Towards an Open Access European Database for Deep Seismic Sounding data

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Controlled source seismic data acquisition experiments have produced a vast amount of Deep Seismic Sounding (DSS) data since its development in the late 50's. These datasets provide critical information on the structure and nature of the crust and the lithosphere, which constitutes a fundamental research tool within Solid Earth Sciences. The DSS datasets are unique and constitute the output of an expensive (in time, effort and cost) scientific process, which evidences the need for their preservation, both the recently acquired and the legacy data. Furthermore, the new developments in processing and imaging techniques generate new possibilities for re-use of the vintage datasets. The availability and accessibility of these datasets, therefore, is of foremost importance for scientists, decision-makers and the general public.

The research community, aware of the value of these data, has pushed forward Open Data policies based on the FAIR principles of data management (Findable, Accessible, Interoperable and Reusable). In this respect, a long-term plan has been launched by the European Plate Observation System (EPOS, https://www.epos-ip.org/) e-infrastructure. The focus is to streamline the integrated use of scientific data, data products and services. In close link with EPOS, the Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe (SERA, http://www.sera-eu.org/home, a Horizon 2020 project) includes a working package to set up a network on DSS data and products management. This initiative ensures the traceability of the data allowing that third parties can freely access, exploit and disseminate the data by means of permanent, international identifiers: a Digital Object Identifier (DOI) and a Uniform Resource Identifier (URI) or handle. Furthermore, the current aim is to go beyond the FAIR principles by linking the data with its related peer-reviewed publications, other scientific contributions and technical reports, facilitating its re-use.

A prototype DSS data exchange system has been developed jointly between the DIGITAL.CSIC (the Spanish National Research Council) services and the Institute of Earth Sciences Jaume Almera-CSIC (https://digital.csic.es/handle/10261/101879, last access January 2020). Within the platform, each dataset includes the acquired raw data and a metadata file. The metadata provides information of the nature of the data itself, list of authors, the context of the data (time and location of the experiments), funding agencies and other relevant legal aspects. The technical information includes the acquisition parameters, data processing and format of the data (SEGY standard in this
case - www.seg.org-, broadly used in the geophysics community). In the developed storage protocol, a permanent identifier is assigned once it has been checked that the data meets all the described requirements. This permanent identifier ensures that any visit or download is accounted for. This information is entered into a statistics referencing database and can also be used as a measure of the impact of the data and/or data product.

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