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Metadata recommendations for geodetic data

Kirsten Elger¹ and the GGOS Committee on DOIs for Geodetic Data Sets*

¹GFZ German Research Centre for Geosciences, Library and Information Services, Potsdam, Germany (kirsten.elger@gfz-potsdam.de)

*A full list of authors appears at the end of the abstract

The geodetic services of the International Association for Geodesy (IAG) are international key players in the provision and distribution of geodetic data. Their operating institutions and funding agencies increasingly require the provision of tangible statistics on data use and access. In addition to the classical provision of data download statistics, data use can also be provided through citations in scholarly literature. Credit through citations, together with the desire for a coordinated approach across the geodetic services, was the motivation for the IAG's Global Geodetic Observing System (GGOS) to establish a "Working Group on using DOI (digital object identifier) for Geodetic Data Sets" in 2019. The "GGOS Committee on DOIs for Geodetic Data Sets" is continuing the work since 2023 for the longer term.

Challenges for applying DOIs to geodetic data and products include the fact that they are mostly dynamic, often provided as real-time data streams (with hundreds of files per day) where the "classical" assignment (and citation) of DOIs to individual (daily) files provided in different product levels is not a practicable solution. In addition, many geodetic data products are based on contributions from hundreds of researchers and institutions that need to be acknowledged following "rules for good scientific practice". Today, DOI-referenced research outputs are fully citable in scholarly literature and scientific journals are increasingly demanding that all sources underlying scientific results (data, code, models, samples) are made available/ published along with the article. Initial data citation metrics allows data providers to demonstrate the value of the data collected by institutes and individual scientists.

An additional benefit of using DOIs for geodetic data is the associated standardised (e.g. DataCite) and machine-readable metadata for data discovery. DataCite is a DOI registration agency specialised for data, code and other publications beyond scholarly literature. Their constantly further-developed metadata schema is supporting the implementation of the FAIR Principles (to make data findable, accessible, interoperable and reusable for humans and machines) and complements discipline-specific metadata standards, like GeodesyML for GNSS station information.

Here we present the first version of our metadata recommendations for geodetic data, developed for the GNSS data use case. The recommendations guide through the DataCite metadata schema, identify recommended and optional properties and how they can be used for geodetic data

supporting data discovery. Initial guidelines were: (1) to include persistent identifier, like ORCID, ROR, DOI for uniquely identifying persons, institutions in the DOI metadata and cross reference with related data/articles/code whenever possible. (2) to have a maximum alignment with existing metadata, like GeodesyML or Sitelogs for GNSS station data with automated processes for mapping DOI metadata generation from existing GNSS metadata bases to DataCite metadata.

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