A system for digital preservation of scientific data using DOI Names

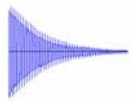
Uwe Rosemann

International Conference on Preservation of Digital Objects

Beijing, China

Problem: The research trajectory

Data



Problem: The research trajectory

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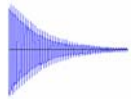


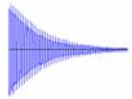
is

analysed

synthesised

interpreted

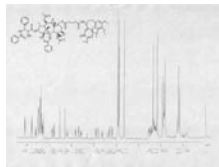
Problem: The research trajectory

Data 

analysed

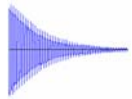
synthesised

interpreted

becomes **Information** 

Problem: The research trajectory

Data



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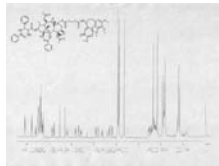
Information

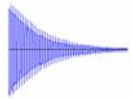


is

published

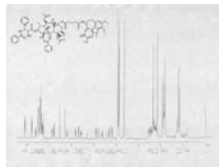
Problem: The research trajectory

Data



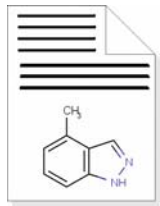
analysed
synthesised
interpreted

Information



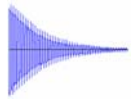
published

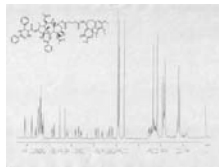
becomes **knowledge**

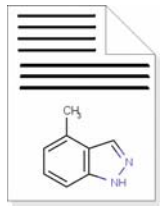


Publication

Problem: The research trajectory

Data  … is lost!

Information  … is traceble

knowledge  … is accassible

Publication

This leads to…

- **… unnecessary duplication of research efforts**
- **The verification of results becomes difficult**
- **Large amounts of research funds are spent every year, while already existing data remain underutilised**

We need..

- … a persistent identifier that allows global access to the data sets and all relevant metadata,
- To enabling citations of data
- To encourage good scientific practice
- To acknowledge scientific work

Project

- **The *German Research Foundation* (DFG) has started the project *Publication and Citation of Scientific Primary Data* to increase the accessibility of scientific primary data, starting with the field of earth science.**
- **The *German National Library of Science and Technology* (TIB) is now established as a "non-commercial" DOI-registration agency for scientific primary data as a member of the *International DOI Foundation* (IDF).**

Primary data publication

- **During her research for the *World Data Center Climate (WDCC)* the scientist Mrs. Weather gains primary data about the temperature in Hannover in the year 2003.**
- **As usual the primary data is tested, evaluated, stored and administrated at the *WDCC.***

- **In addition Mrs. Weather registers the primary data at the TIB.**

Registration of primary data

Mrs. Weather transmits to the TIB the URL where the data can be accessed, together with a XML-file containing all relevant bibliographic metadata

Including all information obligatory for the citing of electronic media (ISO 690-2)

- author
- title
- size
- edition
- language
- publisher
- publishing date
- publishing place

Identifier

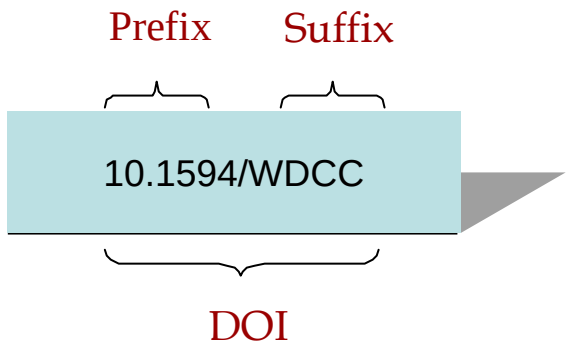
The TIB includes the metadata about the primary data in her catalogue, and awards the primary data with a unique identifier for registration: a DOI name

In her publications, Mrs. Weather is now citing this primary data with its unique DOI name:

Weather, Hermione (2003): Temperature in Hannover for 2003.
[doi: 10.1594/WDCC/W_Han_2003_MMB_2]

Digital Object Identifier (DOI)

- The DOI system is a worldwide system for persistent and actionable identification and interoperable exchange of intellectual property on digital networks;
- A DOI name is made up of two components, the prefix and the suffix;



- The value of the DOI system lies in its combination of Resolution, Metadata and Policy.

Resolving the DOI

This DOI name can be resolved (and the data can be accessed) in every browser worldwide in different ways:

- http://dx.doi.org/10.1594/WDCC/W_Han_2003_MMB_2
- http://doi.tib-hannover.de:8000/10.1594/WDCC/W_Han_2003_MMB_2

Or by

Doi://10.1594/WDCC/W_Han_2003_MMB_2

(after installing a browser plugin)

Scope

- The TIB registers primary data worldwide from a scientific, technical or medical background.
- So far over 450,000 datasets have received a DOI name.
- Furthermore TIB registers any scientific or technical content that is a result of community funded research in Europe.
- The storage, maintaining and evaluation of the contents lies with the content providers (institutions, data centers, …) as so-called publication agents.

Publication agent

- **Content providers, Data centers**
- **Who are responsible for:**
  - Quality assurance
  - Storage of the content and accessibility
  - Creation of metadata

- **The DOI registration can be included into the Workflow of the publication agent**
- **The TIB stores the metadata and keeps it searchable.**

results search [and] (all words) Yancheva

Title: Rock magnetism and X-ray flourescence spectrometry analyses on sediment cores of the Lake Huquang Maar, Southeast China [supplementary data to the reference given]

Author: Gergana **Yancheva** ; Norbert R Nowaczyk ; J Mingram ; Peter Dulski ; Georg Schettler ; Jörg F W Negendank ; Jiaqi Liu ; Daniel M Sigman ; Larry S Peterson ; Gerald Haug

Published: Bremen/Bremerhaven : PANGAEA - Publishing Network for Geoscientific & Environmental Data, 2007-01-23

Extent: 4 Datasets.

Note: This dataset is cited by doi: 10.1038/nature05431

Abstract: The Asian-Australian monsoon is an important component of the Earth's climate system that influences the societal and economic activity of roughly half the world's population. The past strength of the rain-bearing East Asian summer monsoon can be reconstructed with archives such as cave deposits, but the winter monsoon has no such signature in the hydrological cycle and has thus proved difficult to reconstruct. Here we present high-resolution records of the magnetic properties and the titanium content of the sediments of Lake Huguang Maar in coastal southeast China over the past 16,000 years, which we use as proxies for the strength of the winter monsoon winds. We find evidence for stronger winter monsoon winds before the Bølling-Allerød warming, during the Younger Dryas episode and during the middle and late Holocene, when cave stalagmites suggest weaker summer monsoons. We conclude that this anticorrelation is best explained by migrations in the intertropical convergence zone. Similar migrations of the intertropical convergence zone have been observed in Central America for the period AD 700 to 900, suggesting global climatic changes at that time. From the coincidence in timing, we suggest that these migrations in the tropical rain belt could have contributed to the declines of both the Tang dynasty in China and the Classic Maya in Central America.

REFERENCE:
Yancheva, Gergana; Nowaczyk, Norbert R; Mingram, J; Dulski, Peter; Schettler, Georg; Negendank, Jörg F W; Liu, Jiaqi; Sigman, Daniel M; Peterson, Larry S; Haug, Gerald (2007): Influence of the intertropical convergence zone on the East Asian monsoon, Nature, 445, 74-77, doi:10.1038/nature05431

Techn. data: Format: application/zip

Links: doi: 10.1594/PANGAEA.587840
URN: urn:nbn:de:tib-10.1594/PANGAEA.5878400

Holding: Display free access!
Note: Primaerdaten

Always quote citation when using data!

DOI for Scientific and Technical Data
10.1594/WDCC/EH5-T63L31_OM-GR1.5L40_CTL_6H

Title
IPCC-AR4 MPI-ECHAM5_T63L31 MPI-OM_GR1.5L40 PIcntrl(pre-industrial control experiment): atmosphere 6 HOUR values MPImet/MaD Germany

Citation
Roeckner, Erich; Lautenschlager, Michael; Esch, Monika 2006; IPCC-AR4 MPI-ECHAM5_T63L31 MPI-OM_GR1.5L40 PIcntrl(pre-industrial control experiment): atmosphere 6 HOUR values MPImet/MaD Germany. [doi: 10.1594/WDCC/EH5-T63L31_OM-GR1.5L40_CTL_6H]

Publication Date
2006-06-29

Author(s)
Roeckner, Erich; Lautenschlager, Michael; Esch, Monika

Summary
The data represent 6 hourly values of pre-industrial climate simulation. Here, for the year 1860, concentrations of well mixed greenhouse gases (CO2, CH4, N2O) were prescribed. Ocean data (MPI-OM) are available within this experiment, they are stored in EXTRA FORMAT. Datasets with monthly mean values are also available.
As the boundary conditions are not time dependent, the time access is arbitrary.
Technical data to this experiment:
The experiment is using ECHAM5.2.02 coupled to MPI-OM Vers.1.0 GR1.5L40 and was run on a NEC-SX6(hurrikan).
The output from the model run: hurrikan.dkrz.de:/ut/3/m214002/EXP500/run520

Location(s)
World; Latitude: -90.0 to 90.0; Longitude: 0.0 to 360.0

Spatial Coverage
Latitude: -90.0 to 90.0; Longitude: 0.0 to 360.0; Altitude: -6.98 m to 10.0 hPa

Temporal Coverage
1/1/2150 - 31/12/2655 (calendrical, arbitrary numbered years)

Data Format(s)
GRIB

Datasize
8310350578836 Bytes

Contact
Dr. Erich Roeckner
Max-Planck-Institut fuer Meteorologie
Bundesstrasse 53, D-20146 Hamburg, F.R. Germany
http://www.mpimet.mpg.de/

Project
IPCC-Hamburg Climate Model Simulation (IPCC_HH)
The Intergovernmental Panel on Climate Change (IPCC) has been established by WMO and UNEP to assess scientific, technical and socio-economic information, relevant for the understanding of climate change, its potential impacts and options for adaption and mitigation.
Continued description about the work of the IPCC will be found at the homepage (http://www.ipcc.ch) and (www.grida.no/climate/ipcc). As a further development the Special Report on Emission Scenarios (SRES) have been constructed, to explore future developments in the global enviroment with special reference to the production of greenhouse gases and aerosol precursor emissions.
A set of four scenarios families (A1, A2, B1, B2) have been developed (see also http://www.grida.no/climate/ipcc/emission/index.htm)
These data are available at the World Data Center for Climate, Hamburg.(wdc-climate.de).

Additional info
Additional information for this CERA experiment is available here.

Available Datasets (Page 1 of 13)

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	Name	Progress
☐	EH5_OM_CONST_ALAKE: lake fraction of grid box	complete
☐	EH5_OM_CONST_ALB: surface background albedo	complete
☐	EH5_OM_CONST_AZ0L: roughness length over land	complete

Data and article

> **The DOI system offers an easy way to connect the article with the underlying data:**

The dataset:

G.Yancheva, . R Nowaczyk et al (2007)

Rock magnetism and X-ray flourescence spectrometry analyses on sediment cores of the Lake Huguang Maar, Southeast China, PANGAEA

doi:10.1594/PANGAEA.587840

Is cited in the article:

G. Ycheva, N. R. Nowaczyk et al (2007)

Influence of the intertropical convergence zone on the East Asian monsoon

Nature 445, 74-77

doi:10.1038/nature05431

Examples of DOIs for scientific content

- doi:10.1594/EURORAD/CASE.1113 in cooperation with *European Congress for Radiology* (ECR) over 6.500 Case studies
- doi:10.2312/EGPGV/EGPGV06/027-034 in cooperation with *European Association for Computer Graphics* (Eurographics) over 300 articles (Grey literature)
- doi:10.1594/ecrystals.chem.soton.ac.uk/145 Together with the project *eBank* of *UK Office for Library Networking* we assigned DOI names for crystal structures.
- doi:10.2314/CERN-THESIS-2007-001 DOI names for Cern theses
- doi:10.2314/511535090 DOI names for final reports of projects funded by the German government
- doi:10.3203/iwf/C-11493 over 12.000 DOI names for short scientific movie clips

“Non-commercial”

3 ways of financing:

- **Customer-relation with Publication agents**
- **Base funding of TIB (National mission)**
- **Funding agencies (Long-time accessibility of research results)**

The new trajectory of research