



Implementation of the Open Science paradigm at INGV: a challenging experience in a big multidisciplinary research institute

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The Italian Istituto Nazionale di Geofisica e Vulcanologia (INGV; National Institute of Geophysics and Volcanology), is one of the largest geoscience research institute in Europe. Its mission is focused on the studies of the physical and chemical processes of the Earth, from its upper atmosphere to its inner core. Furthermore, INGV is a component of the Italian Civil Protection system for the seismic and volcanic hazard assessment and risks reduction. To this aim, INGV has implemented many different infrastructures: networks of permanent stations (seismic, GNSS, magnetic, gravimetric, geochemical, etc.), analytic and experimental laboratories, volcanological and magnetic observatories, and computational facilities to analyze the data and to model the Earth's processes. These infrastructures are implemented and maintained thanks to national and international funds and to the skilled work of about a thousand of people (researchers and technicians), who operate in nine branches distributed all over the country. Each research activity is conducted in its own peculiar infrastructure environment and generate a large amount of multidisciplinary data, with different processing levels (from raw data to the outcome of complex modelling) and with different formats, sampling rate (in space and time) and volume (in term of bits).

To manage this complex heritage of knowledge in the frame of the Open Science paradigm is a real challenge. It implies to satisfy some essential conditions: to structure and relate a complete set of information describing each type of data and its environment, covering both the technical and managerial aspects; to adopt the most appropriate and well-established data encoding and metadata standards for easing the use and reuse of the data; to setup standardized services for accessing the data; to outline a clear legal and managerial framework for defining the accountability of the data producers, guaranteeing the data quality and integrity, and acknowledging their sources, as well as ensuring the traceability of their use.

In 2012 INGV subscribed the Berlin and OECD declarations on the Open Science to the research data. After an internal preparatory work and the implementation of a specific working group, in 2016 INGV adopted its own general guidelines for the data management, explicitly endorsing the Open Science paradigm. Finally, in late 2018 INGV has adopted a set of practical rules and modified its internal organization by creating a management office to curate its scientific data assets. The role of the "Data Management Office" is to support INGV data producers in applying those rules in compliance with the Open Science paradigm. This contribution will present the four-year-long preparation activities at INGV to adopt the Open Science paradigm, and illustrate its current state of implementation.