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Sustainable FAIR Data management is challenging for RIs and it is challenging to solid Earth scientists

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Interoperability has long been an objective for research infrastructures dealing with research data to foster open access and open science. More recently, FAIR principles (Findability, Accessibility, Interoperability and Reusability) have been proposed. The FAIR principles are now reference criteria for promoting and evaluating openness of scientific data. FAIRness is considered a necessary target for research infrastructures in different scientific domains at European and global level.

Solid Earth RIs have long been committed to engage scientific communities involved in data collection, standardization and quality management as well as providing metadata and services for qualification, storage and accessibility. They are working to adopt FAIR principles, thus addressing the onerous task of turning these principles into practices. To make FAIR principles a reality in terms of service provision for data stewardship, some RI implementers in EPOS have proposed a FAIR-adoption process leveraging a four stage roadmap that reorganizes FAIR principles to better fit to scientists and RI implementers mindset. The roadmap considers FAIR principles as requirements in the software development life cycle, and reorganizes them into data, metadata, access services and use services. Both the implementation and the assessment of “FAIRness” level by means of questionnaire and metrics is made simple and closer to day-to-day scientists works.

FAIR data and service management is demanding, requiring resources and skills and more importantly it needs sustainable IT resources. For this reason, FAIR data management is challenging for many Research Infrastructures and data providers turning FAIR principles into reality through viable and sustainable practices. FAIR data management also includes implementing services to access data as well as to visualize, process, analyse and model them for generating new scientific products and discoveries.

FAIR data management is challenging to Earth scientists because it depends on their perception of finding, accessing and using data and scientific products: in other words, the perception of data sharing. The sustainability of FAIR data and service management is not limited to financial sustainability and funding; rather, it also includes legal, governance and technical issues that concern the scientific communities.

In this contribution, we present and discuss some of the main challenges that need to be urgently tackled in order to run and operate FAIR data services in the long-term, as also envisaged by the European Open Science Cloud initiative: a) sustainability of the IT solutions and resources to support practices for FAIR data management (i.e., PID usage and preservation, including costs for operating the associated IT services); b) re-usability, which on one hand requires clear and tested methods to manage heterogeneous metadata and provenance, while on the other hand can be considered a frontier research field; c) FAIR services provision, which presents many open questions related to the application of FAIR principles to services for data stewardship, and to services for the creation of data products taking in input FAIR raw data, for which is not clear how FAIRness compliancy of data products can be still guaranteed.