



# Forschungsdatenmanagement in interdisziplinären Forschungsverbänden: Ein Erfahrungsbericht aus dem Sonderforschungsbereich/Transregio 32

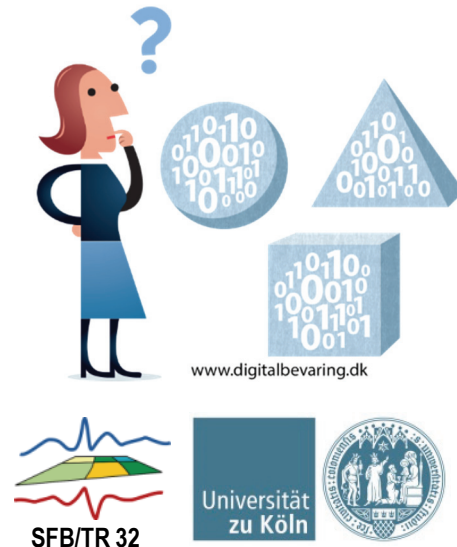
# Forschungsdatenmanagement (FDM) in Forschungsverbänden

## ■ Gründe für FDM

- Transparenz & Reproduzierbarkeit der Forschungsergebnisse
- Vermeidung von Doppelarbeit / redundanter Datenerhebung
- Sicherung nicht replizierbarer Forschungsdaten
- Nachnutzung und Austausch von Forschungsdaten (u.a. zur Schaffung von Synergien)

## ➤ Forschungsdaten sollten ...

- gut aufbereitet, organisiert, dokumentiert, nachhaltig gespeichert und gesichert werden
  - Einrichtung und Etablierung von FDM-Services
  - Aufbau (oder Nachnutzung) einer nachhaltigen Infrastruktur



# FDM in Forschungsverbänden

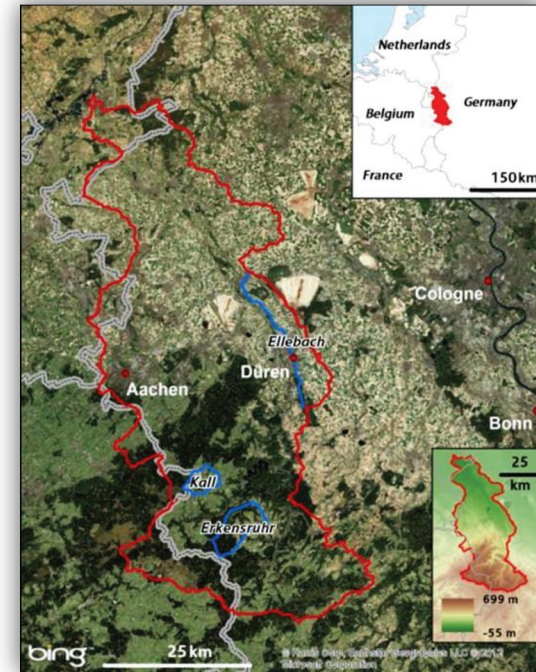
## ■ Merkmale von FDM

- zeitlich begrenzte Projektlaufzeit und Finanzierung
- Berücksichtigung von Anforderungen (u.a. Forscher, Projekt, Förderorganisation)
- Datenverfügbarkeit während und nach Projektlaufzeit
- größtenteils projektspezifische FDM-Lösungen
- seit 2007 Förderung von INF-Projekt in SFBs oder SFB/Transregios



# SFB/TR 32: Muster in Boden-Pflanzen-Atmosphäre-Systemen

- **Sonderforschungsbereich / Transregio 32:**  
„Muster und Strukturen in Boden-Pflanzen-Atmosphäre-Systemen: Erfassung, Modellierung und Datenassimilation“  
Projektlaufzeit 12 Jahre (2007 – 2018)
- **Involvierte Einrichtungen:**  
Universität Aachen, Bonn, Köln, Forschungszentrum Jülich
- **Verschiedene Disziplinen:**  
Geophysik, Bodenkunde, Pflanzenkunde, Hydrologe, Mathematik, Geoinformatik, Geographie, Fernerkundung, Meteorologie, ...
- **Forschungsziel:**  
Erforschung von Wechselwirkungen von Mustern und Strukturen im Boden-Pflanzen-Atmosphärensystem



# SFB/TR 32: Projektdaten



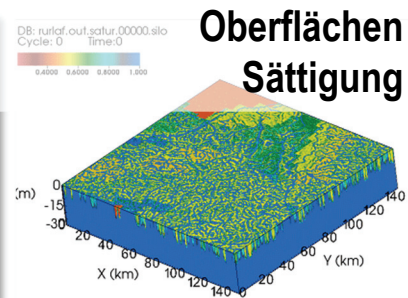
u.a. Temperatur, Druck, Wind



Blattmessungen



Bodenstoffflüsse



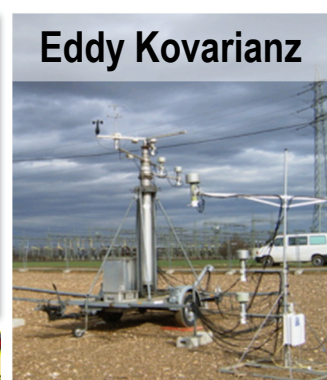
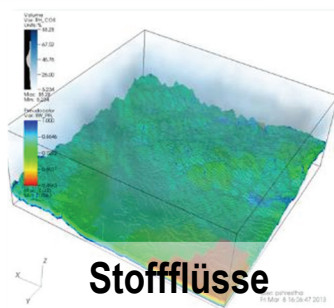
Hyperspektralmessungen



Pflanzenproben



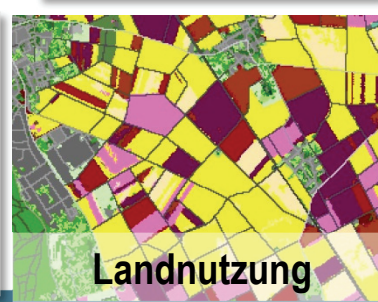
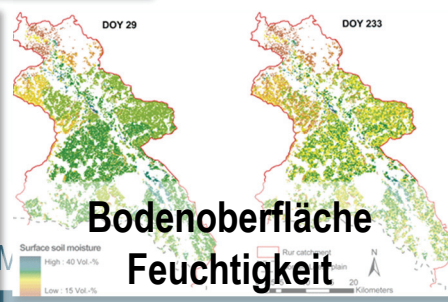
Bodenatmung



Eddy Kovarianz



Wolkenbeobachtungen



Landnutzung

# Ermittlung der FDM-Anforderungen

- **2007: Fragebogenerhebung zur Errichtung einer Projektdatenbank**
  - Bereitstellung von Daten (u.a. Art, Dateiformat, Größe, benutzte Software)
  - Frage zur Projektdatenbank (u.a. Einbindung zusätzlicher Informationen, Datenzugriff, Zeit für Datenaufbereitung)
- **2012: Umfrage zur Datenerhebung Phase 1 (2007-2010)**
  - Mess-/Modellierungsregion, Messinstrumente, Parameter, Messzeitraum, ...
  - Datenbereitstellung, Zeitplanung der Datenabgabe
- **2015: Umfrage zur Datenerhebung Phase 2 (2011-2014) und Phase 3 (2015-2018)**
  - Datenart, Mess-/Modellierungsregion, Messinstrumente, Parameter, ..
  - Datenbereitstellung, Zeitplanung der Abgabe



# Anforderungen an das FDM im SFB/TRR 32

## ■ Datenmenge:

- Projektlaufzeit 12 Jahre (2007-2018) → ca. 65 Teilprojekte → ~ 200 Wissenschaftler

## ■ Datenvielfalt:

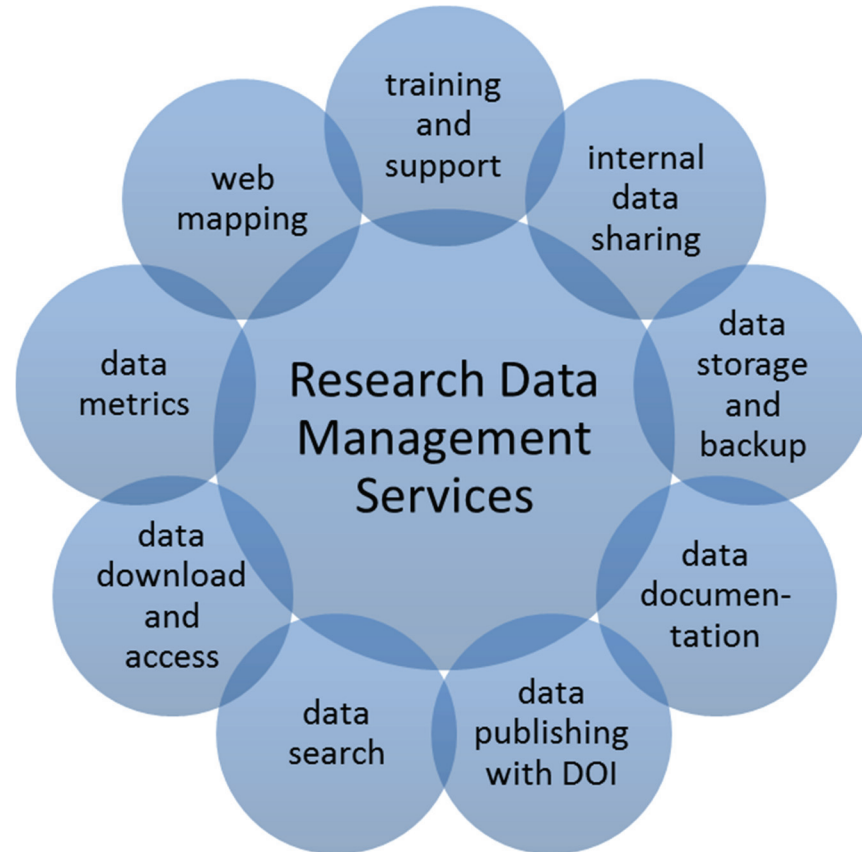
- heterogene Daten in verschiedenen zeitlichen und räumlichen Skalen
- Forschungsdaten, Publikation, Berichte, Karten, Bilder, ...
- disziplinspezifische Dateiformate, unterschiedliche Dateigrößen (kB bis GB)

## ■ Empfehlungen der DFG:

- FDM in Kooperation mit Bibliothek oder Rechenzentrum
- bestehende Infrastruktur und Techniken nachnutzen
- Datenverfügbarkeit über Projektende hinaus
- Gute Wissenschaftliche Praxis



# Aufbau von FDM-Services für den SFB/TR 32





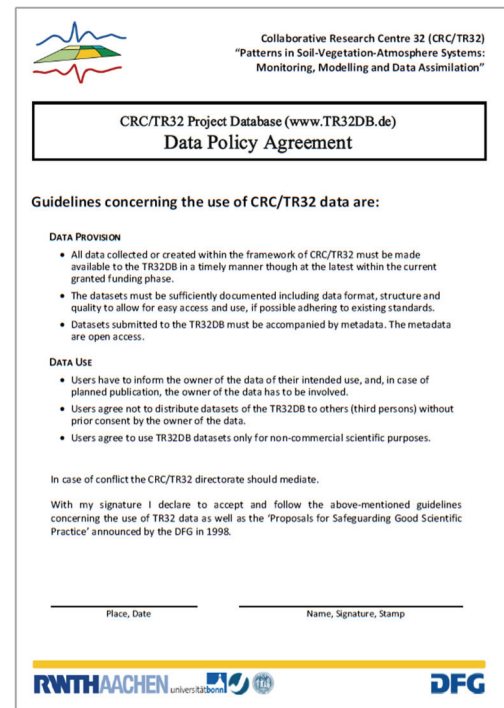
# FDM-Verantwortlichkeiten im SFB/TR 32

## ■ Forscher:

- Aufbereitung und Abgabe der Daten (z.B. Forschungsdaten, Publikationen, Berichte etc.)
- Beschreibung der Daten (u.a. mit Metadaten)
- Verantwortung für Inhalt und Qualität der Daten
- Beachtung der SFB/TR32 Data Policy

## ■ INF-Projekt:

- Bereitstellung eines Datenrepositoriums (u.a. nachhaltige Speicherung, Datenveröffentlichung, Austauschfunktionen)
- FDM-Beratung und Unterstützung (u.a. für Verwendung des Repositoriums)



Collaborative Research Centre 32 (CRC/TR32)  
"Patterns in Soil-Vegetation-Atmosphere Systems:  
Monitoring, Modelling and Data Assimilation"

CRC/TR32 Project Database ([www.TR32DB.de](http://www.TR32DB.de))  
Data Policy Agreement

Guidelines concerning the use of CRC/TR32 data are:

**DATA PROVISION**

- All data collected or created within the framework of CRC/TR32 must be made available to the TR32DB in a timely manner though at the latest within the current granted funding phase.
- The datasets must be sufficiently documented including data format, structure and quality to allow for easy access and use, if possible adhering to existing standards.
- Datasets submitted to the TR32DB must be accompanied by metadata. The metadata are open access.

**DATA USE**

- Users have to inform the owner of the data of their intended use, and, in case of planned publication, the owner of the data has to be involved.
- Users agree not to distribute datasets of the TR32DB to others (third persons) without prior consent by the owner of the data.
- Users agree to use TR32DB datasets only for non-commercial scientific purposes.

In case of conflict the CRC/TR32 directorate should mediate.

With my signature I declare to accept and follow the above-mentioned guidelines concerning the use of TR32 data as well as the 'Proposals for Safeguarding Good Scientific Practice' announced by the DFG in 1998.

\_\_\_\_\_  
Place, Date

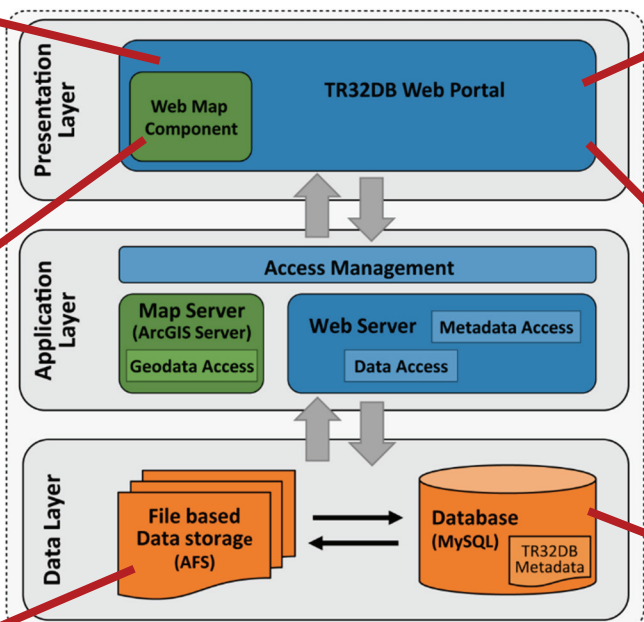
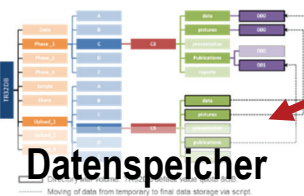
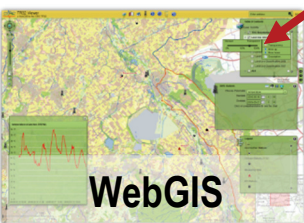
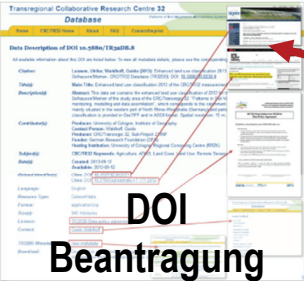
\_\_\_\_\_  
Name, Signature, Stamp

**RWTHAACHEN** universitätsbibliothek **DFG**

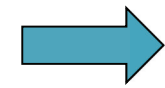
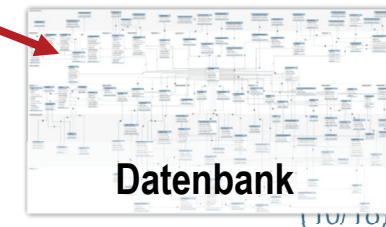
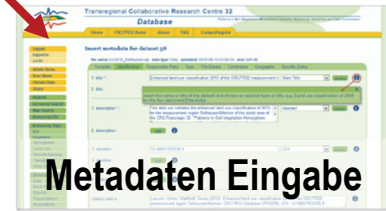
<http://www.tr32db.uni-koeln.de/datapolicy>

# CRC/TR 32 Project Database (www.TR32DB.de)

## Design und Implementierung einer 3-Tier-Architektur



\*gehostet am Regionalen Rechenzentrum der Universität zu Köln



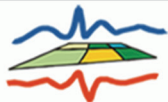
Standardisierte XML Dateien  
 DataCite  
 FIND, ACCESS, AND REUSE DATA



**SFB/TR32  
Webseite**  
 (Publikationen, Berichte)



# TR32DB: Metadaten Eingabe (www.TR32DB.de)



Transregional Collaborative Research Centre 32

Database

Patterns in Soil-Vegetation-Atmosphere-Systems: Monitoring, Modelling and Data Assimilation

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## Insert metadata for dataset 38

file name: LU2010\_Selhausen.zip data type: Data uploaded: 2010-09-12 03:00:03 size: 945 kB


Template Identification Responsible Party Topic File Details Constraints Geographic Specific (Data)

1. title \*: Enhanced land use classification 2013 of the CRC/TR32 measurement r Main Title delete 


2. title:


Insert the name or title of the dataset and choose an optional type of title, e.g. [Land use classification of 2009 for the Rur catchment][Maintitle].

1. description \*: This data set contains the enhanced land use classification of 2013 for the measurement region Selhausen/Merken of the study area of the CRC/Transregio 32: "Patterns in Soil-Vegetation-Atmosphere Abstract delete 

2. description: add 

1. identifier: 10.5880/TR32DB.8 DOI delete 

2. identifier: add 

1. relation: add 

citation advice: Lussem, Ulrike; Waldhoff, Guido (2013): Enhanced land use classification 2013 of the CRC/TR32 measurement region Selhausen/Merken. CRC/TR32 Database (TR32DB). DOI: 10.5880/TR32DB.8 



# TR32DB: Datensuche „Land Use“

Transregional Collaborative Research Centre 32 Database

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Browse by Region

Browse by Phase

Browse by Cluster

**Search Result: All Data from Topic - Land Use**

This section lists all project data of the TR32DB sorted according to the topic 'Land Use'. You are now able to sort or filter your result. Click on the data title, data type symbol or magnifying glass icon to view details.

sort by:  DataID  |  DataType  |  Creator  |  TR32Topic  |  MetadataDate

filter by: **All Phases** | Phase 1 | Phase 2 view datasets: 5 | 10 | 15 | 20 | 50 | 100

**[868] Enhanced land use classification 2013 of the Rur catchment**

Keyword(s): Land Use, Agriculture, ATKIS, Remote Sensing  
 Creator(s): U. Lussem, G. Waldhoff  
 Metadata Date: 2014-05-21 17:11:38 Data Type: Data TR32 Topic: Land Use

**[801] - Land use classification 2012 of the Rur Catchment**

Keyword(s): Land Use, Agriculture, ATKIS, Remote Sensing  
 Creator(s): U. Lussem, G. Waldhoff  
 Metadata Date: 2013-12-27 13:43:05 Data Type: Data TR32 Topic: Land Use

**[763] - GIS- and RS-based land use and land cover analysis - case study Rur-Watershed**

Keyword(s): Remote Sensing, GIS, Land Cover Mapping, Land Use  
 Creator(s): G. Waldhoff, G. Bareth  
 Metadata Date: 2013-12-03 15:45:15 Data Type: Publication TR32 Topic: Land Use

[868] - Enhanced land use classification 2013 of the Rur catchment

All available metadata of the dataset are listed below. Some features are available, e.g. download of dataset or additional description file.

Features: [Download Data](#) [Additional File](#) [Edit Metadata](#) [Apply DOI](#)

**Citation**  
 Lussem, U., Waldhoff, G., 2014. Enhanced land use classification 2013 of the Rur catchment. CRC/TR32 Database. DOI: 10.5880/TR32DB.11

**Abstract:** This data set contains the land use classification 2013 of the Rur catchment. The data set is available for download at the following URL: <http://tr32db.uni-koeln.de/data.php?dataset=868> at 2014-07-03.

**Main Title:** Enhanced land use classification 2013 of the Rur catchment

**Abstract:** This data set contains the land use classification 2013 of the Rur catchment.

**DOI:** 10.5880/TR32DB.11

**Owner:** Ulrike Lussem

**Point Of Contact:** Guido Waldhoff

**Producer:** University of Cologne, Institute of Geography

**Co-Producer:** CRC/Transregio 32, Sub-Project 1

**Funder:** German Research Foundation (DFG)

**Project:** CRC/TR32 Database (TR32DB)

**Land Use**

**Keywords:** Land Use, Agriculture, Remote Sensing, GeoInformation

**File Name:** TR32\_LU13.zip  
**Data Type:** Dataset  
**Size(s):** 1 Datasets  
**File Size:** 7323 KB (7.151 MB)  
**Date(s):** Date Submitted: 2014-05-21  
**Mime Type:** application/zip  
**Data Format:** GeoTIFF  
**Language:** English  
**Status:** Completed

**Constraints**

**Download Permission:** OnlyTR32

**General Access and Use Conditions:** According to the TR32DB data policy agreement.

**Access Limitations:** According to the TR32DB data policy agreement.

**Licence:** TR32DB Data policy agreement

**Geographic**

**North:** 51.4240132  
**East:** 7.3741943  
**South:** 7.3741943  
**West:** 7.3741943

**Measurement Region:** RurCatchingment  
**Measurement Location:** -RurCatchingment-

**Map:**

**Collaborative Research Centre 32 (CRC/Transregio 32)**  
 Patterns in Soil-Vegetation-Atmosphere

**Guidelines concerning the use of CRC/Transregio 32 data are:**

**Basic Provisions**

- All data collected or compiled within the framework of CRC/Transregio 32 shall be made available to the TR32DB in a timely manner through all the links within the current URL.
- Metadata of all data shall be available for download and use.
- Data shall be available for download and use for non-commercial scientific purposes only. In particular, the data shall not be used for commercial purposes.
- In order to ensure the long-term availability of the data, the data shall be made available in a format that is not subject to obsolescence.
- In order to ensure the long-term availability of the data, the data shall be made available in a format that is not subject to obsolescence.

**Basic Provisions**

- Users have to inform the range of the data they intend to use, and in case of personal publications, the source of the data has to be mentioned.
- Users agree not to distribute material of the TR32DB to other third persons without prior consent by the range of the data.
- Users agree to use TR32DB datasets only for non-commercial scientific purposes.

**In case of conflict the TR32DB Data policy agreement should prevail.**

**Copyright**

© 2014 CRC/Transregio 32. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without prior permission by the range of the data.

**Map Data** | [Terms of Use](#) | [Report a map error](#)

# TR32DB: Datensuche über Kartenfunktion

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Browse by Phase

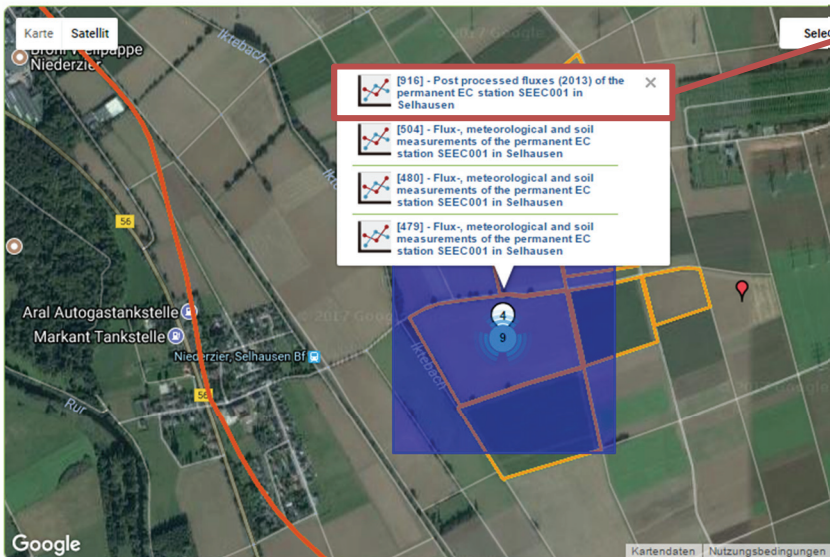
Browse by Cluster

## Map search

Search for project data using a map feature. Only project data with geographic information are visualized.

Depending on the zoom-level marked positions are clustered into **yellow**, **blue** or **red** circles. The number of markers inside the circle. Select a cluster or zoom-in to dissolve the clustering.

Filter options for a refined marker configuration can be chosen in the menu below the map. 



### Filter options for a refined marker configuration

Type:	Topic:	Subproject:	Instrument:
-All-	-All-	D7	Rain Gauge
Data	Atmosphere	D8	Reflectomet
Geodata	Land Use	T1	Scintillomet
Picture	Other	T2	Scintillomet

## [913] - Post processed fluxes the permanent EC station SEEC002 in Selhausen

All available metadata of the dataset are listed below. Some features are available, e.g. download of dataset or additional description file.

### Features

 Download Data

### Citation

Schmidt, M., 2014. Post processed fluxes the permanent EC station SEEC002 in Selhausen. Accessed from <http://tr32db.uni-koeln.de/data.php?dataID=913> at 2015-06-16

### Identification

**Title(s):** Main Title: Post processed fluxes the permanent EC station SEEC002 in Selhausen

**Description(s):** **Abstract:** This data set contains quality checked time series of flux measurements and footprint information of the permanent EC station SEEC002 in Selhausen. The measurement site is located in the dominant land use is cropland. The test site itself consists of a permanent EC station and a TEODOOR data logger. The first tab contains information about the station configuration, mounted sensors and the excel sheet. The second tab contains information about the time series that described in tab 2 are suitable for use in this metafile refers to the TEODOOR data logger. The third tab contains information about the quality controlled flux, meteorological and soil measurements. The fourth tab contains information about the TEODOOR data logger. The fifth tab allows to display and download all data (if already available) for the permanent EC station. Please contact Ralf Kunkel (r.kunkel@tzt.uni-koeln.de) to download data via TEODOOR.

### Identifier(s):

**URL:** [http://teodoor.icg.fka-juelich.de/tereno-online-portal/data-ports/copy\\_of\\_observatorium-efel-niederreineische-bucht/%2Ffb3wradar.bo.fka-juelich.de%3A8080%2Fefeltr\\_public%2Fses\\_SE\\_EC\\_002](http://teodoor.icg.fka-juelich.de/tereno-online-portal/data-ports/copy_of_observatorium-efel-niederreineische-bucht/%2Ffb3wradar.bo.fka-juelich.de%3A8080%2Fefeltr_public%2Fses_SE_EC_002)

### Responsible Party

**Creator(s):** Resource Provider: Marius Schmidt  
**Contributor(s):** Funder: TERENO (TERrestrial Environmental Observatories) network of the Helmholtz Association  
 Funder: German Research Foundation (DFG)  
**Publisher:** CRC/TR32 Database (TR32DB), TEODOOR Portal

### Topic

**TR32 Topic:** Atmosphere  
**Subject(s):** **CRC/TR32 Keywords:** 2m-Temperature, Agriculture, Atmosphere-Land Interaction, Atmospheric Measurement, Canopy Photosynthesis, Canopy Gas-Exchange, Carbon, Climate Station, CO<sub>2</sub>, CO<sub>2</sub> Flux, Crops, EC, Field Scale, Evapotranspiration, Flux Footprint, Friction Velocity, Humidity Measurement, Latent Heat Flux, Meteorology, Momentum Flux, Moisture Sensor, NEE, PAR, Pressure, Radiation, Radiometer, Rainfall Data, Sensible Heat Flux, Soil Moisture, Soil Temperature, Soil Water Content, Surface Fluxes, Turbulent Fluxes, Wind Direction, Wind, Wind Velocity  
**DDC:** 551 Geology, hydrology, meteorology  
**GEMET:** carbon dioxide, agrometeorology, hydrology  
**Topic Category:** Climatology/Meteorology/Atmosphere

### File Details

**File Name:** SE\_EC\_002\_fluxes.xlsx  
**Data Type:** Dataset  
**File Size:** 11583 kB (11.312 MB)  
**Date(s):** Available: 2011-05-15  
**Mime Type:** application/vnd.openxmlformats-officedocument.spreadsheetml.sheet  
**Data Format:** ASCII  
**Language:** English  
**Status:** In Process

### Constraints

**Download Permission:** Only TR32

**Download Information:** To access the data, please use the TEODOOR Portal (<http://teodoor.icg.fka-juelich.de/tereno-online-portal/>) folder/data-search-portal/data-ports/copy\_of\_observatorium-efel-niederreineische-bucht). Please contact Ralf Kunkel (r.kunkel@tzt.uni-koeln.de) to set up an user account if you like to download data via TEODOOR. If not the latest data is needed, please also look for yearly data sets of this station in the TR32 data base.

**Licence:** [TR32DB Data policy agreement](#)



# Herausforderungen und Probleme



doi:10.1371/journal.pbio.1001779.g001

***"[...] sharing is always a virtue for scientists. Although many scientists embrace the idea of sharing data in research, few manage it in practice."***

MARX (2012:509), Nature Biotechnology



NELSON (2009), Nature  
doi:10.1038/461160a



[www.nature.com/news/specials/datasharing/index.html](http://www.nature.com/news/specials/datasharing/index.html)

## ■ TR32DB Daten (Stand 2. Oktober 2017)

- ~ 700GB Daten in Datenspeicher
- 1,700 Metadatensätze in Datenbank

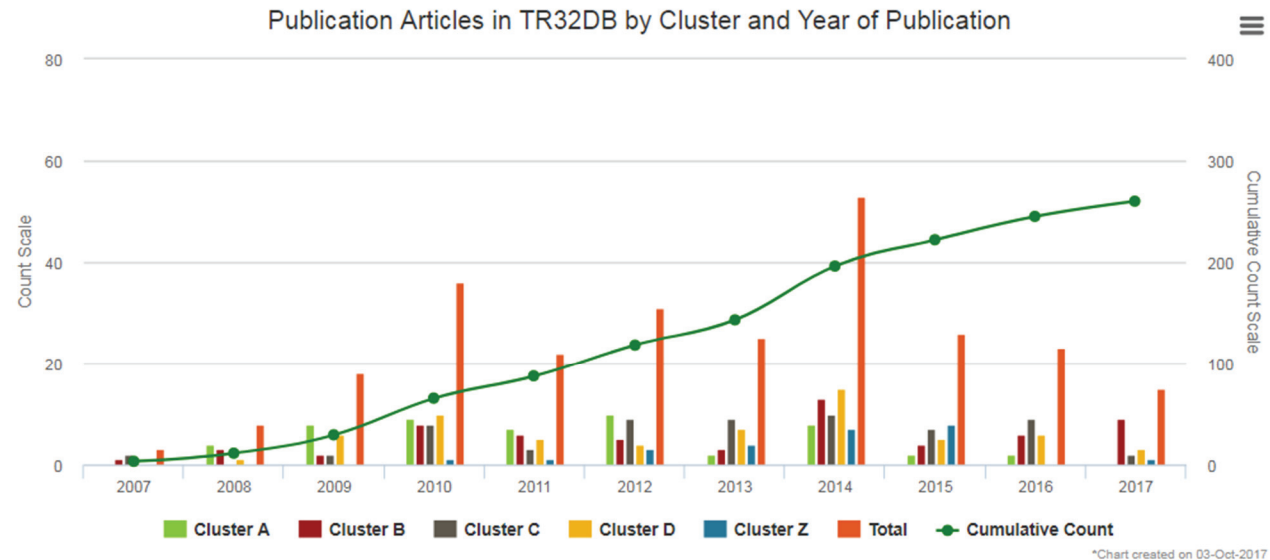
# TR32DB: Statistik

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## Publication Articles in TR32DB by Cluster and Year of Publication

This dynamic grouped bar chart displays the TR32DB publication articles assigned to the each cluster and the year of publication. You can adjust the chart by selecting the data filters according to the cluster, total or cumulative count. The cumulative count is only available for the total number of datasets.

**Note:** In this statistic each publication article is only counted for one (main) cluster. Counting a dataset in all associated clusters would increase the overall count of datasets.

[listing](#)

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Browse by Region

Browse by Phase

Browse by Cluster

## [88] Land Use Classification 2009

42 suitable versions of the dataset are listed below. Some features are available, e.g. download of dataset or additional description file.

Features: Download Dataset Add Metadata Edit Metadata

Created: 2010-02-22

Metadata: 2010 Land Use Classification 2009 CRC/TR32 Database (TR32DB); Accessed from <https://www.terrestrialdata.com/doi/10.21203/02-22>

Identifier: Main Title: Land Use Classification 2009  
Subtitle: New updated version available (dataset ID 374)  
Abstract: Land Use Classification of 2009 by the department, spatial resolution: 15 m, data format: GeTIFF 5  
DOI: 10.21203/02-22-1  
Is Version Of: DOI: 10.21203/02-22-2

Relationships:  
Creator(s): Owner: [GisC/CR32](#)  
Publisher: CRC/TR32 Database (TR32DB)

Name: Land Use  
Project Sub-project(s): CRC/TR32 Keywork: [GIS](#) [TR32](#) [ENVIS](#) [Land Cover](#) [Land Use](#)  
Subject(s): [GISNET](#) [Land Use Classification](#) [remote sensing](#) [remote sensing](#) [remote sensing](#) [remote sensing](#) [remote sensing](#)  
Topic Category: Environment

@@@Details@@@  
File Name: Lc2009.tif  
Data Type: Dataset  
File Size: 793 MB (781.9 MB)  
Date(s): Created: 2010-02-01  
MIME Type: application/tiff  
Data Format: GeTIFF  
Language: English  
Status: Completed

@@@Permissions@@@  
Download Permission: Only TR32  
General Access and Use Conditions: Access and use only for CRC/TR32 members.  
Access Limitations: Access and use only for CRC/TR32 members.  
License: TR32DB (Data Attribution Agreement)

@@@Geographic@@@  
North: 51.481678  
East: 7.3881278  
South: 50.2847654  
West: 5.1918022  
Measurement Region: Eu/Cat/Belgium  
Measurement Location: -Belgium

@@@Specific Information@@@  
Temporal Coverage: 2008/01-01 - 2008/12-31  
Metadata Details:  
Metadata Creator: [Ulrike Lötters](#)  
Metadata Created: 2010-02-01  
Metadata Last Updated: 2010-02-01  
Subgroups: 2  
Funding Phase: 1  
Metadata Language: English

Dataset Metrics

Page Visits:	100
Metadata Downloads:	5
Dataset Downloads:	30

Activity of Dataset

Zoom: 1m 3m 6m YTD 1y All

From: Mar 1, 2010 To: Jan 1, 2017

Chart created on 04-Oct-2017

## [88] - Land Use Classification 2009

All available metadata of the dataset are listed below. Some features are available, e.g. download of dataset or additional description file.

### Dataset Metrics

Page Visits: 213  
Metadata Downloads: 8  
Dataset Downloads: 31

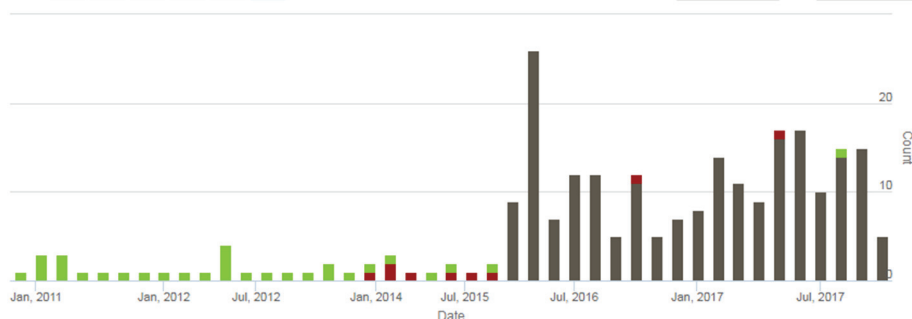
### Dataset Activity

#### Activity of Dataset

Dataset Downloads Metadata Downloads Views

Zoom 1m 3m 6m YTD 1y All

From Mar 1, 2010 To Oct 1, 2017





# Zusammenfassung

## ■ FDM-Infrastrukturen:

- limitierte Lebensdauer durch Finanzierung
- bevorzugt projektspezifische Infrastruktur-Lösungen
  - Zusammenarbeit mit Bibliotheken und Rechenzentren → vorhandene Infrastruktur verwenden
  - FDM-Services und Systemaufbau in enger Zusammenarbeit mit Forschern

## ■ Forschungsdaten

- heterogene, disziplin-spezifische Datenformate und -größen
  - interoperable Metadaten, Datendokumentation
  - Datenqualität ist wichtig

## ■ Umgang mit Forschern

- frühzeitige Einbindung und Zusammenarbeit
- Ermittlung und Beachtung von FDM-Anforderungen
- viel Training und Support; Geduld und Verständnis





# Forschungsdatenmanagement in interdisziplinären Forschungsverbänden: Ein Erfahrungsbericht aus dem Sonderforschungsbereich/Transregio 32