re3data.org
REGISTRY OF RESEARCH DATA REPOSITORIES

Metadata Schema for the Description of Research Data Repositories

Version 3.0

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1 Introduction

1.1 re3data.org

Research data are valuable and ubiquitous. The permanent access to research data is a challenge for all stakeholders in the research community. The long-term preservation and the principle of open access to research data offer broad opportunities for the research community worldwide. A growing number of universities and research centers are starting to build research data repositories allowing permanent access to data sets in a trustworthy environment. Due to disciplinary and other requirements, the landscape of research data repositories is very heterogeneous. Thus it is difficult for researchers, funding bodies, publishers and scholarly institutions to select appropriate repositories for finding and storing research data.

re3data.org is a global registry of research data repositories (RDR) that covers research data repositories from different research disciplines. It presents repositories for the permanent storage and access of research data sets to researchers, funding bodies, publishers and scholarly institutions. Beginning in 2016, re3data.org is a service of DataCite[1] promoting a culture of sharing, increased access and better visibility of research data. DataCite is a global non-for-profit organization that is actively involved in several initiatives to improve the availability and citation of research data via the Internet.

The registry was developed within a research project of the same name and went online in autumn 2012. It was funded by the German Research Foundation (DFG)[3] in two project phases, the first from January 2012 until December 2013. The current funding period started in January 2014 and will last until December 2015. Project partners in re3data.org are the Berlin School of Library and Information Science at the Humboldt-Universität zu Berlin[4], the Library and Information Services department (LIS) of the GFZ German Research Centre for Geosciences[5], the KIT Library at the Karlsruhe Institute of Technology (KIT)[6], and the Libraries of the Purdue University[7]. The German project partners are actively involved in the German Initiative for Network Information (DINI)[8] and current research data management activities. re3data.org cooperates, among others, with BioSharing[9] and OpenAIRE[10].

In March 2014, re3data.org merged with Databib, a similar initative at Purdue University (West Lafayette, Indiana, USA). The aim of this cooperation was to serve the research

[1] https://www.datacite.org/
[3] http://www.dfg.de
[4] http://www.ibi.hu-berlin.de
[5] http://bib.telegrafenberg.de
[6] http://www.bibliothek.kit.edu
[7] https://www.lib.purdue.edu
[8] http://www.dini.de/english
[9] See: http://www.re3data.org/2013/11/biosharing-and-re3data-cooperation/
[10] See: http://www.re3data.org/2013/10/memorandum-of-understanding-between-openaire-and-re3data-org/

community with a single, sustainable registry of research data repositories that incorporates the best features of both initiatives[11].

Further information on re3data.org and Databib can be found in the following publications:

Pampel H, Vierkant P, Scholze F, Bertelmann R, Kindling M, et al. (2013) Making Research Data Repositories Visible: The re3data.org Registry. PLoS ONE 8(11): e78080. doi:10.1371/journal.pone.00780802

Witt, Michael & Giarlo, Michael. (2012) Databib: IMLS LG-46-11-0091-11 Final Report (White Paper). http://docs.lib.purdue.edu/libreports/2

1.2 The Metadata Schema

The re3data.org metadata schema contains metadata properties describing a research data repository such as its general scope, content and infrastructure as well as its compliance with technical, quality and metadata standards. The schema includes required metadata properties and optional properties providing additional information. The schema serves the purpose of:

- recommending a standard for describing a research data repository;
- providing the basis for interoperability between research data repositories and re3data.org;
- helping data repositories move towards shared standards and practices.

To facilitate the selection process of appropriate research data repositories re3data.org developed a series of icons. The icons are displayed for a respective entry if an RDR provides important information concerning the repository, e.g. if it complies with a certificate or supports the provision of persistent identifier systems.

The initial version of the schema (formerly called vocabulary) was developed and tested on 20 randomly chosen repositories. The sample originated from a list of 400 research data repositories. These findings, as well as suggestions from project partners, led to version 1.0. After its publication in July 2012 the re3data.org project team issued a public request for comments that led to substantial changes in the structure of the schema. Version 2.0 of the schema synthesizes all the responses as well as current developments in the realm of research data repositories. Versions 2.1 and 2.2 introduced minor changes, as well as the re3data.org Registration Policy explaining. The current version 3.0 includes changes of the re3data.org Registration Policy as well as structural adjustments on the schema to better reflect changes within the landscape of research data repositories.

[11] See: http://www.re3data.org/2014/03/datacite-re3data-org-databib-collaboration/

Future developments of the schema will also rely on the feedback of the research data repository community. This open and transparent development process is to ensure a strong basis for a future standard for describing research data repositories that is supported by and rooted in the community. re3data.org appreciates your continuous feedback and invites you to share ideas for future developments of re3data.org.

1.3 re3data.org Registration Policy

The major aim of the registry is to improve the visibility of research data repositories irrespective of its type or disciplinary scope. A research data repository is a subtype of a sustainable information infrastructure which provides long-term storage and access to research data. Research data means information objects generated by scholarly projects for example through experiments, measurements, surveys or interviews.

A research data repository listed in re3data.org is either:

- a data provider primarily offering research data and its metadata (ideally exposing metadata via application programming interfaces),

  or

- a service provider primarily harvesting metadata of research data from data providers as a basis for building value-added services, e.g. a portal.

To be registered in re3data.org a research data repository must comply with the following minimum requirements:

A repository has to

- have focus on research data;
- be operated by a legal entity with an organisational framework that provides sustainability (e.g. library, university);
- clarify access conditions to the repository and research data;
- and provide terms of use.

1.4 Research Data Repository Registration Workflow

Anyone can suggest research data repositories to be listed in re3data.org via an application form providing information such as the name and URL of the RDR.[15] The information is reviewed and enhanced by an editorial board who analyze the website of the

[15] http://www.re3data.org/suggest/

RDR using a handbook that gives practical information on how to obtain the metadata properties of the re3data.org schema. A repository is indexed when the minimum requirements of the re3data.org Registration Policy are met. Before a new record of an RDR is published in re3data.org all gathered information is reviewed by a second editor.

To update a re3data.org entry the operator of a respective RDR can use the web form suggesting additions and/or changes on the entry. After a review by the re3data.org editorial team, the entry will be updated.

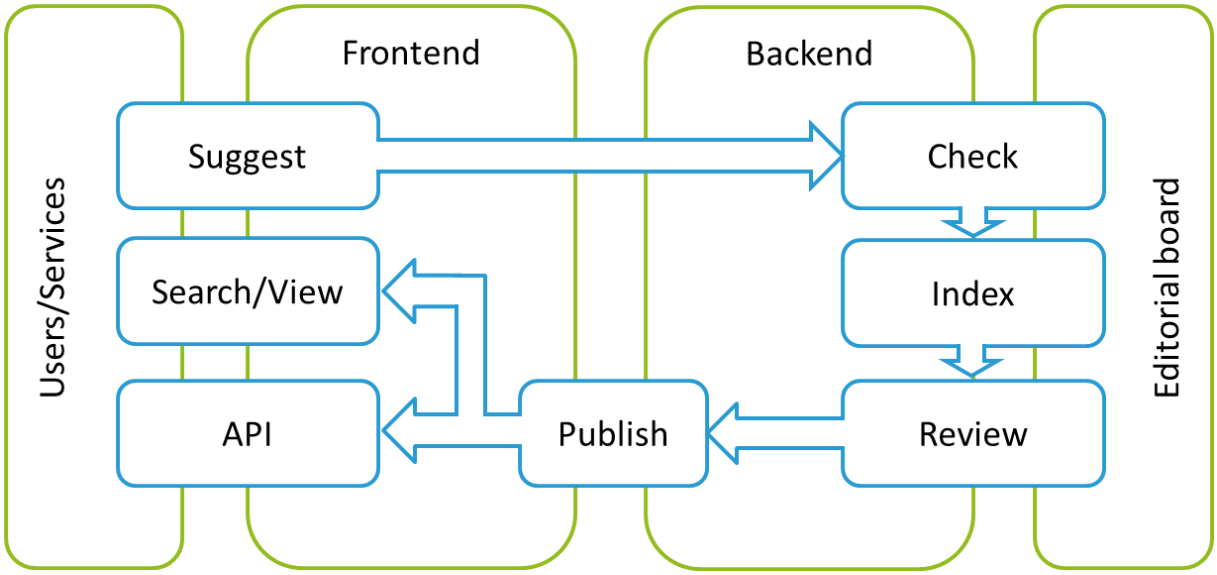

Figure 1: Research Data Repository Registration Workflow of re3data.org

1.5 Version Update

Version	*Date of Publication*	*Summary of Changes to prior Version*
1.0	July 2012	Initial document
2.0	December 2012	Structural changes, including addition of language attributes, addition of definitions of controlled vocabularies, changes in occurrences (See: http://dx.doi.org/10.2312/re3.002)
2.1	December 2013	Addition and deletion of properties, addition of controlled vocabularies, changes in occurrences and definitions, addition of definitions, change of title (See: http://dx.doi.org/10.2312/re3.004)
2.2	December 2014	Addition of properties, addition of controlled vocabularies, changes and additions of definitions (See: http://doi.org/10.2312/re3.006)
3.0	December 2015	Structural changes, including addition and deletion of controlled vocabularies, changes in occurrences and definitions, addition of new properties, change of title (this document)

3 re3data.org Metadata Properties

The table below provides a detailed description of the re3data.org properties that describe a research data repository registered in re3data.org. For an example of how the properties are expressed in XML format, please see the XML example provided (see section 3).

A naming convention has been used for all properties and attributes as follows: properties, attributes and child properties begin with a lowercase letter. If the name of the element consists of more than one word, subsequent words begin with capital letters. The indicator A/C shows whether the property being described is an attribute (A) or a child (C) of the corresponding property that has preceded it.

The attribute *Occurrence (Occ)* explains if a property can have multiple instances, which is indicated by the notation: Occ. 1-n, meaning that a property must occur once (1), and may occur multiple times (n). "Req" indicates that an attribute is required if the corresponding property is applied. The terms of the "Controlled Vocabulary" are regulated by the re3data.org team. The values of the controlled vocabularies are explained and defined in the appendix (4.1). The primary language for all metadata is English. Other language descriptions can be added as additional information.

ID	*re3data.org property*	*Definition*	*A/C*	*Occ*	*Allowed values, examples, other constraints*
1	identifiers	The identifiers provided by re3data.org (wrapper element).		1	-
1.1	re3data	A unique string to identify the RDR metadata entry. The internal identifier is assigned by re3data.org.	C	1	Auto-Value Example: r3d100010134
1.2	doi	The DOI assigned to the re3data.org metadata entry of the RDR to make the metadata entries citable.	C	1	Auto-Value Example: http://doi.org/10.17616/R3XS37
2	repositoryName	The full name of the RDR.		1	The format is open. Example: Access to Archival Databases
2.1	language	The language of the RDR name.	A	Req	Controlled vocabulary Allowed values from: ISO-639-3. Examples: eng, deu, fra
3	additionalName	The alternative name or acronym for the RDR.		0-n	The format is open. Example: AAD

ID	*re3data.org property*	*Definition*	*A/C*	*Occ*	*Allowed values, examples, other constraints*
3.1	language	The language of the RDR additional name.	A	Req	Controlled vocabulary Allowed values from: ISO-639-3. Examples: eng, deu, fra
4	repositoryUrl	The URL of the RDR.		1	URL Example: http://cdiac.esd.ornl.gov/home.html
5	repositoryIdentifier	An identifier provisioned for the website of the RDR (wrapper element).		0-n	-
5.1	repositoryIdentifierType	The type of the provider of the identifier for the RDR (e.g. DOI, URN, VIAF, DataCite).	C	1	Example: DOI
5.2	repositoryIdentifierValue	A globally unique identifier that refers to the RDR.	C	1	Example: http://doi.org/10.1234/foo
6	description	A textual description providing additional information about the RDR (primary language is English).		0-1	The format is open (max. 2.000 characters).
6.1	language	The language of the RDR description.	A	Req	Controlled vocabulary Allowed values from: ISO-639-3. Examples: eng, deu, fra
7	repositoryContact	The email address of the contact or an URL of an online contact form of the RDR.		0-n	The format is open. Example: info@researchdata.com
8	type	The type of the RDR.		1-n	Controlled vocabulary Allowed values: disciplinary governmental institutional multidisciplinary project-related other
9	size	The number of items contained in the RDR.		0-1	The format is open. Example: 5.000 datasets; 30 studies
9.1	updated	The date of the last update of the RDR size.	A	Req	YYYY or YYYY-MM-DD or any other format described in W3C-DTF (ISO-8601)
10	startDate	Releasing date of the RDR.		0-1	YYYY or YYYY-MM-DD or any other format described in W3C-DTF (ISO-8601)

ID	*re3data.org property*	*Definition*	*A/C*	*Occ*	*Allowed values, examples, other constraints*
11	endDate	The RDR ended its service of ingesting new research data and/or providing it (wrapper element).		0-1	-
11.1	closed	The date when the RDR stopped ingesting new research data to its database. The database and its research data are still available.	C	0-1	YYYY or YYYY-MM-DD or any other format described in W3C-DTF (ISO-8601) or empty value with attribute xsi:nil set to "true"
11.2	offline	The date when the RDR went offline. The database and/or the website are no longer available.	C	0-1	YYYY or YYYY-MM-DD or any other format described in W3C-DTF (ISO-8601) or empty value with attribute xsi:nil set to "true"
12	repositoryLanguage	The user interface language of the RDR.		1-n	Controlled vocabulary Allowed values from: ISO-639-3. Examples: eng, deu, fra
13	subject	The disciplinary focus of the RDR (wrapper element).		1-n	
13.1	subjectScheme	The subject scheme according to which the subject of the RDR is described.	A	Req	Controlled vocabulary Allowed values from: DFG Classification of Subject Area
13.2	subjectId	The ID/notation of the subject classification.	C	1	The format is dependent on scheme. Examples: 11 10101
13.3	subjectName	The subject(s) of the RDR.	C	1	The format is dependent on scheme. Examples: Humanities Prehistory
14	missionStatementUrl	The URL of a mission statement describing the designated community of the RDR.		0-1	URL Example: http://cdiac.ornl.gov/aboutcdiac.html
15	contentType	All types of resources available in the RDR.		0-n	The format is dependent on scheme. Examples: Raw data, Images
15.1	contentTypeScheme	The name and/or URL of the subject scheme or classification code.	A	Req	Controlled vocabulary Allowed values from: PARSE.Insight survey

ID	*re3data.org property*	*Definition*	*A/C*	*Occ*	*Allowed values, examples, other constraints*
16	providerType	The type of provider.		1-2	Controlled vocabulary Allowed values: dataProvider serviceProvider
17	keyword	English keyword(s) describing the subject focus of the RDR.		0-n	Examples: computer science
18	institution	All institutions being responsible for funding, creating and/or running the RDR (wrapper element).		1-n	-
18.1	institutionName	The name of the responsible institution.	C	1	Example: National Institute of General Medical Sciences, U.S. National Institutes of Health
18.1.1	language	The language of the institution name.	A	Req	Controlled vocabulary Allowed values from: ISO-639-3. Examples: eng, deu, fra
18.2	institutionAdditionalName	The alternative name or acronym for the responsible institution.	C	0-n	Example: NIGMS
18.2.1	language	The language of the institution additional name.	A	Req	Controlled vocabulary Allowed values from: ISO-639-3. Examples: eng, deu, fra
18.3	institutionCountry	The location of the responsible institution.	C	1	Controlled vocabulary Allowed Values from: ISO-3166-1 alpha-3. Examples: DEU, GBR, USA
18.4	responsibilityType	The type of responsibility for each responsible institution.	C	0-n	Controlled vocabulary Allowed values: funding general main sponsoring technical
18.5	institutionType	The type of responsible institution.	C	0-1	Controlled vocabulary Allowed values: commercial non-profit
18.6	institutionUrl	The URL of the responsible institution.	C	0-1	Example: http://www.nigms.nih.gov/
18.7	institutionIdentifier	The identifier for the responsible institution (wrapper element).	C	0-n	-

ID	*re3data.org property*	*Definition*	*A/C*	*Occ*	*Allowed values, examples, other constraints*
18.7.1	institutionIdentifierType	The provider name of the identifier for the responsible institution (e.g. ISNI, VIAF, FundRef, DataCite).	C	1	Example: ISNI
18.7.2	institutionIdentifierValue	A globally unique identifier that refers to the institution.	C	1	Example: http://isni.org/isni/0000000100755874
18.8	responsibilityStartDate	The start date of the period of responsibility.	C	0-1	YYYY or YYYY-MM-DD or any other format described in W3C-DTF (ISO-8601)
18.9	responsibilityEndDate	The end date of the period of responsibility.	C	0-1	YYYY or YYYY-MM-DD or any other format described in W3C-DTF (ISO-8601)
18.10	institutionContact	The email address of the contact or an URL of an online contact form of the institution.	C	0-n	The format is open. Example: john.doe@researchdata.com
19	policy	Policies providing information concerning the usage of the RDR (wrapper element).		0-n	-
19.1	policyType	The type of the policy.	C	1-n	Controlled vocabulary Allowed values from: Access policy Collection policy Data policy Metadata policy Preservation policy Submission policy Terms of use Usage policy Quality policy
19.2	policyName	The name of the policy.	C	1	The format is open. Example: Data policy of the information system PANGAEA
19.3	policyUrl	The URL of the policy.	C	1	Example: http://www.pangaea.de/curator/files/pangaea-data-policy.pdf
20	databaseAccess	The access regulation to the RDR (wrapper element).		1	-
20.1	databaseAccessType	The type of access to the RDR.	C	1	Controlled vocabulary Allowed values: open embargoed restricted closed

ID	*re3data.org property*	*Definition*	*A/C*	*Occ*	*Allowed values, examples, other constraints*
20.2	databaseAccessRestriction	All existing access restrictions to the RDR (required if restricted is chosen).	C	0-n	Controlled vocabulary Allowed values: feeRequired registration other
21	databaseLicense	The database license of the RDR (wrapper element).		0-n	-
21.1	databaseLicenseName	The name of the database license.	C	1	Example: Creative Commons Attribution 4.0 International
21.2	databaseLicenseUrl	The database license URL.	C	1	Example: http://creativecommons.org/licenses/by/4.0/
22	dataAccess	The access regulation to the research data provided by the RDR (wrapper element).		1-n	-
22.1	dataAccessType	The type of access to research data.	C	1	Controlled vocabulary Allowed values: open restricted closed
22.2	dataAccessRestriction	All existing access restrictions to the research data (required if restricted is chosen).	C	0-n	Controlled vocabulary Allowed values: feeRequired institutional membership registration other
23	dataLicense	The license of the research data, existing in the RDR (wrapper element).		1-n	-
23.1	dataLicenseName	The name of the data license.	C	1	Example: Creative Commons Attribution 4.0 International
23.2	dataLicenseUrl	The data license URL.	C	1	Example: http://creativecommons.org/licenses/by/4.0/
24	dataUpload	The regulation for submitting research data to the RDR (wrapper element).		1-n	-
24.1	dataUploadType	The type of the data upload.	C	1	Controlled vocabulary Allowed values: open restricted closed

ID	*re3data.org property*	*Definition*	*A/C*	*Occ*	*Allowed values, examples, other constraints*
24.2	dataUploadRestriction	All existing restrictions to the data upload (required if restricted is chosen).	C	0-n	Controlled vocabulary Allowed values: feeRequired institutional membership registration other
25	dataUploadLicense	The license for data upload (wrapper element).		0-n	-
25.1	dataUploadLicenseName	The name of the data upload license.	C	1	Example: RAD Submission of Array Data
25.2	dataUploadLicenseUrl	The data upload license URL.	C	1	URL Example: http://cbil.upenn.edu/RAD/php/RAD-data_sub.php
26	software	The name of the software that is used to run the RDR.		0-n	Example: DSpace
27	versioning	The RDR supports versioning of research data.		1	Controlled vocabulary Allowed values: yes no unknown
28	api	The API supported by the RDR (wrapper element).		0-n	-
28.1	apiType	The type of the API.	C	1	Example: OAI-PMH
28.2	apiUrl	The URL of the API.	C	1	Example: http://www.datadryad.org/oai/
28.3	apiDocumentation	A link referring to the API documentation, a website that states its availability and other information for using the API.	C	1	Example: http://wiki.datadryad.org/Data_Access#OAI-PMH
29	pidSystem	The persistent identifier system that is used by the RDR.		0-n	Example: DOI
30	citationReference	The RDR is covered by SCOPUS or the Data Citation Index.		0-n	Controlled vocabulary Allowed values: Data Citation Index SCOPUS
31	metrics	Any service, tool, etc. that is used by the RDR to track, measure and visualize the usage of provided research data.		0-n	Example: Altmetric; usage statistics

ID	*re3data.org property*	*Definition*	*A/C*	*Occ*	*Allowed values, examples, other constraints*
32	citationGuidelineUrl	The URL of the RDR providing information on how to cite its research data. The DataCite citation format is recommended (http://www.datacite.org/whycitedata).		0-1	Example: http://wiki.pangaea.de/wiki/Citation
33	aidSystem	The author identifier system that is used by the RDR.		0-n	Example: ORCID
34	enhancedPublication	The RDR offers the interlinking between publications and data.		1	Controlled vocabulary Allowed values: yes no unknown
35	qualityManagement	Any form of quality management concerning the research data or metadata of the RDR.		1	Controlled vocabulary Allowed values: yes no unknown
36	certificate	The certificate, seal or standard the RDR complies with.		0-n	Example: Data Seal of Approval (DSA), ISO 16919
37	metadataStandard	The metadata standard the RDR complies with (wrapper element).		0-n	-
37.1	metadataStandardName	The name of the metadata standard.	C	1	Example: Data Documentation Initiative (DDI)
37.2	metadataStandardUrl	The URL of the metadata standard.	C	1	URL Example: http://www.ddialliance.org/Specification/
38	syndication	The alerting service the RDR offers (wrapper element).		0-n	-
38.1	syndicationType	The type of the alerting service.	C	1	Example: RSS
38.2	syndicationUrl	URL of the alerting service(s) provided by the RDR.	C	1	Example: http://datacentrum.3tu.nl/en/information/rss/
39	remarks	Additional remarks		0-1	The format is open.
40	entryDate	The date the RDR was indexed in re3data.org.		1	YYYY-MM-DD (ISO-8601)
41	lastUpdate	The date the metadata of the RDR was updated.		1	YYYY-MM-DD (ISO-8601)

4 XML Example

This is an XML example (of a fictional research data repository) illustrating how the re3data.org schema can be used to describe research data repositories.

```
<?xml version="1.0" encoding="utf-8"?>
<!--re3data.org Metadata Schema for the Description of Research Data Repositories. Version 3.0, December 2015. doi:10.2312/re3.008-->
<r3d:re3data xmlns:r3d="http://www.re3data.org/schema/3-0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.re3data.org/schema/3-0 http://schema.re3data.org/3-0/re3dataV3-0.xsd">
  <r3d:repository>
    <r3d:identifiers>
       <r3d:re3data>r3d100000001</r3d:re3data>
       <r3d:doi>http://doi.org/10.17616/R34S33</r3d:doi>
    </r3d:identifiers>
    <r3d:repositoryName language="eng">Global Research Data Repository</r3d:repositoryName>
    <r3d:additionalName language="eng">GReDaR</r3d:additionalName> <!-- optional --> <!-- multiple -->
    <r3d:additionalName language="deu">Globales Forschungsdatenrepositorium</r3d:additionalName> <!-- optional --> <!-- multiple -->
    <r3d:repositoryUrl>http://www.globalresearchdatarepository.org</r3d:repositoryUrl>
    <r3d:repositoryIdentifier> <!-- optional --> <!-- multiple -->
       <r3d:repositoryIdentifierType>DOI</r3d:repositoryIdentifierType>
       <r3d:repositoryIdentifierValue>http://doi.org/0123456789/gredar</r3d:repositoryIdentifierValue>
    </r3d:repositoryIdentifier>
    <r3d:description language="eng">The Global Research Data Repository (GReDaR) is the place where researchers from all academic disciplines can
put their research data. Research data deposited in GReDaR</r3d:description> <!-- optional -->
    <r3d:repositoryContact>info@greadar.org</r3d:repositoryContact> <!-- optional --> <!-- multiple -->
    <r3d:type>disciplinary</r3d:type> <!-- multiple -->
    <r3d:size updated="2012-11-23">10.000 datasets; 323 studies</r3d:size> <!-- optional -->
    <r3d:startDate>2011-01-01</r3d:startDate> <!-- optional -->
    <r3d:endDate> <!-- optional -->
       <r3d:closed>2013-07-31</r3d:closed> <!-- optional -->
       <r3d:offline>2014-11-26</r3d:offline> <!-- optional -->
    </r3d:endDate>
    <r3d:repositoryLanguage>eng</r3d:repositoryLanguage> <!-- multiple -->
    <r3d:repositoryLanguage>deu</r3d:repositoryLanguage> <!-- multiple -->
    <r3d:repositoryLanguage>fra</r3d:repositoryLanguage> <!-- multiple -->
    <r3d:subject subjectScheme="DFG"> <!-- multiple -->
       <r3d:subjectId>31302</r3d:subjectId>
       <r3d:subjectName>Oceanography</r3d:subjectName>
    </r3d:subject>
    <r3d:subject subjectScheme="DFG"> <!-- multiple -->
       <r3d:subjectId>111</r3d:subjectId>
       <r3d:subjectName>Social Sciences</r3d:subjectName>
    </r3d:subject>
```

```
    <r3d:subject subjectScheme="DFG"> <!-- multiple -->
       <r3d:subjectId>20103</r3d:subjectId>
       <r3d:subjectName>Cell Biology</r3d:subjectName>
    </r3d:subject>
    <r3d:missionStatementUrl>http://www.globalresearchdatarepository.org/mission_statement</r3d:missionStatementUrl> <!-- optional -->
    <r3d:contentType contentTypeScheme="parse">Structured text</r3d:contentType> <!-- optional --> <!-- multiple -->
    <r3d:contentType contentTypeScheme="parse">Images</r3d:contentType> <!-- optional --> <!-- multiple -->
    <r3d:providerType>dataProvider</r3d:providerType> <!-- multiple -->
    <r3d:keyword>Earth Science</r3d:keyword> <!-- optional --> <!-- multiple -->
    <r3d:keyword>Measure Data</r3d:keyword> <!-- optional --> <!-- multiple -->
    <r3d:keyword>Social Science</r3d:keyword> <!-- optional --> <!-- multiple -->
    <r3d:keyword>Maps</r3d:keyword> <!-- optional --> <!-- multiple -->
    <r3d:institution> <!-- multiple -->
      <r3d:institutionName language="eng">Institute for Research Data</r3d:institutionName>
      <r3d:institutionAdditionalName language="eng">IRD</r3d:institutionAdditionalName> <!-- optional --> <!-- multiple -->
      <r3d:institutionAdditionalName language="deu">Institut für Forschungsdaten</r3d:institutionAdditionalName> <!-- optional --><!-- multiple -->
      <r3d:institutionCountry>DEU</r3d:institutionCountry>
      <r3d:responsibilityType>general</r3d:responsibilityType> <!-- optional --> <!-- multiple -->
      <r3d:responsibilityType>technical</r3d:responsibilityType> <!-- optional --> <!-- multiple -->
      <r3d:institutionType>non-profit</r3d:institutionType> <!-- optional -->
      <r3d:institutionUrl>http://www.ird.org</r3d:institutionUrl> <!-- optional -->
      <r3d:institutionIdentifier> <!-- optional --> <!-- multiple -->
        <r3d:institutionIdentifierType>URN</r3d:institutionIdentifierType>
        <r3d:institutionIdentifierValue>urn:47110815/ird</r3d:institutionIdentifierValue>
      </r3d:institutionIdentifier>
      <r3d:responsibilityStartDate>2011-01-01</r3d:responsibilityStartDate> <!-- optional -->
      <r3d:responsibilityEndDate>2014-07-31</r3d:responsibilityEndDate> <!-- optional -->
      <r3d:institutionContact>John Doe, Institut für Forschungsdaten, Unter den Linden 6, 10099 Berlin, Germany</r3d:institutionContact>
<!-- optional --> <!-- multiple -->
      <r3d:institutionContact>johndoe@globalresearchdatarepository.org</r3d:institutionContact> <!-- optional --> <!-- multiple -->
      <r3d:institutionContact>http://www.globalresearchdatarepository.org/contactform/</r3d:institutionContact> <!-- optional --> <!-- multiple -->
    </r3d:institution>
    <r3d:policy> <!-- optional --> <!-- multiple -->
      <r3d:policyType>Data policy</r3d:policyType> <!-- multiple -->
      <r3d:policyName>Data Management Policy</r3d:policyName>
      <r3d:policyUrl>http://www.globalresearchdatarepository.org/policy.html</r3d:policyUrl>
    </r3d:policy>
    <r3d:databaseAccess>
      <r3d:databaseAccessType>restricted</r3d:databaseAccessType>
      <r3d:databaseAccessRestriction>registration</r3d:databaseAccessRestriction> <!-- optional --> <!-- multiple -->
    </r3d:databaseAccess>
    <r3d:databaseLicense> <!-- optional --> <!-- multiple -->
      <r3d:databaseLicenseName>CC0</r3d:databaseLicenseName>
      <r3d:databaseLicenseUrl>http://creativecommons.org/publicdomain/zero/1.0/</r3d:databaseLicenseUrl>
```

```
    </r3d:databaseLicense>
    <r3d:databaseLicense> <!-- optional --> <!-- multiple -->
      <r3d:databaseLicenseName>other</r3d:databaseLicenseName>
      <r3d:databaseLicenseUrl>http://example.org/dataLicense</r3d:databaseLicenseUrl>
    </r3d:databaseLicense>
    <r3d:dataAccess> <!-- multiple -->
      <r3d:dataAccessType>embargoed</r3d:dataAccessType>
    </r3d:dataAccess>
    <r3d:dataAccess> <!-- multiple -->
      <r3d:dataAccessType>restricted</r3d:dataAccessType>
      <r3d:dataAccessRestriction>registration</r3d:dataAccessRestriction> <!-- optional --> <!-- multiple -->
    </r3d:dataAccess>
    <r3d:dataAccess> <!-- multiple -->
      <r3d:dataAccessType>closed</r3d:dataAccessType>
    </r3d:dataAccess>
    <r3d:dataLicense> <!-- multiple -->
      <r3d:dataLicenseName>Creative Commons Attribution 4.0 International</r3d:dataLicenseName>
      <r3d:dataLicenseUrl>http://creativecommons.org/licenses/by/4.0/</r3d:dataLicenseUrl>
    </r3d:dataLicense>
    <r3d:dataLicense> <!-- multiple -->
      <r3d:dataLicenseName>Copyrights</r3d:dataLicenseName>
      <r3d:dataLicenseUrl>http://www.globalresearchdatarepository.org/copyrights/dataset1234</r3d:dataLicenseUrl>
    </r3d:dataLicense>
    <r3d:dataUpload> <!-- multiple -->
      <r3d:dataUploadType>restricted</r3d:dataUploadType>
      <r3d:dataUploadRestriction>registration</r3d:dataUploadRestriction> <!-- optional --> <!-- multiple -->
    </r3d:dataUpload>
    <r3d:dataUploadLicense> <!-- optional --> <!-- multiple -->
      <r3d:dataUploadLicenseName>GReDaR Data Deposit License</r3d:dataUploadLicenseName>
      <r3d:dataUploadLicenseUrl>http://www.globalresearchdatarepository.org/deposit_license/</r3d:dataUploadLicenseUrl>
    </r3d:dataUploadLicense>
    <r3d:software>EPrints</r3d:software> <!-- optional --> <!-- multiple -->
    <r3d:versioning>yes</r3d:versioning>
    <r3d:api> <!-- optional --> <!-- multiple -->
      <r3d:apiType>OAI-PMH</r3d:apiType>
      <r3d:apiUrl>http://globalresearchdatarepository.org/oai</r3d:apiUrl>
      <r3d:apiDocumentation>http://www.globalresearchdatarepository.org/oai/documentation</r3d:apiDocumentation>
    </r3d:api>
    <r3d:api> <!-- optional --> <!-- multiple -->
      <r3d:apiType>REST</r3d:apiType>
      <r3d:apiUrl>http://www.globalresearchdatarepository.org/rest</r3d:apiUrl>
      <r3d:apiDocumentation>http://www.globalresearchdatarepository.org/rest/documentation</r3d:apiDocumentation>
    </r3d:api>
    <r3d:pidSystem>DOI</r3d:pidSystem> <!-- optional --> <!-- multiple -->
```

```
    <r3d:citationReference>SCOPUS</r3d:citationReference> <!-- optional --> <!-- multiple -->
    <r3d:metrics>Altmetric</r3d:metrics> <!-- optional --> <!-- multiple -->
    <r3d:citationGuidelineUrl>http://www.globalresearchdatarepository.org/how-to-cite.html</r3d:citationGuidelineUrl> <!--optional-->
    <r3d:aidSystem>ORCID</r3d:aidSystem> <!-- multiple --> <!-- optional -->
    <r3d:enhancedPublication>yes</r3d:enhancedPublication>
    <r3d:qualityManagement>yes</r3d:qualityManagement>
    <r3d:certificate>Data Seal of Approval (DSA)</r3d:certificate> <!-- optional --> <!-- multiple -->
    <r3d:certificate>ISO 16919</r3d:certificate> <!-- optional --> <!-- multiple -->
    <r3d:metadataStandard> <!-- optional --> <!-- multiple -->
      <r3d:metadataStandardName>DataCite Metadata Schema</r3d:metadataStandardName>
      <r3d:metadataStandardUrl>http://www.dcc.ac.uk/resources/metadata-standards/datacite-metadata-schema</r3d:metadataStandardUrl>
    </r3d:metadataStandard>
    <r3d:syndication> <!-- optional --><!-- multiple-->
      <r3d:syndicationType>RSS</r3d:syndicationType>
      <r3d:syndicationUrl>http://www.globalresearchdatarepository.org/news.rss</r3d:syndicationUrl>
    </r3d:syndication>
    <r3d:remarks>This is additional information on the research data repository visible to all users.</r3d:remarks> <!-- optional -->
    <r3d:entryDate>2012-11-15</r3d:entryDate>
    <r3d:lastUpdate>2012-12-21</r3d:lastUpdate>
  </r3d:repository>
</re3data>
```

5 Appendix

5.1 Attribute Values and Controlled Vocabularies

The following tables describe and define the allowed attribute values as well as the controlled vocabularies of the re3data.org metadata properties (see section 2).

2.1; 3.1; 6.1; 18.1.1; 18.2.1 language; 12 repositoryLanguage

Value	*Definition*
Examples: eng, deu, fra	ISO-639-3; http://www.iso.org/iso/catalogue_detail?csnumber=39534

8 type

Value	*Definition*
disciplinary	Disciplinary repository (Subject repository): "This is a collection of research outputs with a common link to a particular subject discipline. Subject repositories are likely to cover one broad-based discipline, with contributors from many different institutions supported by a variety of funders; the repositories themselves are likely to be funded from one or more sources within the subject community. Although for some subject repositories the funding may be fragile, if they are of enough importance to the community then funding crises are usually weathered."[16]
governmental	Governmental Repository: This is a collection of outputs from projects and programmes related to governmental institutions. The repository is primarily supported by a federal agency. These repositories are likely closed for external contributions.
multidisciplinary	Multidisciplinary Repository: This is a collection of research outputs serving multidisciplinary needs. These repositories cover several research disciplines. Contributors from many different institutions and communities are likely accepted.

[16] Jones, C et al. "Report of the Subject and Institutional Repositories Interactions Study." (2008): pag. 5. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.140.7316&rep=rep1&type=pdf retrieved 28 Aug. 2013.

Value	*Definition*
institutional	Institutional Repository: "This is a collection of research outputs with a common link to a particular institution, usually by authorship. These repositories are likely to cover more than one research discipline, to have funders in many if not all the Research Councils and support communities who have different approaches to research dissemination. Whether deposit of content is mandatory is a decision that will be made by each institution. The institutions may have many requirements for the content of the repository, from open access dissemination, through metrics, marketing to strategic planning. It is likely that many of these processes in the past were undertaken through collection of bibliographic information."[17]
project-related	Project-related Repository: This is a collection of research outputs with a specific focus on the research data resulting from particular research projects. All contributions must be linked to the particular project, mission, etc.
other	Other (Repository Type): A research data repository that is not one of the listed repository types, e.g. a funder repository.

9.1 updated; 10 startDate; 11.1 closed; 11.2 offline; 18.8 responsibilityStartDate; 18.9 responsibilityEndDate; 38 entryDate; 39 lastUpdate

Value	*Definition*
YYYY or YYYY-MM-DD	ISO-8601; http://www.w3.org/TR/NOTE-datetime

13.1 subjectScheme

Value	*Definition*
DFG	DFG Classification of Subject Area, Review Board, Research Area and Scientific Discipline (using Level 1-4). http://www.dfg.de/en/dfg_profile/statutory_bodies/review_boards/subject_areas/index.jsp (retrieved 23 Nov. 2015)

15 contentType

PARSE.Insight type	*Examples of File Formats*
Standard office documents	text documents, spreadsheets, presentations
Networkbased data	websites, email, chat history, etc.
Databases	DBASE, MS Access, Oracle, MySQL, etc.
Images	JPEG, JPEG2000, GIF, TIF, PNG, SVG, etc.
Structured graphics	CAD, CAM, 3D, VRML, etc.
Audiovisual data	WAVE, MP3, MP4, Flash, etc.
Scientific and statistical data formats	SPSS, FITS, GIS, etc.
Raw data	device specific output

[17] Jones, C et al. "Report of the Subject and Institutional Repositories Interactions Study." (2008): pag. 5

PARSE.Insight type	*Examples of File Formats*
Plain text	TXT in various encodings
Structured text	XML, SGML, etc.
Archived data	ZIP, RAR, JAR, etc.
Software applications	modelling tools, editors, IDE, compilers, etc.
Source code	scripting, Java, C, C++, Fortran, etc.
Configuration data	parameter settings, logs, library files
Other	-

15.1 contentTypeScheme

Value	*Definition*
parse	For the values of parse see the PARSE.Insight types in contentType 14. For the source see page 5 in http://www.parse-insight.eu/downloads/PARSE-insight_survey_questions_research.pdf

16 providerType

Value	*Definition*
dataProvider	A research data repository is a data provider if it offers research data and its metadata (ideally exposing metadata via interfaces).
serviceProvider	A research data repository is a service provider if it harvests the metadata of research data from data providers as a basis for building value-added services.

18.3 institutionCountry

Value	*Definition*
Examples: DEU, GBR, USA	ISO-3166-1 Alpha-3 code; http://en.wikipedia.org/wiki/ISO_3166-1#Current_codes
AAA	international institutions
EEC	European Union

18.4 responsibilityType

Value	*Definition*
funding	Funding responsibility refers to the institution that funds / funded the setup or running of the research data repository.
general	General responsibility refers to the institution that is generally responsible for providing services and content of the research data repository.
main	Main responsibility refers to the leading institution operating and maintaining the research data repository.
sponsoring	Sponsoring responsibility (in contrast to funding responsibility) refers to financial support of a research data repository in return for e.g. advertising on the website.
technical	General responsibility refers to the institution that is responsible for the technical matters of the research data repository, e.g. hosting.

18.5 institutionType

Value	*Definition*
commercial	A commercial institution is an institution that distributes surplus revenues as profit or dividends.
non-profit	The institution does not aim at economic profits but at non-profit (e.g. social, cultural and academic) goals of its members.

19.1 policyType

Value	*Definition*
Access policy	This policy describes access regulations for the collection.
Collection policy	This policy provides a comprehensive framework for the collection of research output. It describes the scope of the collection as well as the content's type and origin.
Data policy	This policy provides a comprehensive framework for the management of the collection. General principles, aims and responsibilities must be clarified. Several aspects are likely described such as access, usage or submission regulations as well as the collection's scope.
Metadata policy	This policy describes access and usage regulations for the provided metadata.
Preservation policy	This policy provides a comprehensive framework for the long term preservation of the collection. Principles, aims and responsibilities must be clarified. An important aspect is the description of preservation concepts to ensure the technical and conceptual utility of the content.
Submission policy	This policy provides a comprehensive framework for the contribution of research data. Criteria for submitting content to the repository as well as data preparation guidelines can be stated. Concepts for the quality assurance may be provide.
Terms of use	This policy describes the terms and conditions under which services of the repository and the collection can be accessed and used.
Usage policy	This policy describes access and/or usage regulations for the collection.
Quality policy	This policy provides a comprehensive framework for the quality management of the repository. Concepts and responsibilities are described to assure the quality of the collection.

20.1 databaseAccessType (see chapter 4.2)

Value	*Definition*
open	There are no access barriers.
restricted	External users can overcome access barriers.
closed	External users cannot overcome access barriers.

20.2 databaseRestriction

Value	*Definition*
feeRequired	A single or regular payment is required.
registration	A free registration is required.
other	Other restrictions beside registration or payment such as a written consent are required.

22.1 dataAccessType (see chapter 4.2)

Value	*Definition*
open	There are no access barriers.
embargoed	External users cannot overcome access barriers until the data is released for open access.
restricted	External users can overcome access barriers.
closed	External users cannot overcome access barriers.

22.2 dataAccessRestriction

Value	*Definition*
feeRequired	A single or regular payment is required.
institutional membership	Only people associated to a member institution can access the data.
registration	A free registration is required.
other	Other restrictions beside registration or payment such as a written consent are required.

24.1 dataUploadType (see chapter 4.2)

Value	*Definition*
open	There are no access barriers.
restricted	External users can overcome access barriers.
closed	External users cannot overcome access barriers.

24.2 dataUploadRestriction

Value	*Definition*
feeRequired	A single or regular payment is required.
institutional membership	Only people associated to a member institution can access the data.
registration	A free registration is required.
other	Other restrictions beside registration or payment such as a written consent are required.

30 citationReference

Value	*Definition*
Data Citation Index	The research data repository is covered by the Data Citation Index.
SCOPUS	The research data repository is covered by SCOPUS.

5.3 DFG Classification

1 Humanities and Social Sciences
- 11 Humanities
  - 101 Ancient Cultures
    - 10101 Prehistory
    - 10102 Classical Philology
    - 10103 Ancient History
    - 10104 Classical Archaeology
    - 10105 Egyptology and Ancient Near Eastern Studies
  - 102 History
    - 10201 Medieval History
    - 10202 Early Modern History
    - 10203 Modern and Current History
    - 10204 History of Science
  - 103 Fine Arts, Music, Theatre and Media Studies
    - 10301 Art History
    - 10302 Musicology
    - 10303 Theatre and Media Studies
  - 104 Linguistics
    - 10401 General and Applied Linguistics
    - 10402 Individual Linguistics
    - 10403 Typology, Non-European Languages, Historical Linguistics
  - 105 Literary Studies
    - 10501 Medieval German Literature
    - 10502 Modern German Literature
    - 10503 European and American Literature
    - 10504 General and Comparative Literature and Cultural Studies
  - 106 Non-European Languages and Cultures, Social and Cultural Anthropology, Jewish Studies and Religious Studies
    - 10601 Social and Cultural Anthropology and Ethnology/Folklore
    - 10602 Asian Studies
    - 10603 African, American and Oceania Studies
    - 10604 Islamic Studies, Arabian Studies, Semitic Studies
    - 10605 Religious Studies and Jewish Studies
  - 107 Theology
    - 10701 Protestant Theology
    - 10702 Roman Catholic Theology
  - 108 Philosophy
    - 10801 History of Philosophy
    - 10802 Theoretical Philosophy
    - 10803 Practical Philosophy
- 12 Social and Behavioural Sciences
  - 109 Education Sciences
    - 10901 General Education and Historiy of Education
    - 10902 Research on Teaching, Learning and Training
    - 10903 Research on Socialization and Educational Institutions and Professions
  - 110 Psychology
    - 11001 General, Biological and Mathematical Psychology
    - 11002 Developmental and Educational Psychology
    - 11003 Social Psychology, Industrial and Organisational Psychology
    - 11004 Differential Psychology, Clinical Psychology, Medical Psychology, Methodology
  - 111 Social Sciences
    - 11101 Sociological Theory

- 11102 Empirical Social Research
- 11103 Communication Science
- 11104 Political Science
- 112 Economics
  - 11201 Economic Theory
  - 11202 Economic and Social Policy
  - 11203 Public Finance
  - 11204 Business Administration
  - 11205 Statistics and Econometrics
  - 11206 Economic and Social History
- 113 Jurisprudence
  - 11301 Legal and Political Philosophy, Legal History, Legal Theory
  - 11302 Private Law
  - 11303 Public Law
  - 11304 Criminal Law and Law of Criminal Procedure
  - 11305 Criminology

2 Life Sciences
- 21 Biology
  - 201 Basic Biological and Medical Research
    - 20101 Biochemistry
    - 20102 Biophysics
    - 20103 Cell Biology
    - 20104 Structural Biology
    - 20105 General Genetics
    - 20106 Developmental Biology
    - 20107 Bioinformatics and Theoretical Biology
    - 20108 Anatomy
  - 202 Plant Sciences
    - 20201 Plant Systematics and Evolution
    - 20202 Plant Ecology and Ecosystem Analysis
    - 20203 Inter-organismic Interactions of Plants
    - 20204 Plant Physiology
    - 20205 Plant Biochemistry and Biophysics
    - 20206 Plant Cell and Developmental Biology
    - 20207 Plant Genetics
  - 203 Zoology
    - 20301 Systematics and Morphology
    - 20302 Evolution, Anthropology
    - 20303 Animal Ecology, Biodiversity and Ecosystem Research
    - 20304 Sensory and Behavioural Biology
    - 20305 Biochemistry and Animal Physiology
    - 20306 Animal Genetics, Cell and Developmental Biology
- 22 Medicine
  - 204 Microbiology, Virology and Immunology
    - 20401 Metabolism, Biochemistry and Genetics of Microorganisms
    - 20402 Microbial Ecology and Applied Microbiology
    - 20403 Medical Microbiology, Molecular Infection Biology
    - 20404 Virology
    - 20405 Immunology
  - 205 Medicine
    - 20501 Epidemiology, Medical Biometry, Medical Informatics
    - 20502 Public Health, Health Services Research, Social Medicine

20503 Human Genetics
20504 Physiology
20505 Nutritional Sciences
20506 Pathology and Forensic Medicine
20507 Clinical Chemistry and Pathobiochemistry
20508 Pharmacy
20509 Pharmacology
20510 Toxicology and Occupational Medicine
20511 Anaesthesiology
20512 Cardiology, Angiology
20513 Pneumology, Clinical Infectiology Intensive Care Medicine
20514 Hematology, Oncology, Transfusion Medicine
20515 Gastroenterology, Metabolism
20516 Nephrology
20517 Endocrinology, Diabetology
20518 Rheumatology, Clinical Immunology, Allergology
20519 Dermatology
20520 Pediatric and Adolescent Medicine
20521 Gynaecology and Obstetrics
20522 Reproductive Medicine/Biology
20523 Urology
20524 Gerontology and Geriatric Medicine
20525 Vascular and Visceral Surgery
20526 Cardiothoracic Surgery
20527 Traumatology and Orthopaedics
20528 Dentistry, Oral Surgery
20529 Otolaryngology
20530 Radiology and Nuclear Medicine
20531 Radiation Oncology and Radiobiology
20532 Biomedical Technology and Medical Physics
206 Neurosciences
20601 Molecular Neuroscience and Neurogenetics
20602 Cellular Neuroscience
20603 Developmental Neurobiology
20604 Systemic Neuroscience, Computational Neuroscience, Behaviour
20605 Comparative Neurobiology
20606 Cognitive Neuroscience and Neuroimaging
20607 Molecular Neurology
20608 Clinical Neurosciences I - Neurology, Neurosurgery
20609 Biological Psychiatry
20610 Clinical Neurosciences II - Psychotherapy, Psychosomatic Medicine
20611 Clinical Neurosciences III - Ophthalmology
23 Agriculture, Forestry, Horticulture and Veterinary Medicine
207 Agriculture, Forestry, Horticulture and Veterinary Medicine
20701 Soil Sciences
20702 Plant Cultivation
20703 Plant Nutrition
20704 Ecology of Agricultural Landscapes
20705 Plant Breeding
20706 Phytomedicine
20707 Agricultural and Food Process Engineering
20708 Agricultural Economics and Sociology
20709 Inventory Control and Use of Forest Resources

- 20710 Basic Forest Research
- 20711 Animal Husbandry, Breeding and Hygiene
- 20712 Animal Nutrition and Nutrition Physiology
- 20713 Basic Veterinary Medical Science
- 20714 Basic Research on Pathogenesis, Diagnostics and Therapy and Clinical Veterinary Medicine

3 Natural Sciences
- 31 Chemistry
  - 301 Molecular Chemistry
    - 30101 Inorganic Molecular Chemistry
    - 30102 Organic Molecular Chemistry
  - 302 Chemical Solid State and Surface Research
    - 30201 Solid State and Surface Chemistry, Material Synthesis
    - 30202 Physical Chemistry of Solids and Surfaces, Material Characterisation
    - 30203 Theory and Modelling
  - 303 Physical and Theoretical Chemistry
    - 30301 Physical Chemistry of Molecules, Interfaces and Liquids - Spectroscopy, Kinetics
    - 30302 General Theoretical Chemistry
  - 304 Analytical Chemistry, Method Development (Chemistry)
    - 30401 Analytical Chemistry, Method Development (Chemistry)
  - 305 Biological Chemistry and Food Chemistry
    - 30501 Biological and Biomimetic Chemistry
    - 30502 Food Chemistry
  - 306 Polymer Research
    - 30601 Preparatory and Physical Chemistry of Polymers
    - 30602 Experimental and Theoretical Physics of Polymers
    - 30603 Polymer Materials
- 32 Physics
  - 307 Condensed Matter Physics
    - 30701 Experimental Condensed Matter Physics
    - 30702 Theoretical Condensed Matter Physics
  - 308 Optics, Quantum Optics and Physics of Atoms, Molecules and Plasmas
    - 30801 Optics, Quantum Optics, Atoms, Molecules, Plasmas
  - 309 Particles, Nuclei and Fields
    - 30901 Particles, Nuclei and Fields
  - 310 Statistical Physics, Soft Matter, Biological Physics, Nonlinear Dynamics
    - 31001 Statistical Physics, Soft Matter, Biological Physics, Nonlinear Dynamics
  - 311 Astrophysics and Astronomy
    - 31101 Astrophysics and Astronomy
- 33 Mathematics
  - 312 Mathematics
    - 31201 Mathematics
- 34 Geosciences (including Geography)
  - 313 Atmospheric Science and Oceanography
    - 31301 Atmospheric Science
    - 31302 Oceanography
  - 314 Geology and Palaeontology
    - 31401 Geology and Palaeontology
  - 315 Geophysics and Geodesy
    - 31501 Geophysics
    - 31502 Geodesy, Photogrammetry, Remote Sensing, Geoinformatics, Cartography
  - 316 Geochemistry, Mineralogy and Crystallography

- 31601 Geochemistry, Mineralogy and Crystallography
- 317 Geography
  - 31701 Physical Geography
  - 31702 Human Geography
- 318 Water Research
  - 31801 Hydrogeology, Hydrology, Limnology, Urban Water Management, Water Chemistry, Integrated Water Resources Management

4 Engineering Sciences
- 41 Mechanical and industrial Engineering
  - 401 Production Technology
    - 40101 Metal-Cutting Manufacturing Engineering
    - 40102 Primary Shaping and Reshaping Technology
    - 40103 Micro-, Precision, Mounting, Joining, Separation Technology
    - 40104 Plastics Engineering
    - 40105 Production Automation, Factory Operation, Operations Management
  - 402 Mechanics and Constructive Mechanical Engineering
    - 40201 Construction, Machine Elements
    - 40202 Mechanics
    - 40203 Lightweight Construction, Textile Technology
    - 40204 Acoustics
- 42 Thermal Engineering/Process Engineering
  - 403 Process Engineering, Technical Chemistry
    - 40301 Chemical and Thermal Process Engineering
    - 40302 Technical Chemistry
    - 40303 Mechanical Process Engineering
    - 40304 Biological Process Engineering
  - 404 Heat Energy Technology, Thermal Machines, Fluid Mechanics
    - 40401 Energy Process Engineering
    - 40402 Technical Thermodynamics
    - 40403 Fluid Mechanics
    - 40404 Hydraulic and Turbo Engines and Piston Engines
- 43 Materials Science and Engineering
  - 405 Materials Engineering
    - 40501 Metallurgical and Thermal Processes, Thermomechanical Treatment of Materials
    - 40502 Sintered Metallic and Ceramic Materials
    - 40503 Composite Materials
    - 40504 Mechanical Behaviour of Construction Materials
    - 40505 Coating and Surface Technology
  - 406 Materials Science
    - 40601 Thermodynamics and Kinetics of Materials
    - 40602 Synthesis and Properties of Functional Materials
    - 40603 Microstructural Mechanical Properties of Materials
    - 40604 Structuring and Functionalisation
    - 40605 Biomaterials
- 44 Computer Science, Electrical and System Engineering
  - 407 Systems Engineering
    - 40701 Automation, Control Systems, Robotics, Mechatronics
    - 40702 Measurement Systems
    - 40703 Microsystems
    - 40704 Traffic and Transport Systems, Logistics
    - 40705 Human Factors, Ergonomics, Human-Machine Systems
  - 408 Electrical Engineering

40801 Electronic Semiconductors, Components, Circuits, Systems
40802 Communication, High-Frequency and Network Technology, Theoretical Electrical Engineering
40803 Electrical Energy Generation, Distribution, Application
409 Computer Science
40901 Theoretical Computer Science
40902 Software Technology
40903 Operating, Communication and Information Systems
40904 Artificial Intelligence, Image and Language Processing
40905 Computer Architecture and Embedded Systems
45 Construction Engineering and Architecture
410 Construction Engineering and Architecture
41001 Architecture, Building and Construction History, Sustainable Building Technology, Building Design
41002 Urbanism, Spatial Planning, Transportation and Infrastructure Planning, Landscape Planning
41003 Construction Material Sciences, Chemistry, Building Physics
41004 Structural Engineering, Building Informatics, Construction Operation
41005 Applied Mechanics, Statics and Dynamics
41006 Geotechnics, Hydraulic Engineering

5.4 Explanation Of re3data.org Access Types

The policies and access control measures of a research data repository regulate a number of issues, particularly: Who can access the research data repository? Who can download research data and how can the user reuse these research data from the repository? And who is permitted to deposit research data? To describe such access regulations of a research data repository, re3data.org differentiates between three categories representing different levels of access. First there is the access to the research data repository defining who can access the database in general, e.g. searching the repository requires a membership. Secondly there is the access to the research data sets in the research data repository in particular, e.g. being able to download data from the repository. Thirdly there is the access to upload and deposit research data sets to the research data repository. The access to each level can be open, restricted and/or closed. Open means that there are no access barriers. Restricted means that external users can overcome access barriers, e.g. by creating a user account. Closed means external users cannot overcome access barriers. Embargoed access means that external users cannot overcome access barriers until the research data are released for open or restricted access. The last stated access type applies only to the level of access to the research data sets.

As shown in the matrix below the access to the research data repository is the basic level to define the general framework of access to the actual research data sets, e.g. a research data set in a research data repository that is restricted through registration cannot be open but just restricted or even closed; a research data set in a closed research data repository which underlies access restrictions that cannot be overcome by external users is neither open nor restricted but only closed. Thus to define the general accessibility of a research data repository the values highlighted in orange are needed (values in braces can occur).

Access (property)	*Open Access*		*Restricted Access*		*Closed Access*
Access to Repository (20.1 databaseAccessType)	open		open or restricted		closed
Access to Data (22.1 dataAccessType)	open (embargoed, restricted, closed)		restricted (embargoed, closed)		closed
Data Upload (24.1 dataUploadType)	open or restricted	closed	open or restricted	closed	-