

The TR32DB Metadata Schema: A multi-level Metadata Schema for an Interdisciplinary Project Database

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Introduction

The multi-level TR32DB Metadata Schema (Curd, 2014) was designed and implemented with the purpose to describe all heterogeneous data, which are created by project participants of the CRC/TR32, with accurate, interoperable metadata. The metadata schema considers the interoperability to recent metadata standards and schemas. It is applied in the CRC/TR32 project database (TR32DB, www.tr32db.de), a research data management system, to improve the documentation, searchability and re-use of the data. The TR32DB is established for the multi-disciplinary, long-term research project CRC/TR32.

Research Project Description

The Transregio Collaborative Research Center 32: 'Patterns in Soil-Vegetation-Atmosphere Systems: monitoring, modelling, and data assimilation' (CRC/TR32, www.tr32.de) is an interdisciplinary, joint research project of the German Universities of Aachen, Bonn, Cologne, and the Research Centre Jülich. The scientists cover the fields of soil and plant science, geography, hydrology, meteorology, remote sensing, geophysics, and mathematics. They work on exchange processes between the soil, vegetation, and adjacent atmospheric boundary layer (SVA) to yield improved numerical SVA models to predict CO₂-, water- and energy transfer by calculating the patterns at various spatial and temporal scales.

Multi-level Metadata Schema Overview

- implementation of core elements of recent metadata standards and principles
- Dublin Core as base schema
- amount and kind of metadata elements depend on data type
- data type specific elements (e.g. instrument and parameter)
- CRC/TR32 specific elements:
 - topics (e.g. soil, vegetation, land use, atmosphere)
 - specific keywords and themes

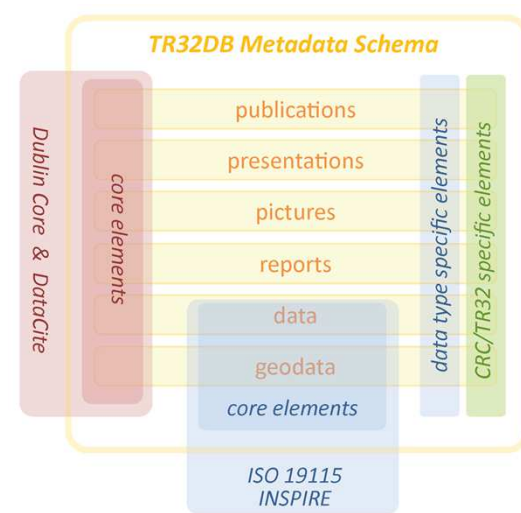


Figure 1. The TR32DB Metadata Schema overview of applied metadata standards and principles

Metadata Schema Structure and Documentation

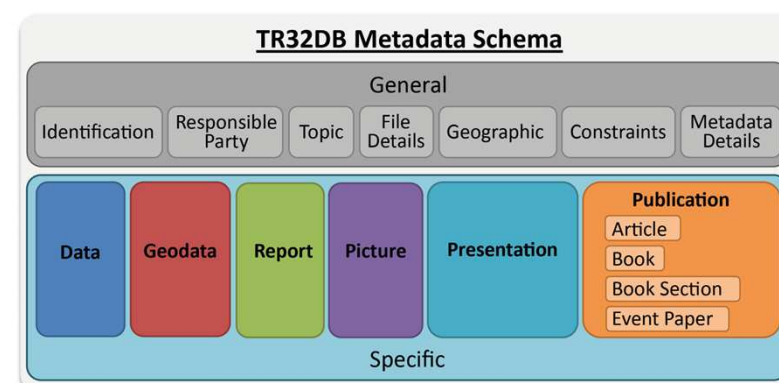


Figure 2. The TR32DB Metadata Schema structure

2.2.1 TR32DB 'GENERAL' Metadata Properties					
ID	TR32DB property name	Definition	Occ	OB	Notes (allowed values, examples, other constraints)
1	Title	A name given to the dataset. Typically a title will be a name by which the dataset is formally known.	1-n	M	Free Text
1.1	titleType	The type of title.	1	M	Controlled List: FreeText (see appendix for values and definitions).
2	Description	A textual description of the content of the dataset including additional	1-n	M	Free Text
2.1	descriptionType				
3	Identifier				
3.1	identifierType				

Figure 3. The TR32DB Metadata Schema documentation (Curd, 2014)

- obligation: mandatory (M), optional (O), and automatic (A) elements
- occurrence (Occ): 0-1,0-n,1,1-n
- metadata values: free text, date, controlled vocabulary lists
- TR32DB Metadata Schema mapping

Implementation of Metadata Schema in TR32DB Web-Interface (www.tr32db.de)

Figure 4. Input of metadata for a specific dataset (e.g. report) using the TR32DB metadata input wizard

Figure 5. Presentation of data search results according to a TR32DB topic (e.g. land use)

Figure 6. View of available metadata of a specific dataset (e.g. ID 868) with linkage to related details

Conclusion

A key issue of research data management systems is the documentation of all research data with accurate metadata (Greenberg et al., 2013). This is particularly important for long-term research projects (Michener, 2006) and should follow recent metadata standards and schemas (Jensen et al., 2011). Consequently, the TR32DB Metadata Schema is designed in a multi-level approach combining several metadata schemas and standards, as well as data type and project specific metadata elements to describe all heterogeneous data. Metadata elements of Dublin Core are applied as a base. Overall, the interoperable TR32DB Metadata Schema allows the accurate description of all heterogeneous data, generated by the CRC/TR32 participants. The multi-level approach enables a simple enhancement of the schema according to changing requirements of the project participants.

References

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