain scientists and e-scientists working in the same research environment represented by the EPOS research infrastructure. A pan-European infrastructure such EPOS might represent the collaborative framework where experiencing the difficulties and testing solutions to make solid Earth science data FAIR with the goal of fostering open science.