

BITS - a Use Case for Terminologies in Earth System Sciences

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Abstract:

The exponential growth of data due to technological developments along with an increased recognition of research data as relevant research output during the last decades substantiates fundamental challenges in terms of interoperability, reproducibility and reuse of scientific information. Being cross-disciplinary at its core, research in Earth System Science comprises divergent domains such as Paleontology, Marine Science, Biodiversity Research, Atmospheric Sciences and Molecular Biology. Furthermore, different types of data such as observation and simulation data and a huge variety in data sizes (from Climate Model Output to Images of Specimen) exemplifies the challenges of implementing particularly the I and R in FAIR data principles. Within the various disciplines, distinct methods and terms for indexing, cataloguing, describing and finding scientific data have been developed, resulting in a large amount of controlled Vocabularies, Taxonomies and Thesauri. However, given the semantic heterogeneity across scientific domains (even within the Earth System Sciences), effective utilisation and (re)use of data is impeded while the importance of enhanced and improved interoperability across research areas will increase even further.

The BITS Project¹ (BluePrints for the Integration of Terminology Services in Earth System Sciences) aims to address the inadequate implementation of encoding semantics by establishing a Terminology Service that may serve the whole Earth System Science Community on national, european and international level. This TS will be developed based on the existing Terminology Service² of the TIB, supplemented by an ESS Collection³ that already contains relevant terminologies for Earth and Environmental Sciences and to which further relevant terminologies will be added. The implementation of this TS within two data repositories (World Data Center for Climate⁴ at the German Climate Computing Center⁵ and a Data Collection at Senckenberg - Leibniz Institution for Biodiversity and Earth System Research⁶) will showcase the benefits regarding e.g. enhanced and improved discoverability of research products. As all BITS Project Partners are involved in several NFDI activities (on section level as well as within NFDI consortia), we aim to foster collaboration activities across services and infrastructures: by extending the already existing cooperation of the TIB TS and TS4NFDI, or by advocating output of NFDI (BASE and Consortia) services within the wider Earth System Science Community. Within NFDI4Earth the Interest Group on FAIR Earth System Science Terminologies (FAIR ESST) was established, a.o. to monitor the BITS Project from a domain specific perspective. To sum up: we believe that the BITS Project may serve as a Use Case for the interaction of basic and thematic services within the NFDI (and beyond). How exactly this interaction is done (by using widgets offered by TS4NFDI), how

¹ <https://projects.tib.eu/bits/home>

² <https://terminology.tib.eu/ts>

³ <https://terminology.tib.eu/ts/collections?col=ESS>

⁴ <https://www.wdc-climate.de/ui/>

⁵ <https://www.dkrz.de/en>

⁶ <https://www.senckenberg.de/en/>

this will enhance the discoverability of research output (within the Earth System Sciences) and how this may contribute to further standardisation (e.g. for CF conventions) will be part of our proposed presentation/contribution.

Keywords: Terminologies, Earth System Sciences, interoperability, metadata, discoverability