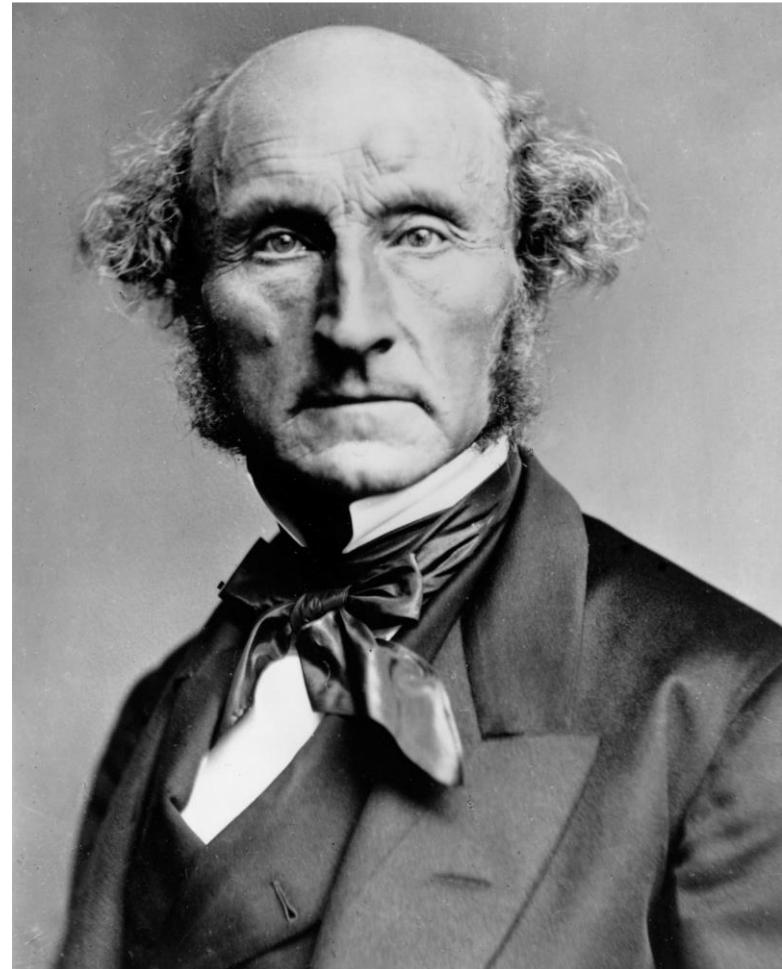




Open (Geo)Science

Academia must be open

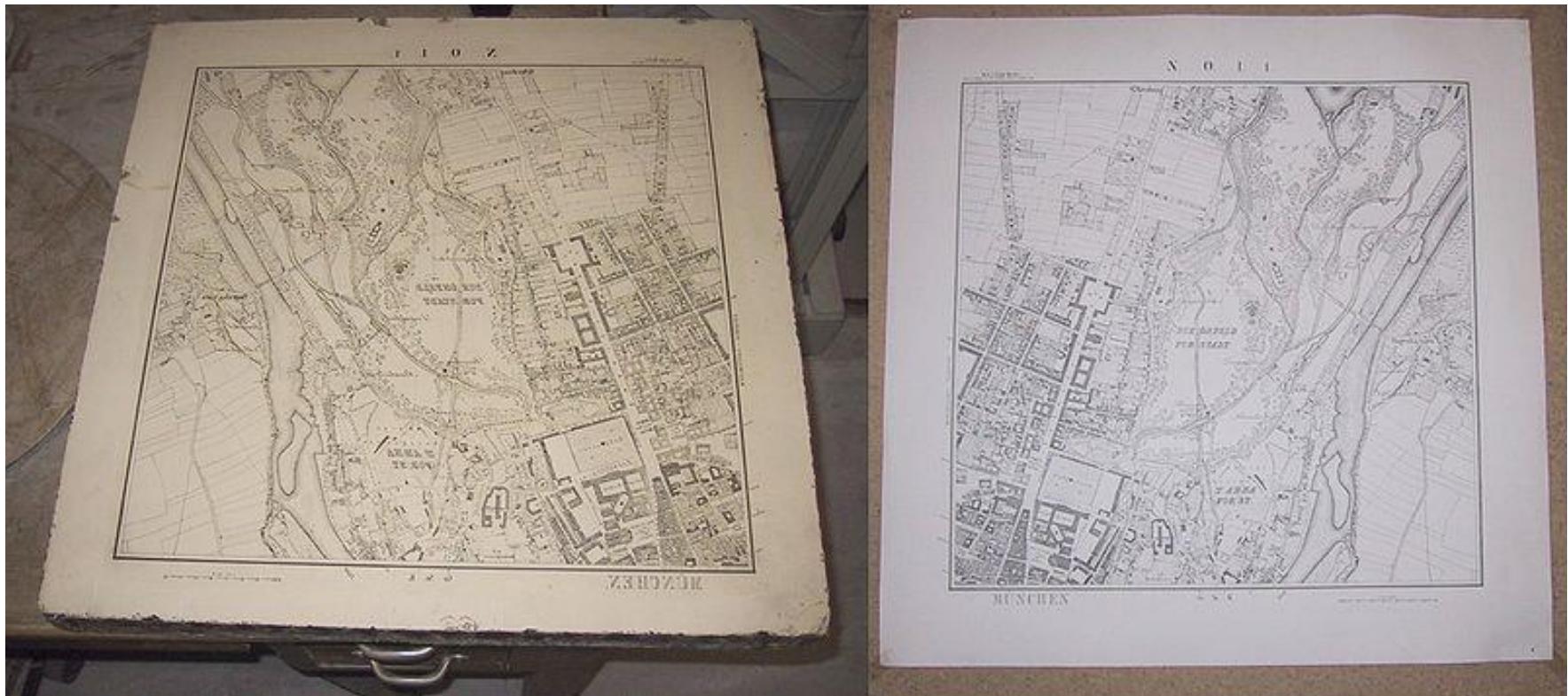
“A university exists for the purpose of laying open to each succeeding generation the accumulated treasures of the thoughts of mankind.”



John Stuart Mill addressing students as newly elected Rector of St Andrews University in 1867.

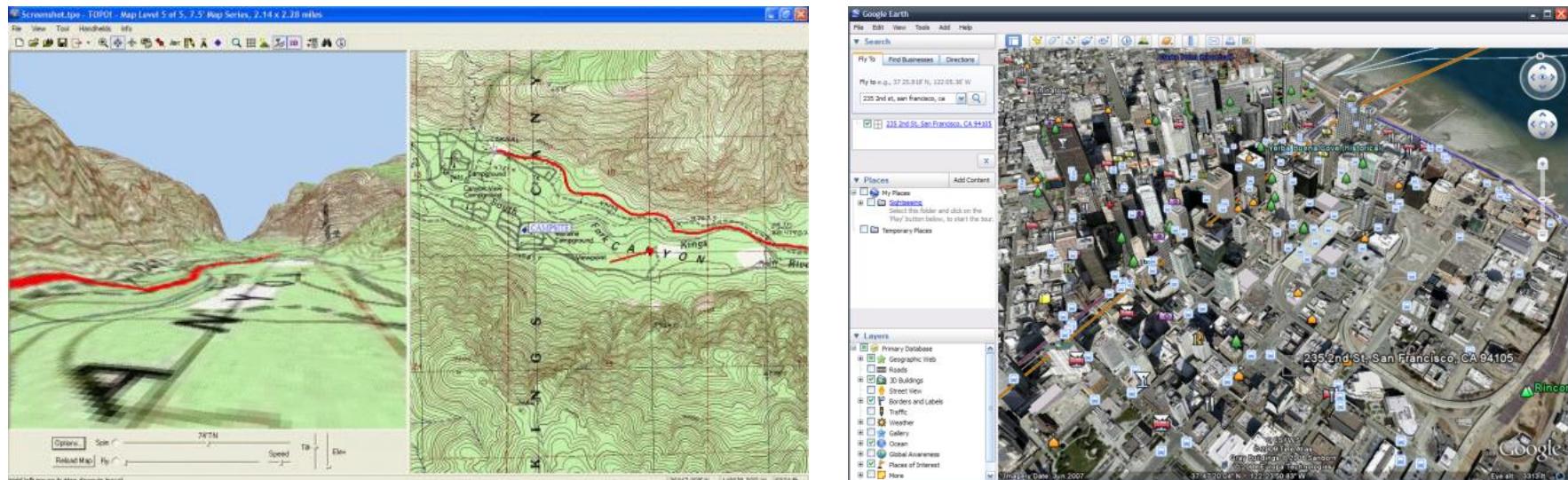
1st Scientific revolutions

- After 1665: Print-centric
 - The science of accessing



2nd Scientific revolutions

- After 1989: **Web-centric**
 - The science of exchanging



Open Science revolution

- Upcoming: **DigitalCommons**-centric
 - Open Science, the science of sharing

“science carried out and communicated in a manner which allows others to contribute, collaborate and add to the research effort, with all kinds of data, results and protocols made freely available at different stages of the research process”

Pre-OpenScience era (untill yestarday)

**knowledge
sharing**



Publication

from Latin *publicare*
“make public”

Patent

from Latin *patentum*
“open, lying open”

The WWW was born for Open Science

...and today it offers novel opportunities to let science be more
Open and make a paradigm shift

<https://groups.google.com/forum/#!msg/alt.hypertext/eCTkkOoWTAY/bJGhZyooXzkJ>

Message-ID: <6484@cernvax.cern.ch>
Date: 6 Aug 91 14:56:20 GMT
From: timbl@info.cern.ch (Tim Berners-Lee)
Newsgroups: alt.hypertext
Subject: Re: Qualifiers on Hypertext links...



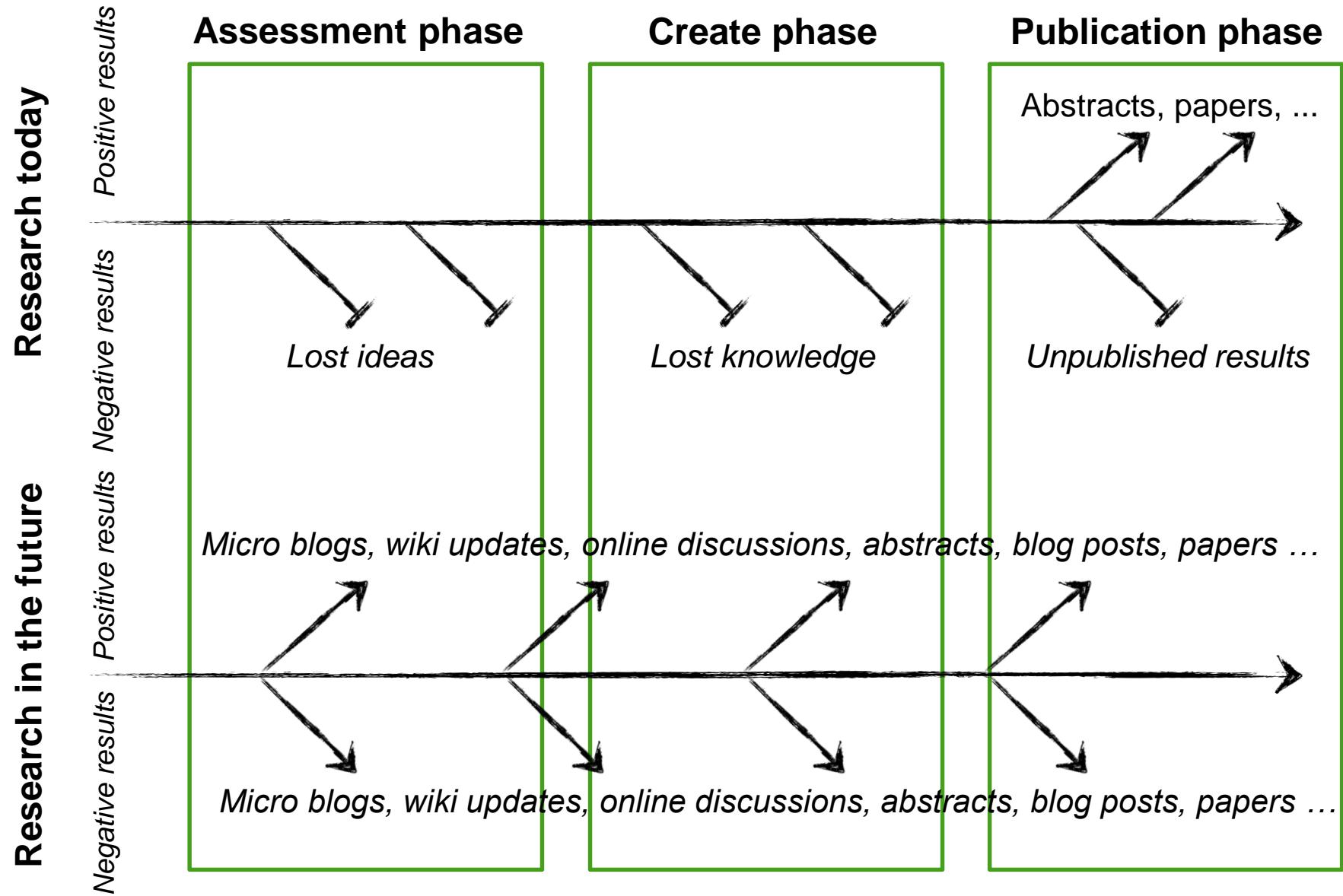
In article <64...@cernvax.cern.ch> I promised to post a short summary of the WorldWideWeb project. Mail me with any queries.

WorldWideWeb - Executive Summary

The WWW project merges the techniques of information retrieval and hypertext to make an easy but powerful global information system.

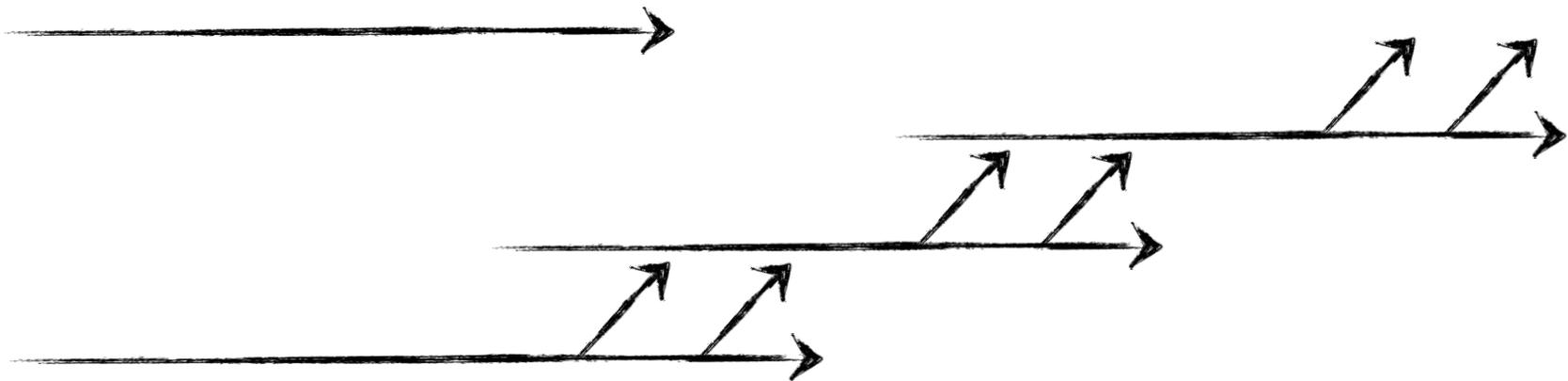
The project started with the philosophy that much academic information should be freely available to anyone. It aims to allow information sharing within internationally dispersed teams, and the dissemination of information by support groups.

Research life cycle

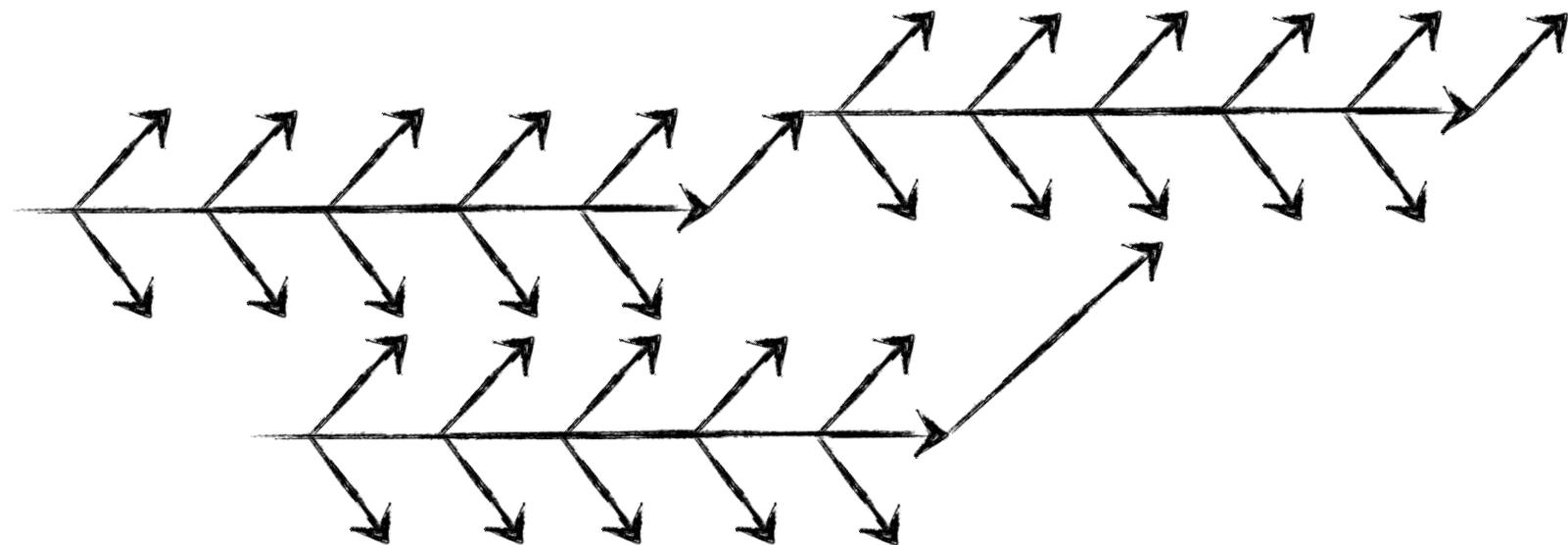


Resesources interaction

Research today



Research in the future



Pragmatic School

Assumption:

Knowledge-creation could be more efficient if scientists worked together.

Goal:

Making the process of knowledge creation more efficient and goal oriented.

Keywords:

Wisdom of the crowds, network effects, Open Data, Open Code

Democratic School

Assumption:

The access to knowledge is unequally distributed.

Goal:

Making knowledge freely available for everyone.

Keywords:

Open access, intellectual property rights, Open data, Open code

Infrastructure School

Assumption:

Efficient research depends on the available tools and applications.

Goal:

Creating openly available platforms, tools and services for scientists.

Keywords:

Collaboration platforms and tools

Public School

Assumption:

Science needs to be made accessible to the public.

Goal:

Making science accessible for citizens.

Keywords:

Citizen Science, Science PR, Science Blogging

Measurement School

Assumption:

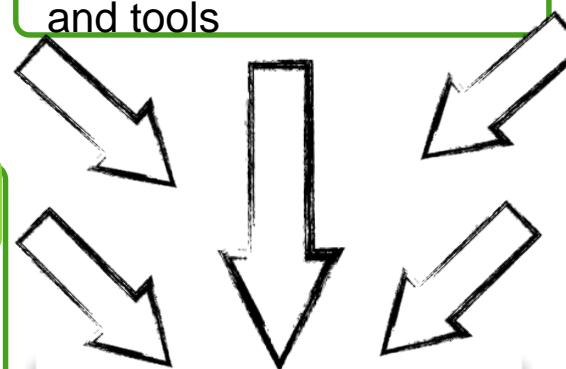
Scientific contributions today need alternative impact measurements.

Goal:

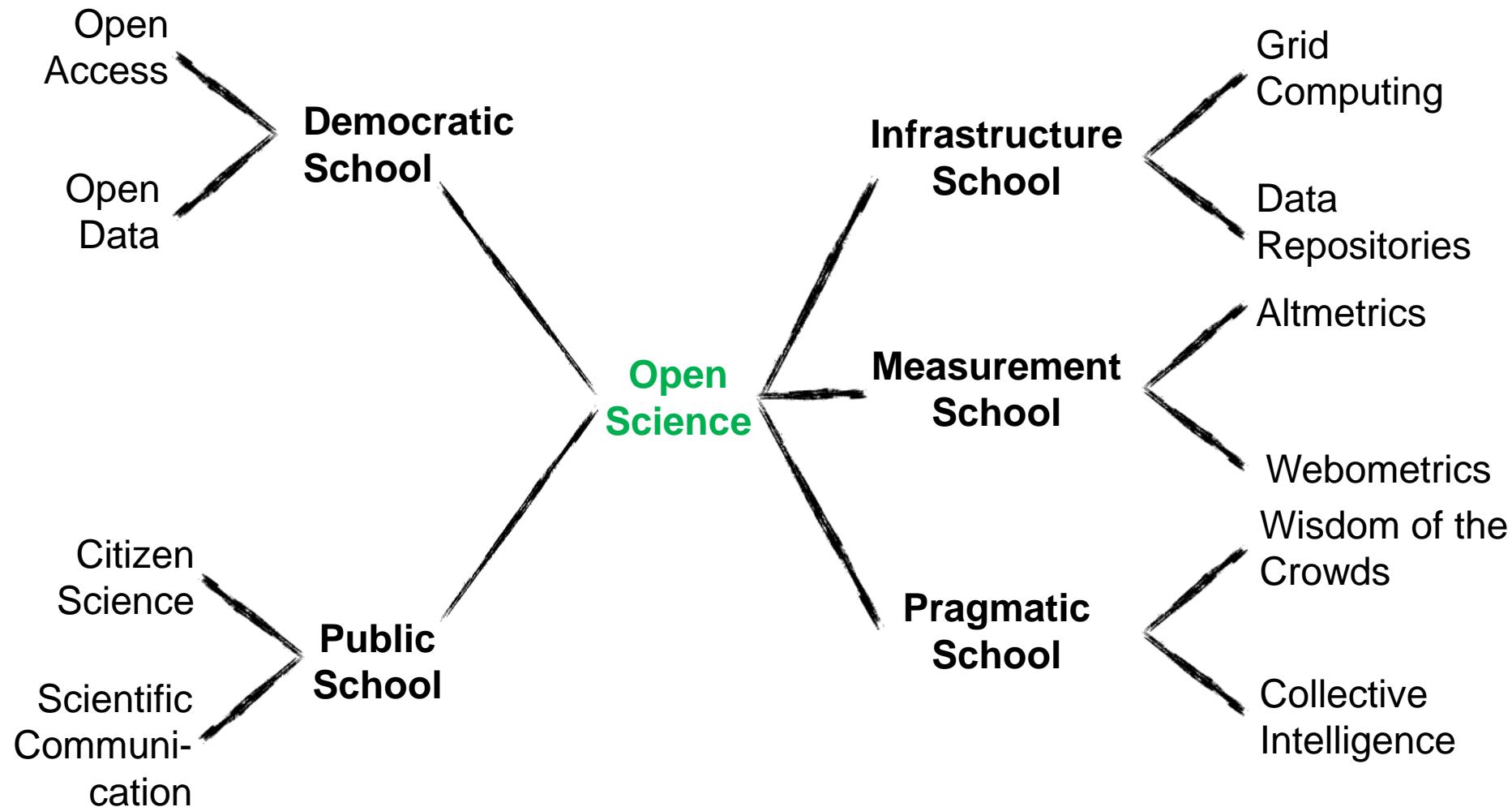
Developing an alternative metric system for scientific impact.

Keywords:

Altmetrics, peer review, citation, impact factors



Open Science



Expected benefits of opening science

- **Efficiency:** access to inputs and outputs can improve productivity of the research
- **Quality and integrity:** permits a greater and more accurate replication and validation of research results
- **Economic benefits:** access to scientific results boost innovation, also in developing economies

Expected benefits of opening science

- **Innovation and knowledge transfer:** reduce delays in transferring knowledge and create new products
- **Public disclosure and engagement:** open to society for citizen's participation
- **Global benefits:** international sharing of challenges understanding
- **Fair opportunity:** open and equitable access to knowledge and tools

Scientific breakthroughts

Sharing of Data Leads to Progress on Alzheimer's

By GINA KOLATA

Published: August 12, 2010

In 2003, a group of scientists and executives from the [National Institutes of Health](#), the [Food and Drug Administration](#), the drug and medical-imaging industries, universities and nonprofit groups joined in a project that experts say had no precedent: a collaborative effort to find the biological markers that show the progression of [Alzheimer's disease](#) in the human brain.



[Enlarge This Image](#)

Now, the effort is bearing fruit with a wealth of recent scientific papers on the early diagnosis of Alzheimer's using methods like PET scans and tests of spinal fluid. More than 100 studies are under way to test drugs that might slow or stop the disease.

And the collaboration is already serving as a model for similar efforts against [Parkinson's disease](#). A \$40 million project to look for biomarkers for Parkinson's, sponsored by the [Michael J. Fox Foundation](#), plans to enroll 600 study subjects in the United States and Europe.

"It was unbelievable. Its not science the way most of us have practiced in our careers. But we all realised that we would never get biomarkers unless all of us parked our egos and intellectual property noses outside the door and agreed that all of our data would be public immediately."

Dr John Trojanowski, University of Pennsylvania

www.nytimes.com/2010/08/13/health/research/13alzheimer.html?pagewanted=all&_r=0

Citation advantage

A study that analysed the citation counts of 10,555 papers on gene expression studies that created microarray data, showed:

“studies that made data available in a public repository received 9% more citations than similar studies for which the data was not made available”



Data reuse and the open data citation advantage,
Piwowar, H. & Vision, T. <https://peerj.com/articles/175>

Economic benefit

The case of NASA Landsat satellite imagery of the Earth's surface:

Up to 2008

- Sold through the US Geological Survey for US\$600 per scene
- Sales of 19,000 scenes per year
- Annual revenue of \$11.4 million

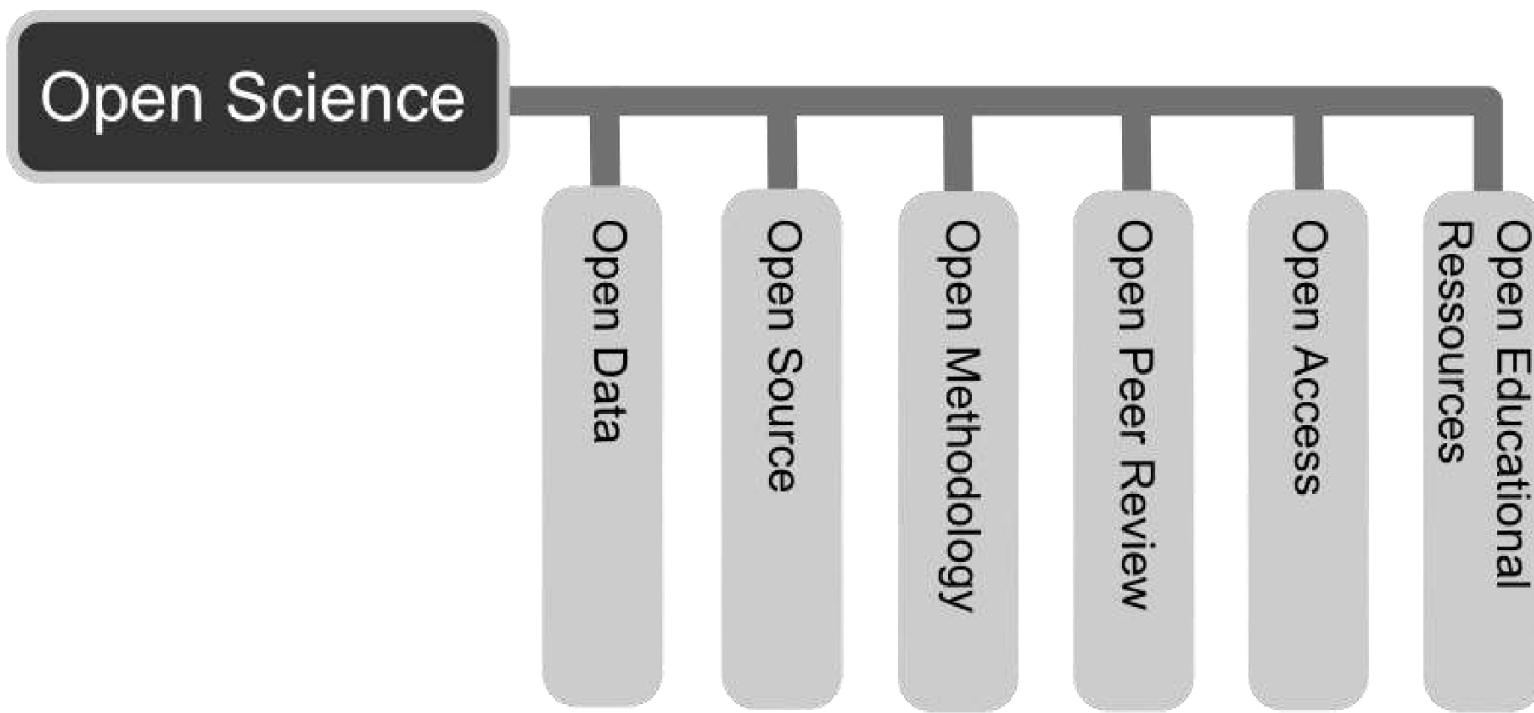
Since 2009

- Freely available over the internet
- Google Earth now uses the images
- Transmission of 2,100,000 scenes per year.
- Estimated to have created value for the environmental management industry of \$935 million, with direct benefit of more than \$100 million per year to the US economy
- Has stimulated the development of applications from a large number of companies worldwide

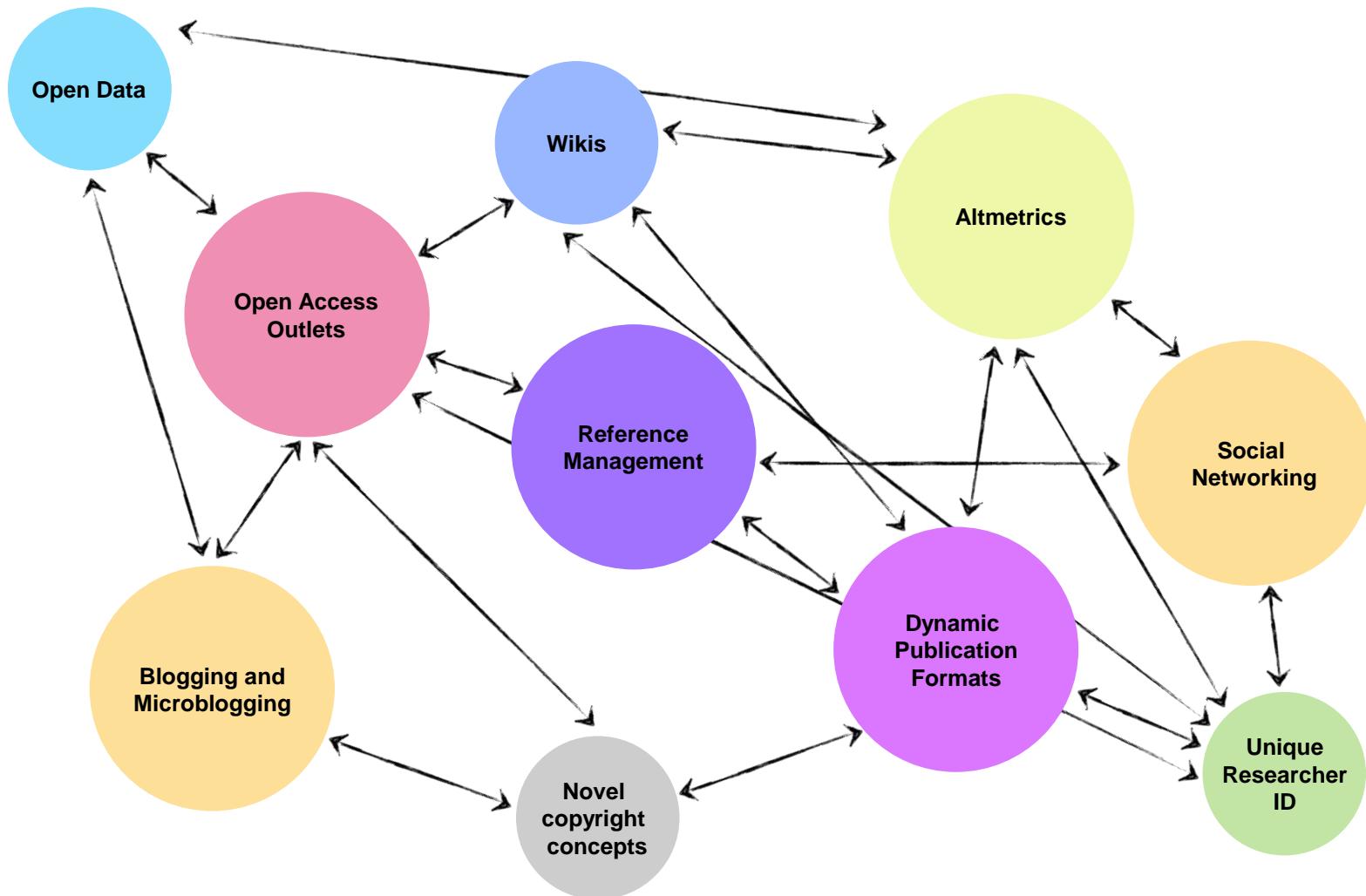


<http://earthobservatory.nasa.gov/IOTD/view.php?id=83394&src=ve>

Open Science = Σ open components

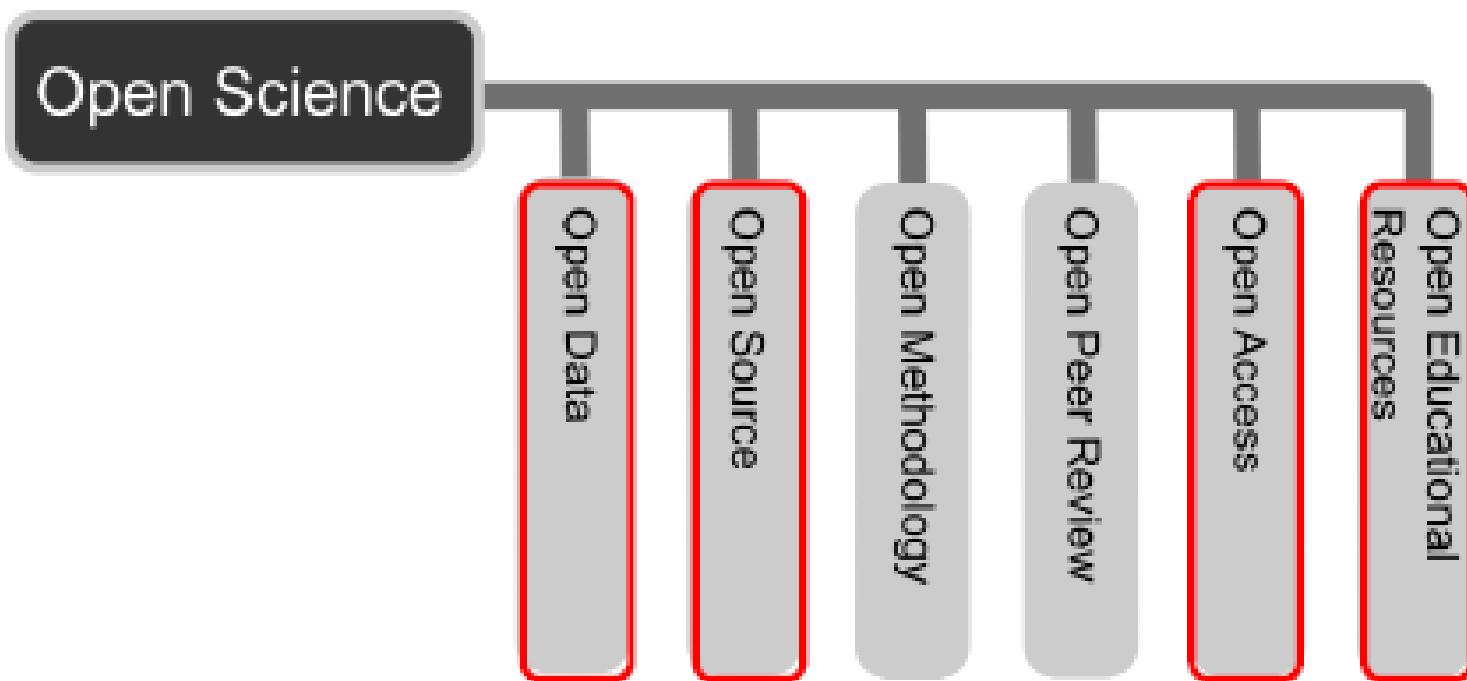


OS exists only as an interconnected sys



FOSS4G as a pioneer of Open Science

- FOSS4G has a long experience not only in Open Software....



But most important it knows how the process to be open should be

- Encourage participation from all contributors
- Adopt open standards and collaborate with other OSGeoprotects
- Show responsibility to control their codebase to ensure Open Source integrity
- Document how project management occurs
- Maintain source code in a public versioning system
- Maintain a public tracking system for issues
- Maintain public mailing lists/forums
- Setup automated build and testing systems
- Maintain both user and developer documentation

[Home](#) » [Initiatives](#) » Open GeoScience

Open GeoScience

Open Science is a paradigm to make scientific research, data and results transparent and accessible for science and society. It consists of several tiers, including Open Access, Open Data and Open Source. Open Science enables scientists to publish and share scientific knowledge, ensuring re-use of results, data and methodologies, and due recognition of scientific achievements beyond journal publications.

Goals

- Launch the discussion how to address "Open Geoscience" among all stakeholders within OSGeo.
- Development of best practices within and beyond OSGeo.
- Establish communication with scientific communities such as EGU and AGU.
- Create working groups on specific open geoscience topics



Open GeoScience Committee

Reach out:

- European Geoscience Union (**EGU**) General Assembly in Vienna:
4th OSGeo Townhall
- During the EGU GA, the **MoU** with American Geophysical Union (**AGU**) was signed

Advocating OSGeo as part of Open Science:

- **Enabling FAIR data - project:** Representing OSGeo at meetings (Washington DC, Potsdam, Vienna, Berlin)
- Representing OSGeo at NSF workshops for the **US Geospatial Software Institute (GSI)** (Los Angeles, Chicago)

Upcoming:

- **Open Source Geospatial Research & Education (OGRS 2018)** in Lugano, Switzerland
 - *Open GeoScience prize !*
 - *OSGeo Townhall !*





9-11 October, 2018 / SUPSI Campus Trevano
5th Open Source Geospatial Research and Education Symposium

TUE 9 OCT 2018 13:30

OPEN SCIENCE



LUC HENRY

SCIENTIFIC ADVISOR, EPFL

WED 10 OCT 2018 13:30

OPEN LICENSES



MALCOM BAIN

IT LAWYER, ID LAW PARTNERS

THU 11 OCT 2018 09:00

OPEN EDUCATION



SUSANNE BLEISCH

PRESIDENT OF GITTA

University of Applied Sciences and Arts
of Southern Switzerland

SUPSI



Hes-SO
University of Applied Sciences and Arts
Western Switzerland



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Journal titles or ISSNs Publisher names

nature

Exact title starts with contains ISSN

[Advanced Search](#) [Search](#) [Reset](#)

(ISSN: 0028-0836, EISSN: 1476-4687)

RoMEO:	This is a RoMEO yellow journal
Paid OA:	This journal is not in the list for the paid open access option.
Author's Pre-print:	author can archive pre-print (ie pre-refereeing)
Author's Post-print:	subject to Restrictions below: author can archive post-print (ie final draft post-refereeing)
Restrictions:	<ul style="list-style-type: none">• 6 months embargo
Publisher's Version/PDF:	author cannot archive publisher's version/PDF
General Conditions:	<ul style="list-style-type: none">• Authors retain copyright• Published source must be acknowledged and DOI cited• Must link to publisher version• Publisher's version/PDF cannot be used• On author's personal website and institutional repository• If funding agency rules apply, authors may post authors version to their relevant funding body's archive
Mandated OA:	Compliance data is available for 28 funders
Paid Open Access:	Open Access Hybrid Model - Selected Titles Only
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Updated:	06-Mar-2013 - Suggest an update for this record
Link to this page:	http://www.sherpa.ac.uk/romeo/issn/0028-0836/
Published by:	Nature Publishing Group - Yellow Policies in RoMEO

Open Access platform

OpenAIRE

Open Access Infrastructure for research in Europe

- aggregates data on OA publications
- mines & enriches it content by linking things together
- provides services & APIs e.g.
to generate publication lists

www.openaire.eu



<http://vimeo.com/108790101>

Opening the data...



<https://okfn.org>

1. Choose your dataset(s)

- What can you may open? You may need to revisit this step if you encounter problems later.

2. Apply an open license

- Determine what IP exists. Apply a suitable licence e.g. CC-BY

3. Make the data available

- Provide the data in a suitable format. Use repositories.

4. Make it discoverable

- Post on the web, register in catalogues...

Licensing data openly

A.Digital Curation Centre and JISC Legal
Working level guide

DCC
JISClegal information

**How to License
Research Data**

Alex Ball (DCC)

Horizon 2020 Open Access
guidelines point to:

or

This DCC guide outlines the pros and cons of each approach and gives practical advice on how to implement your licence

CREATIVE COMMONS LIMITATIONS



NC Non-Commercial
What counts as commercial?



ND No Derivatives
Severely restricts use

These clauses are not open licenses

SUPSI



4 TIMES OPEN AND NON- CONVENTIONAL SOLUTION FOR ENVIRONMENTAL MONITORING

**Massimiliano Cannata, Daniele Strigaro, Mirko Cardoso,
Milan Antonovic, Marcus Hoffmann**



SUPSI





9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



11 SUSTAINABLE CITIES
AND COMMUNITIES



image: source UN Climate Action policy brief

In most of the world it is difficult to cope with natural hazards and implement natural resources management due to missing or inaccessible data

impacts on
Water / Food / Society / Health

17 PARTNERSHIPS
FOR THE GOALS



13 CLIMATE ACTION



The motivation

Problem
missing hydro-met monitoring systems



[COSTS]

[HARDWARE]
[SOFTWARE]

[INACCESSIBILITY]

[LOCAL SUPPORT]
[REPLACEMENTS]
[SOURCE CODE]

[NO INTEROPERABILITY]

[CLOSED PROTOCOLS]
[PROPRIETARY SOLUTIONS]
[NO COORDINATION]

Solution

4 open & low-cost technologies

OPEN



Hardware

OPEN



Software

OPEN



Standard

OPEN



Data

STATE OF THE ART

State of play in developing countries

Few data

Low quality control

No real time

For purchase only

Can we rely on these open technologies to fill the data gap and cope with climate change impacts?

Quality

Durability

Costs

Sustainability

Development

integrated open-monitoring-system



Open
Hardware
Arduino



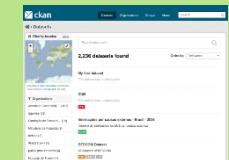
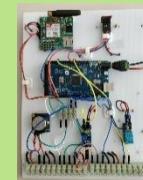
Open Standard (SOS)
Sensor Observation
Service



Open
Software
IstSOS

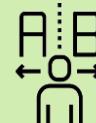


Open Data
CKAN



Findings

quality, applicability, sustainability



prototypes
validation



network
deployment



application
in real cases

RESEARCH

The research question

Data quality is surprisingly high: sufficient for coping with natural hazard and implement water management

Intermediate results

Trevano, Reference station

Precipitation

Tipping bucket Lastem-Lsi
DQA036

- R 0.2 mm resolution

Temperature and humidity

Campbell CS215

- T accuracy $\pm 0.3^\circ\text{C}$ (at 25°C)
- H accuracy $\pm 4\%$ (0% to 100% range) at 25°C

Pressure

Campbell CS100

- P accuracy $\pm 0.5 \text{ mb}$ (@ $+20^\circ\text{C}$)

Cost ~ 4'500 EUR



4onse-mod, Prototype station

Precipitation

Tipping bucket Davis Aerocone
6465

- R 0.2 mm resolution

Temperature

DS18B20

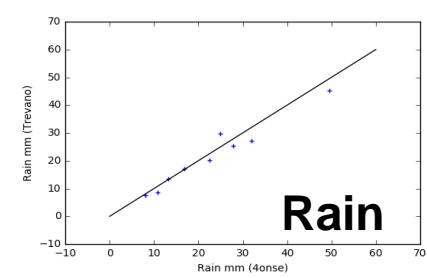
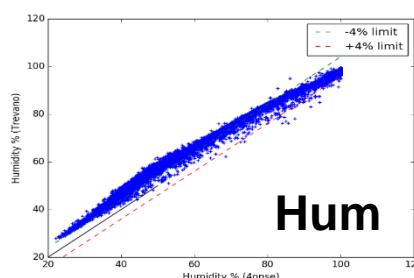
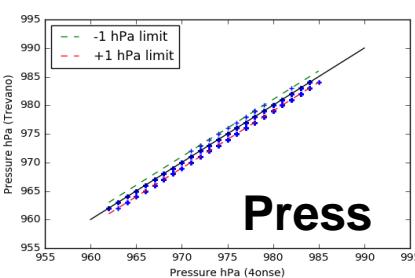
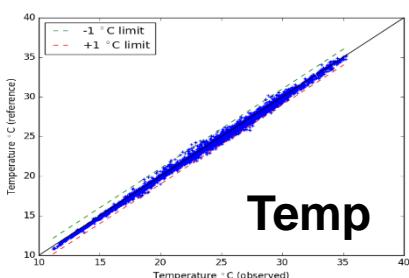
- T accuracy $\pm 0.5^\circ\text{C}$ (at 25°C)

Pressure and humidity

BME280

- P accuracy $\pm 1 \text{ hPa}$ (at $+25\text{--}40^\circ\text{C}$)
- H accuracy $\pm 3\%$ at 25°C

Cost ~ 450 EUR



Preliminary results



- Open Methodology
- Open Hardware
- Open Standards
- Open Software
- Open Access
- Open Education
- Open Data

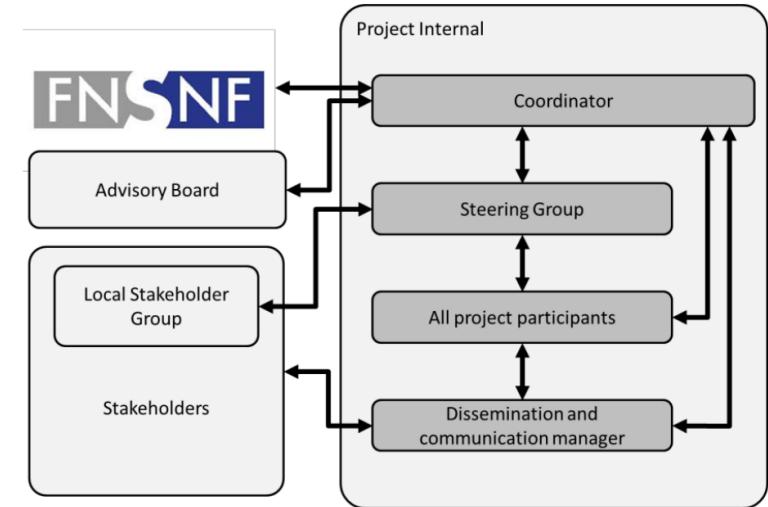
4onse is an Open Science project !

Everything accessible from the project Website (www.4onse.ch)

- Open governance
- Open communication
- Open participation

The screenshot shows a Google Groups interface. At the top, there's a search bar labeled 'Cerca messaggi'. Below it, a red button says 'NUOVO ARGOMENTO'. To the right of the search bar are icons for 'Segna tutti come letti' and 'Filtri'. On the left, a sidebar has sections for 'Gruppi', 'I miei gruppi' (with 'Home page' and 'Speciali' options), 'Preferiti' (with a note to click a star to add to favorites), and 'Visualizzati di recente' (listing 'PyData' and 'Tornado Web Server'). The main area shows a list of messages in the '4ONSE' group, which is 'Condiviso in privato' (shared privately) with 30 of 112 messages unread. The messages listed are:

- [4onse] Stations' weekly report (1)
- [4onse] Minutes of the meeting 21-09-2018 (1)
- [4onse] Today's meeting (1)
- [4onse] Today meeting 07-09-2018 (3)
- WS progress and River Gauges Installations (2)



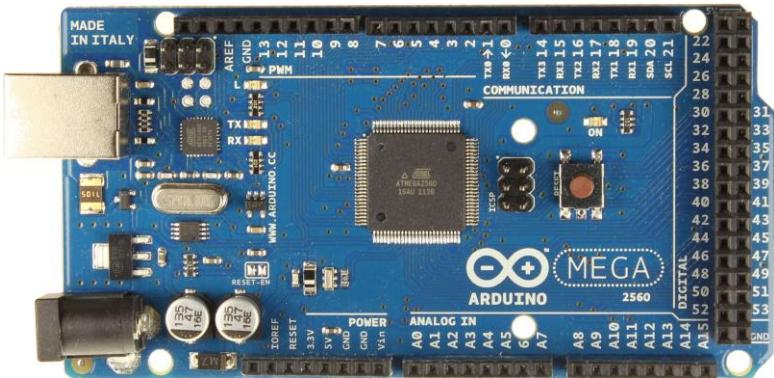
Join-us: became a testing partner

4onse is a fully Open project where everyone's contribution is more the welcome and considered very valuable !!!

Become a testing partner

If you feel to participate in the effort of building and testing non-conventional monitoring system for strengthen sustainable data production and management for sustainable development subscribe using the form below after reading the [Information Sheet](#) fill the Form below to.

Royalty free components and schematics, blueprints, logic designs

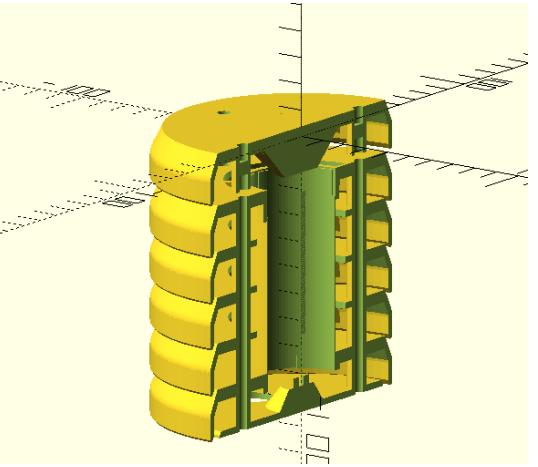


Massimo Banzi co-founder of Arduino project, teached Interaction Design at SUPSI

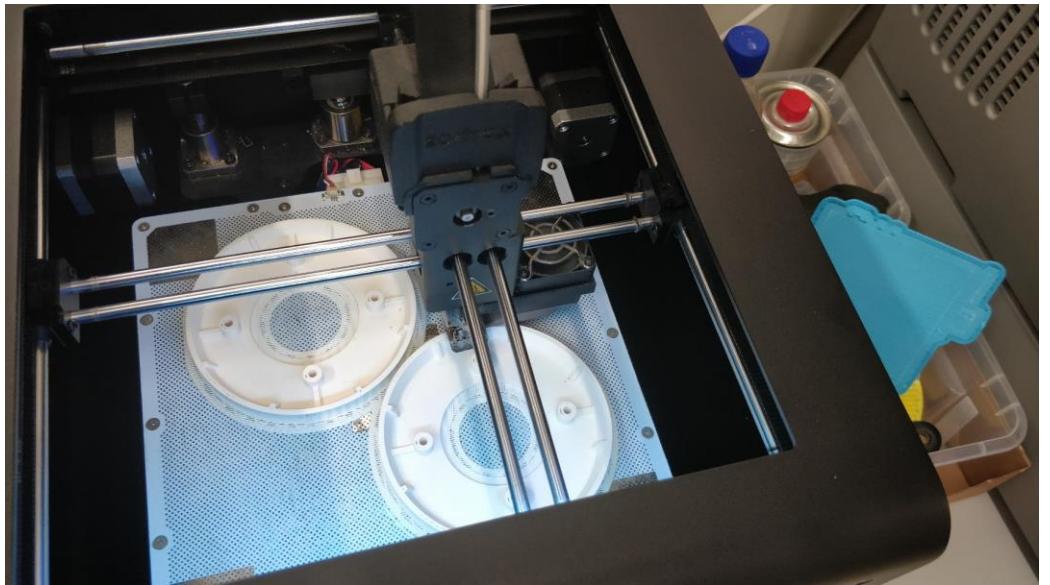
Open Hardware



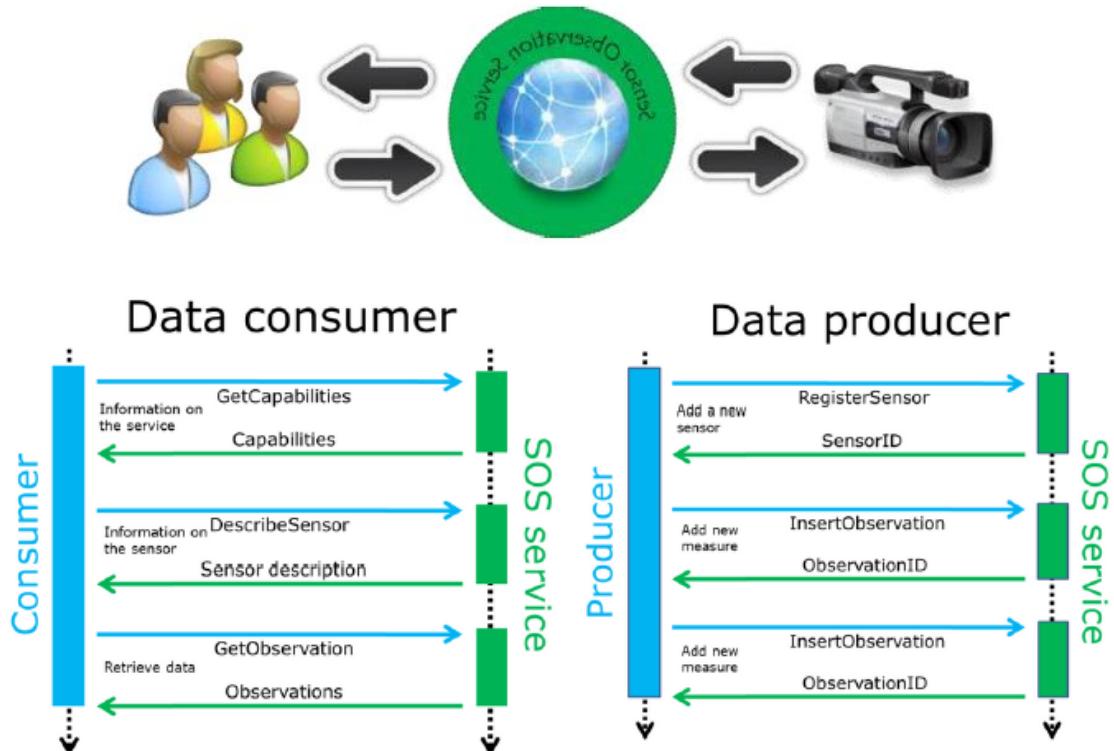
3D printed solution for self production



in collaboration with FabLab LCV-DACD
(special thanks to Marco Lurati for the support !!!)



Open Standards



Interoperability through standardized

- data access
- semantics data representation

Specifications are free and open without any implementation restriction

Sensor Observation Service (SOS)

Open Software

Server Services - Data Management Status (beta)

 Data Editor  Data Viewer

Service: **sos** Offering: **temporary** Procedure: **T_GRA**

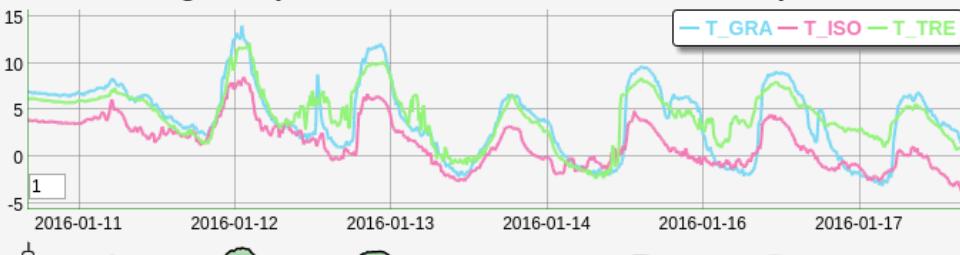
T TRE    
sos:temporary
 Fr:2007-11-02T23:00:00.000000Z To:2016-01-18T13:50:00.000000Z
 air-temperature (°C)
 Aggregation: no

T ISO    
sos:temporary
 Fr:2006-10-06T23:00:00.000000Z To:2016-01-18T13:40:00.000000Z
 air-temperature (°C)
 Aggregation: no

T GRA    
sos:temporary
 Fr:2006-04-26T23:00:00.000000Z To:2016-01-18T13:40:00.000000Z
 air-temperature (°C)
 Aggregation: no

From: 2016-01-11 00:00 +0 To: 2016-01-11 00:00 Property: air-temperature Plot

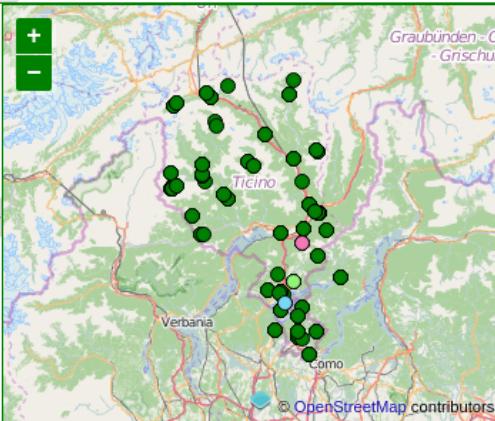
urn:ogc:def:parameter:x-istsos:1.0:meteo:air:temperature



Day Week All

Show CSV

Date	T_GRA	QI
2016-01-11T00:10:00+01:00	7.04	210
2016-01-11T00:20:00+01:00	6.915	210
2016-01-11T00:30:00+01:00	6.922	210
2016-01-11T00:40:00+01:00	6.895	210
2016-01-11T00:50:00+01:00	6.878	210
2016-01-11T01:00:00+01:00	6.788	210
2016-01-11T01:10:00+01:00	6.776	210
2016-01-11T01:20:00+01:00	6.776	210
2016-01-11T01:30:00+01:00	6.886	210
2016-01-11T01:40:00+01:00	6.879	210
2016-01-11T01:50:00+01:00	6.723	210
2016-01-11T02:00:00+01:00	6.801	210



Open Source Software by Institute of Earth Science - SUPSI

Open Source implementation of SOS by IST-SUPSI used for Ticino hydro-met data

istSOS is an OSGeo incubating project distributed under the GPL v2 license.

www.istsos.org

All publications are OA (Preprints with Open Review also available)

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLII-4/W2, 155-160, 2017
<https://doi.org/10.5194/isprs-archives-XLII-4/W2-155-2017>

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05 Jul 2017

EXTENDING THE SCALABILITY OF ISTSOS WITHIN THE 4ONSE PROJECT

D. Strigaro, M. Cannata, M. Cardoso, M. Antonovic, and M. Hoffmann
 IST-SUPSI, Institute of Earth Sciences, University of Applied Sciences and Arts of Southern Switzerland, via Trevano 6952 Canobbio, Switzerland

Keywords: istSOS, istSOS-proxy, EMS, WNS, Big data, SOS, scalability, 4onse

Abstract. An Environmental Monitoring System (EMS) is needed not only to prevent many natural risks such as droughts, flooding and landslides but also to provide information for a better management of water resources and crops irrigation and finally it helps to increase the reliability of weather and climatological models. In addition, a monitoring system can directly impact the economic, social and political spheres. Unfortunately, in most developing and low income countries, due to the high costs of hardware and software there is a lack of efficient monitoring systems. The aim of the 4onse project (analysis of Four times Open Non-conventional system for Sensing the Environment), funded by the Swiss National Science Foundation, is the development of a totally open solution to monitor the environment. As well as the hardware layer, a monitoring system needs a data management software usually hosted on a server structure. As a software platform which is SOS OGC compliant, istSOS is chosen to receive, manage, validate and distribute environmental data. In the following article a solution to support big data is presented to extend the istSOS capabilities. In fact, a sensors network can hardly stress a data management system because of the several concurrent users and sensors and the long time series which every weather station can easily produce. Thus, a software called istSOS-proxy is developed as a single access point over multiple instances of istSOS whose procedures are distributed to balance the total load. First results on the effectiveness of the solution are proved thanks to load testing simulations of different levels of concurrent users.



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Appropriateness of low cost sensor network for environmental monitoring in a tropical country: Experience and lessons learnt from real world deployment

[Research article](#) [Computer Aided Design](#) [Real-Time and Embedded Systems](#)

B H Sudantha[✉]¹, Emeshi J Warusavitharana[✉]², Rangajeewa Ratnayake[✉]²,
 P K S. Mahanama[✉]², Massimiliano Cannata[✉]³, Daniele Strigaro[✉]³

September 20, 2018



Highlighted in [Open Source Geospatial Research & Education Symposium \(OGRS2018\)](#)

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[\[link text\]](#) [\[link URL\]](#)

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Title: Enabling weather monitoring system in low income economies using open and non-conventional systems: data quality analysis.

Corresponding Author: Daniele Strigaro

Massimiliano Cannata

Rangajeewa Ratnayake

Your details:

Note: If the information below is incorrect, please [Contact](#) the Corresponding Author of this submission.

First Name: Massimiliano

Last Name: Cannata

E-mail Address: massimiliano.cannata@supsi.ch

ORCID: 0000-0003-2527-1416



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Open technologies for monitoring systems aimed at disaster risk reduction

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ABSTRACT

This research is spearheading the integration of Free and Open Source Software (FOSS) and Open Source Hardware (OSHW) in the field of agri-meteorology applications to disaster risk reduction, flood and droughts. A Do-It-Yourself weather station based on OSHW standards has been developed from local sources in Sri Lanka, reporting by SMS to tank/reservoir managers when rainfall is higher than 1mm/hour. These weather stations are soon going to be reprogrammed to report in istSOS, a FOSS web-based Sensor-Cloud. This paper presents the first results of this work, showing how we will collect data from these weather stations and publish them in istSOS, sending them to the cloud every hour and before if intensities are dimmed worrying for flood risks. This is both a scientific, technological, and practical challenge toward a very low cost real time disaster risk notification system in places where climate, economy and maintenance supports are themselves other challenges.

Keywords: FOSS, OSHW, istSOS, DIY, weather station, flood, disaster, risk, reduction

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4onse is a research project aimed at evaluating non-conventional monitoring systems to empower low-income economies with environmental data production and support risk reduction.

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Building a 4onse weather station

time 12 hr cost 450 USD difficulty Medium



Weather station documentation

This documentation aims to be a comprehensive guide to build the first official version of the [4onse weather station](#). It contains the full documentation both for the hardware and the software components. Visit <http://www.4onse.ch> for more information and contact us to help, give your feedback or ask specific questions.

What is 4onse?

The [4onse](#) project (4 TIMES OPEN & NON-CONVENTIONAL TECHNOLOGY FOR SENSING THE ENVIRONMENT) is funded by the Swiss National Science Foundation (SNSF) in the context of the Research for Development (R+D) program with decision IZ01Z0_160906/1. One of the project outcomes is an Environmental Monitoring System (EMS) based on "Open" technologies, including software, hardware, standard and data.

Go to the guides

The project has developed two type of system, which are based on the same sensors but differs for hook up approach: the [4onse-mod](#) uses wires and connectors while [4onse-pcb](#) uses printed board.

- [Overview](#)
- [4onse-mod weather station](#)
- [4onse-pcb weather station](#)

Contribute to this documentation

You can contribute to improve this documentation on [GitHub](#) by signaling issues or proposing changes.

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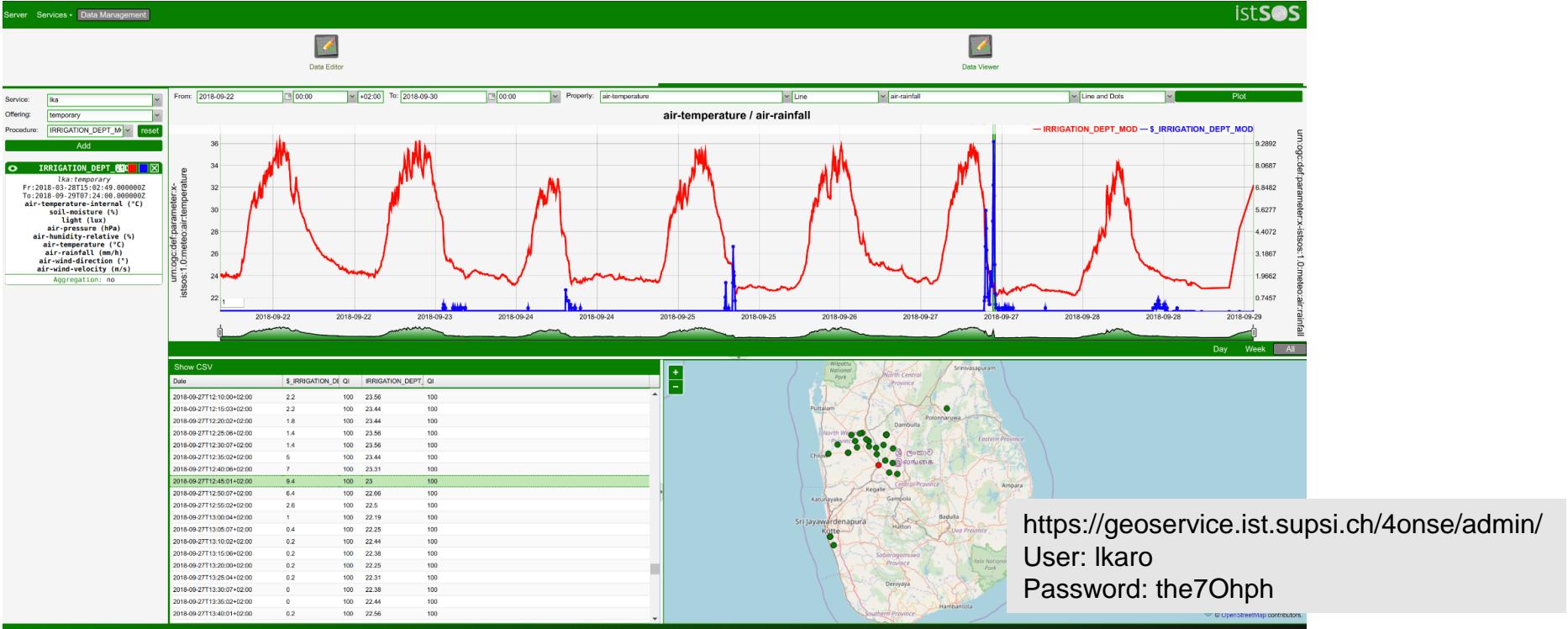
Free 4onse Workshop within OGRS2018

Wed 10th October 09:00-12:30 S104

All the courses held within the project are open and free of charge (workshop tomorrow morning S104)

Open Education

All produced data are free and accessible using open data portals or standard service



Open Data

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May 8, 2018 (v1) Report Open Access

4onse D2.6 - Documentation for user, developers, calibration, tutorial

Strigaro Daniele, Cannata Massimiliano, Rangajeewa Ratnayake

This document collects the information and guides to build the first official version of the 4onse monitoring system. It contains the full documentation both for the hardware and the software components.

Uploaded on May 9, 2018

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<https://geoservice.ist.supsi.ch/4onse/admin/>
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Different degrees of openness

Degrees of openness

Five star open data



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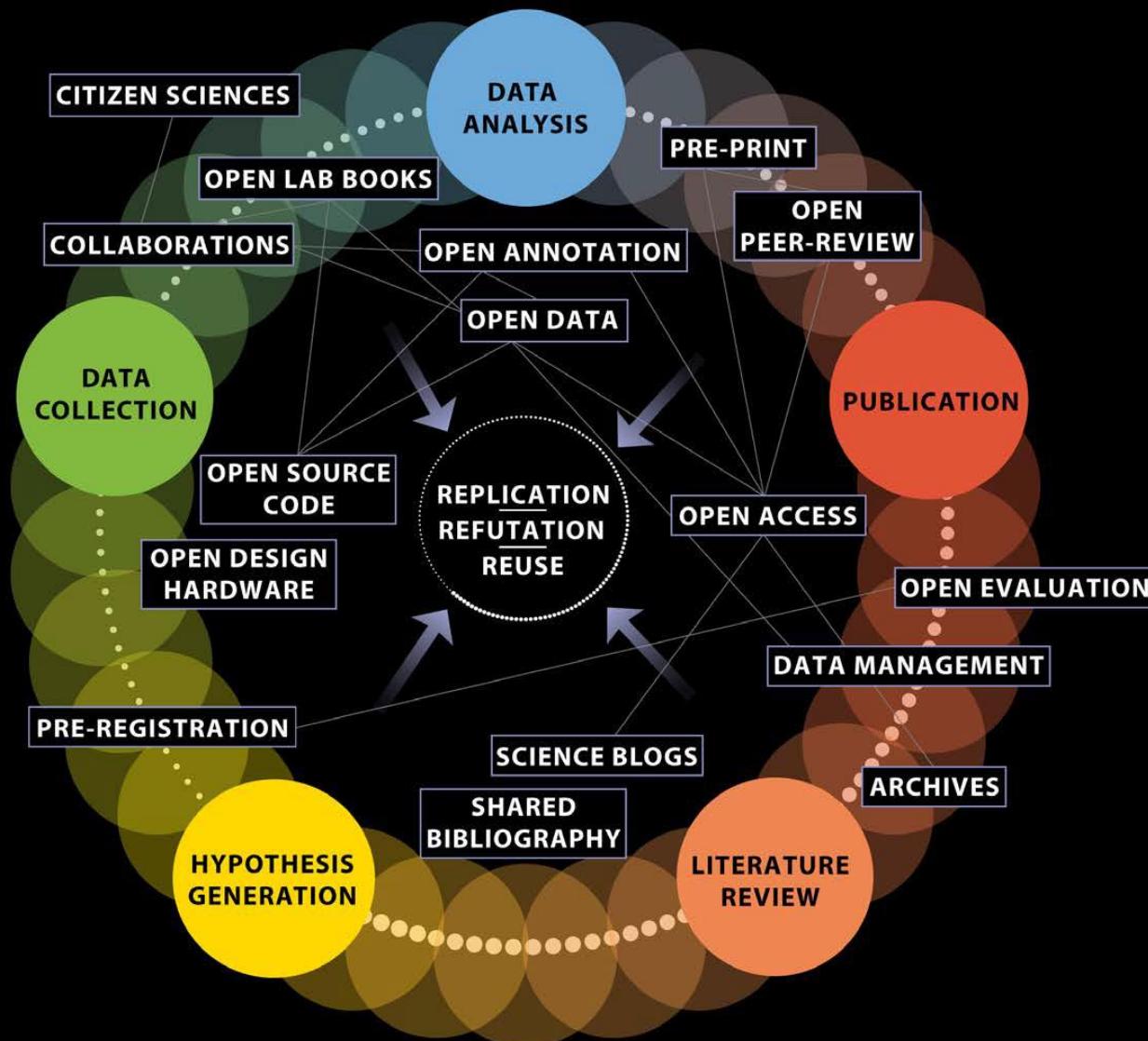
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Openness at every stage



Open Science path is paved... ...no way to go back



“The European Commission’s vision is that information already paid for by the public purse should not be paid for again each time it is accessed or used, and that it should benefit European companies and citizens to the full.”

http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf

Open Science in Horizon 2020

Peer-reviewed publications

- Mandated to deposit machine-readable electronic copy of paper in repository by the date of publication
- Ensure OA via green/gold routes
- Embargo of 6 months (STEM) or 12 months (HSS) allowed
- Bibliographic metadata must be made openly available
- Aim to deposit research data

Research data

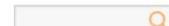
- Pilot for projects in named areas. Other can participate voluntarily.
- Applies to research data underlying publications, plus any other data as decided by project.
- Participants must:
 - Write a DMP as a project deliverable
 - Deposit data in a repository
 - Make it possible for others to access, mine, exploit and reuse the data
 - Share information on the tools needed

**“As open as possible,
as closed as necessary”**

Switzerland: 100% OA by 2020



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NRP

NCCR

Making open access the new normal

10/Oct/2018



It has never been so easy to obtain grants for open access publications from the SNSF. Researchers can now apply for them on the mySNF online platform – even after the project has ended.

Contact

Open Access to Publications
Tobias Philipp

Open Access to Publications



The SNSF requires grantees to make the results of SNSF-funded projects available in an open access (OA) publication or database. As of 2020, all results will have to be available in open access. Researchers can apply for grants from the SNSF to cover OA publishing costs.

Take home message

- **Open Science is a response to:**
 - Unfair dissemination and growing commodification of knowledge
 - Irreproducibility and sloppy science due to pressure to produce (positive) results
 - Too long delay from discovery to dissemination
 - Failure to take into consideration scholarship beyond publications in the evaluation process
 - Slow adoption of digital technologies (e.g. Electronic Laboratory Notebooks)

Take home message

- **Open Science is an opportunity to:**
 - make the entire research process transparent and accessible
 - increase cooperation and efficiency, and therefore impact
 - change in the way scholarly knowledge is produced, evaluated and disseminated
 - claim back ownership for the scientific community
 - enable trust and facilitate knowledge transfer from academia to society

Take home message

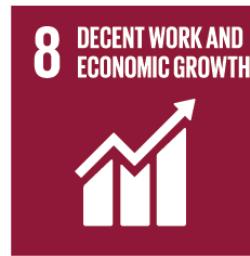
- **New researcher's skills requirements to:**
 - Discipline scientific knowledge
 - Large and international team coordination
 - Networking and multidisciplinary studies (STEM & SSH)
 - Dissemination and communication (including social media)
 - Legal understanding of licenses
 - Software management processes
 - Data management

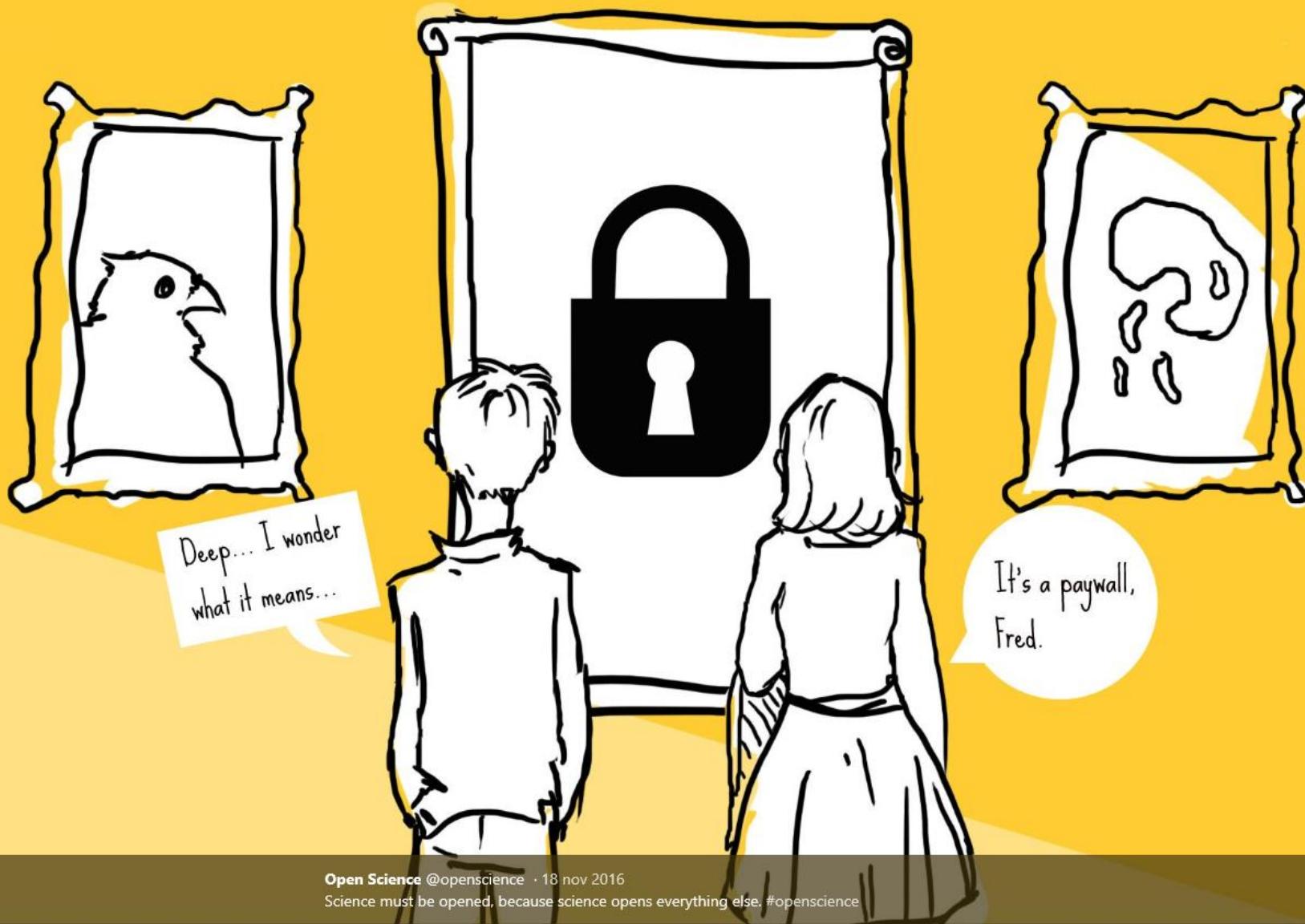
Soft skills and Open mind

Openness is just a mean...



SUSTAINABLE DEVELOPMENT GOALS





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▼

Science must be opened, because science opens everything else