

TRAVEL REPORT FORM

출장보고서

결 재	선임연구 원	팀장	부서장	부서장
	09/21	09/21	09/22	대결 09/23
협 조	한정민	이현록	유진호	김형진

I. Reporter 보고자

Department 소속	Position 직위(직급)	Name 성명	Travel Date 날짜	Note 비고
기후예측본부	선임연구원	한정민	9/10~9/17	

II. Major Activities 주요업무 수행내용

1. Main Contents and Activities 주요내용 및 활동

- 개요
 - : SciDataCon2016는 CODATA, ICSU World Data System, Research Data Alliance에서 공동개최하는 International DataWeek2016의 한 부분으로 데이터 수집, 가공, 공유관련 컨퍼런스이다.
 - 주요테마는 Research and Data, Data Science and Data Analysis, Data Stewardship, Education and Data, Data, Society, Ethics and Politics 등으로 나뉘고 구두발표와 포스터 발표, 포럼형식으로 진행되었다.
- 주요내용 및 활동
 - : SciDataCon2016의 Principles, platforms and Metrics to improve data, getting Data, Data citation, Geospatial data, Worldwide data infrastructure의 주제로 발표하는 학회장에 참석.
 - : Enhancing Data infrastructure Services to Sustain Earth Sciences Researcher's Needs for a Robust Science을 주제로한 세션에서 "Development of Climate Information processing system based on openAPI"라는 제목으로 구두발표함.
 - : Networking break에서 타기관 참석자와 연구분야 논의 및 향후 공동연구를 위한 정보교류를 함.

2. Relevance to APEC Climate Center's Activities 결론 및 소감

- 여러 주제 중 본인이 참석한 세션에서는 데이터 수집방법론, 데이터 공유규칙 개발, 데이터 처리 기법 등이 약 30%,50%,20% 정도의 비중을 차지함.
- 주요기관에서는 자료수집 및 검증을 통한 교류에 많은 비중을 할애하고 있었으며, 개발된 WPS,CDF나 R package등 자료처리 기술을 소개하는 행사를 진행하였음.
- 다양한 방법의 과학데이터 서비스 사이트를 수집하였으며, 각 서비스의 특성을 분석하여 APCC 데이터 서비스 방법 및 자료처리 기술에 벤치마킹으로 활용하고자 함.(자료특성분석, 서비스 특성, 적용기술, 사용빈도 측정 등)
- 전세계적으로 데이터에 대한 Trend를 반영하듯이 BigData 처리와 OpenData 활용에 대한 논의가 있었으며 국가나 국제적인 협동체 구성이 중요하며 이는 각 산업과 교육에 연결하기 위한 global community가 요구됨을 강조하고 있음.
- 컨퍼런스에 참여한 각 기관과 비교하면 APCC는 앞으로 데이터 처리, 자료서비스가 많이 부족하여 정보서비스에 개선에 매진하고자 함.

III. References 참고사항

(with attachment of any information or report in case of attendance of conferences, workshops and meetings) 학술대회, 워크숍, 회의 등 참석 시 관련 정보 및 문서 첨부

1. Presented and Collected Materials 주요 수집자료

-
- 컨퍼런스 발표자료(keynote)
 - 자료 서비스 웹사이트 주소 및 운영 담당자 연락처

2. Suggestions and Remarks 건의사항

3. 발표회장 사진



<그림 1 SciDataCon2016 발표회장(Grand ballroom) 사진>

Challenges and Opportunities with Citizen Science: How a decade of experiences have shaped our forward paths

*Elaine M. Faustman, Ph.D. DABT, James C. Wallace, Jesse A. Port, Marissa N. Smith
Institute for Risk Analysis and Risk Communication*



SCHOOL OF PUBLIC HEALTH

UNIVERSITY of WASHINGTON

Outline

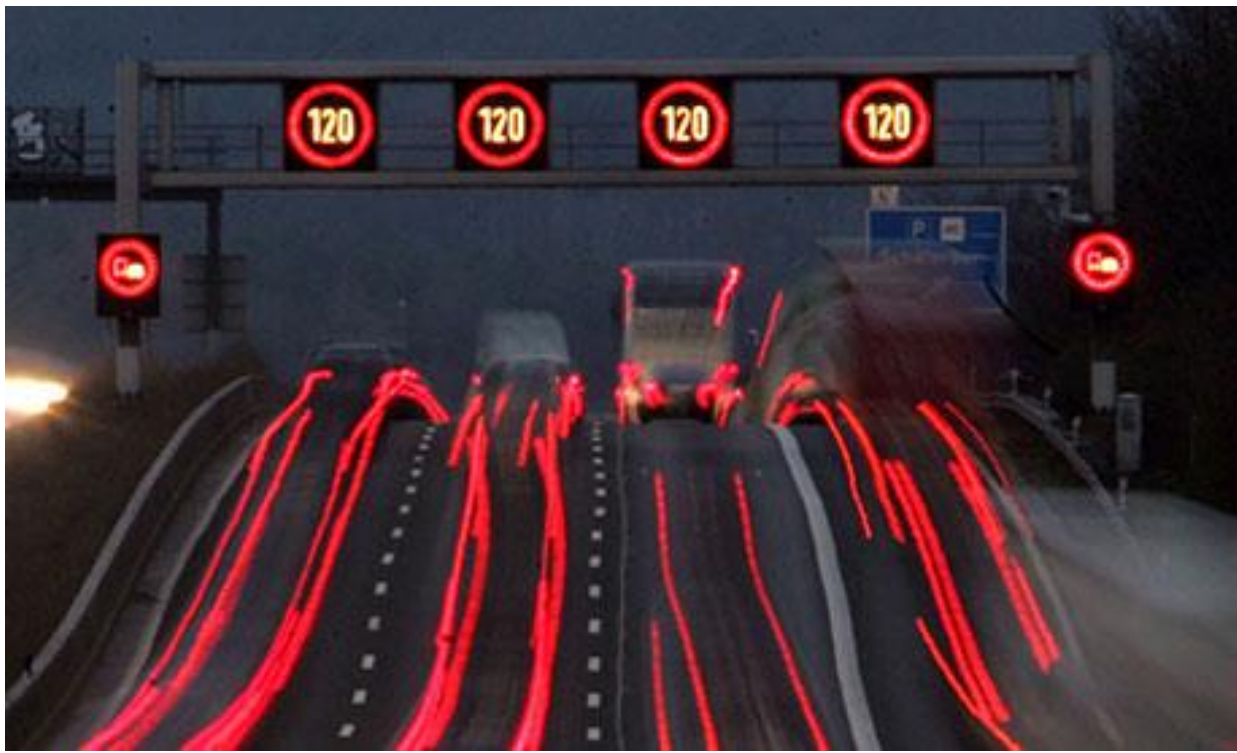
- ✂ Historical Perspectives
- ✂ Examples of Citizen Science Opportunities
- ✂ Community Based Participatory Research
- ✂ Challenges to our scientific community



Citizen Astronomers Have
Contributed Greatly to Our
Knowledge of the Skies



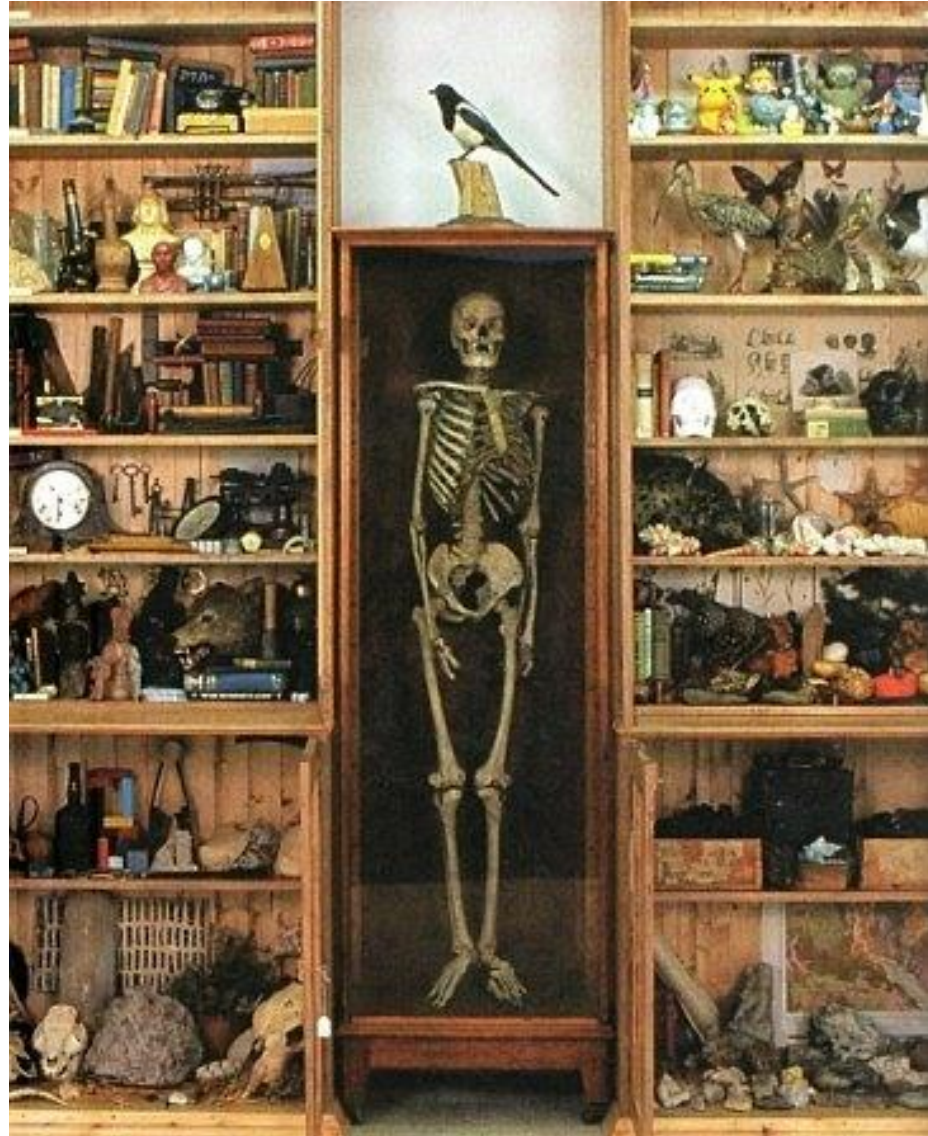
Traffic Applications: Individual Decision Making and Real-Time Citizen Data Input



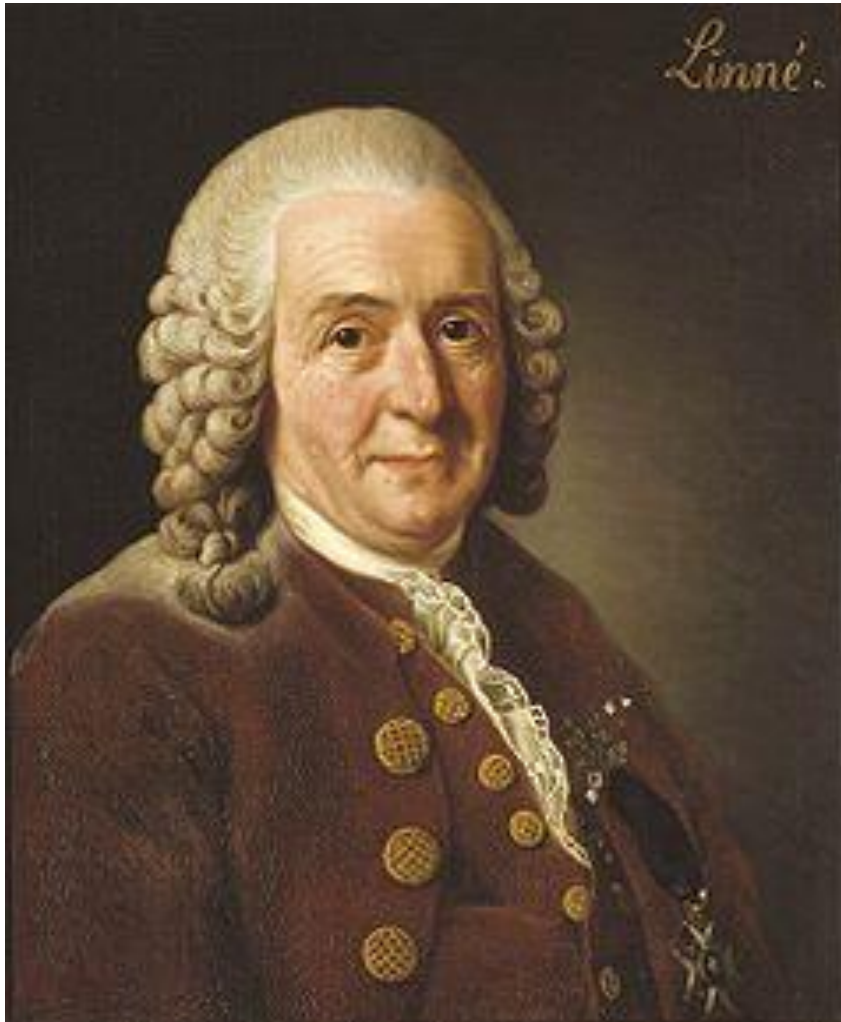
Gentleman Scientists



Cabinets of Curiosity Science



Carl Linnaeus (Carl von Linné)



Carl von Linné, [Alexander Roslin](#), 1775.

Oil painting in the portrait collection at [Gripsholm Castle](#)

CAROLI LINNÆI
EQUITIS DE STELLA POLARI,
ARCHIATRI REGII, MED. & BOTAN. PROFESS. UPSAL.;
ACAD. UPSAL. HOLMENS. PETROPOL. BEROL. IMPER.
LOND. MONSPEL. TOLOS. FLORENT. SOC.

**SYSTEMA
NATURÆ**

PER
REGNA TRIA NATURÆ,
SECUNDUM
CLASSES, ORDINES,
GENERA, SPECIES,
CUM
CHARACTERIBUS, DIFFERENTIIS.
SYNONYMIS, LOCIS.

TOMUS I.

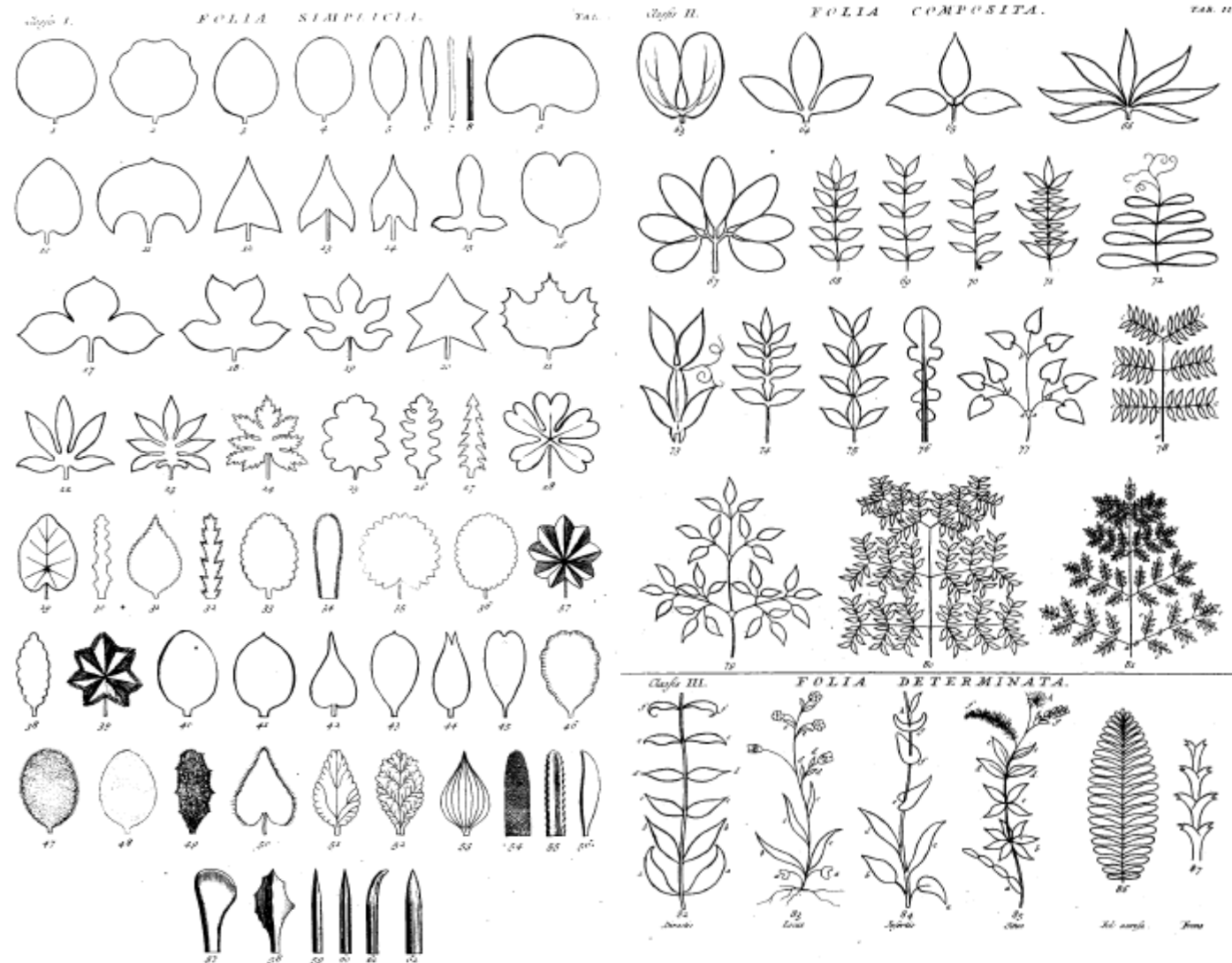
10
EDITIO DECIMA, REFORMATA.

Cum Privilegio S:æ R:æ M:tis Sveciæ.

HOLMIÆ,
IMPENSIS DIRECT. LAURENTII SALVII,
1758.

Title page of the 10th edition
of *Systema Naturæ* (1758)

Leaf forms from *Hortus Cliffortianus*



Evolving Concepts of “Right to Know”

National and International Right to Know

Administrative Procedures Act (1946).

Freedom of Information Act (1966) – DOJ.

National Environmental Policy Act, 1969 (NEPA) – CEQ.

Federal Hazard Communication Standard (1972) – OSHA.

Emergency Planning and Community Right to Know Act (1986) – EPA.

Convention on Access to Information, Public Participation in Decision-making, and Access to Justice in Environmental Matters (2000) -UNEP

Political Theory Perspectives on the right to know

Constitutionalist model

Dahl, 1989

Elected officials are responsible for making decisions. Information must flow freely between democratic institutions.

Public Choice model

Buchanan and Tullock, 1962

Citizens must have free access to information

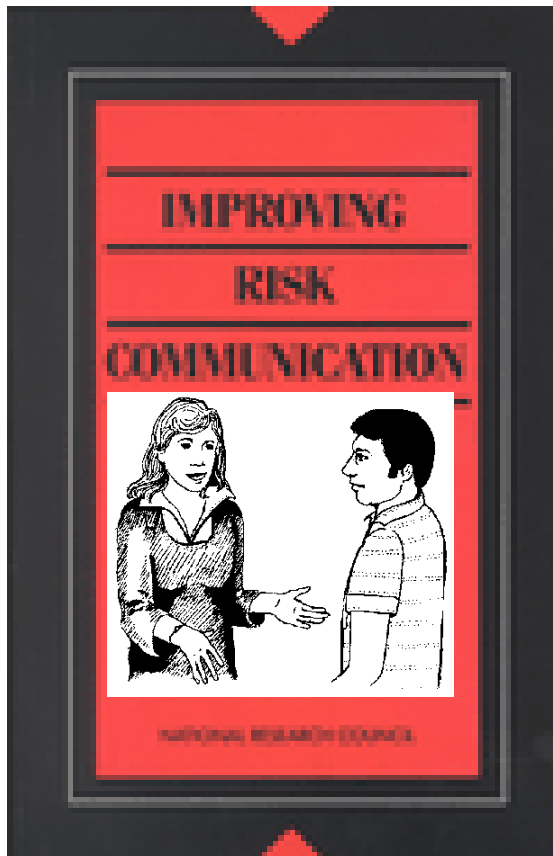
Deliberative model

Habermas, 1987

People must actively deliberate the meaning of information and attempt to create shared understanding

Academy Reports have Defined in U.S. Rights of Citizens to Know, Understand, and Shape Research

NAS 1989 – Improving Risk Communication as a Two Way Process



NAS 1996 - Understanding Risk Engage Science through Analysis and Deliberation

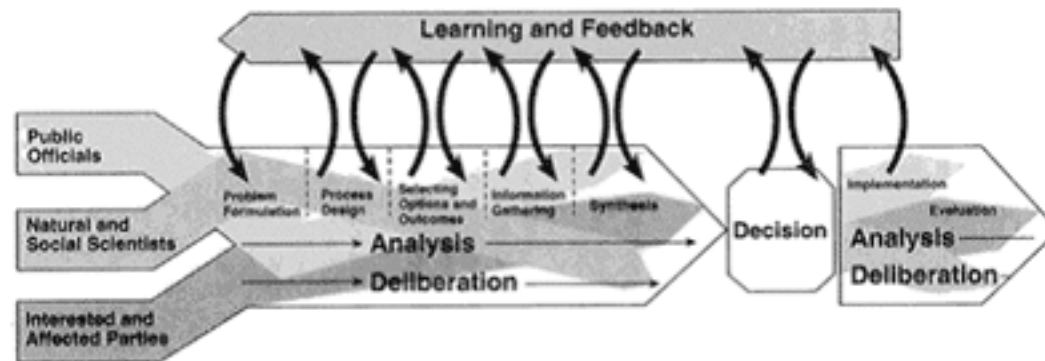
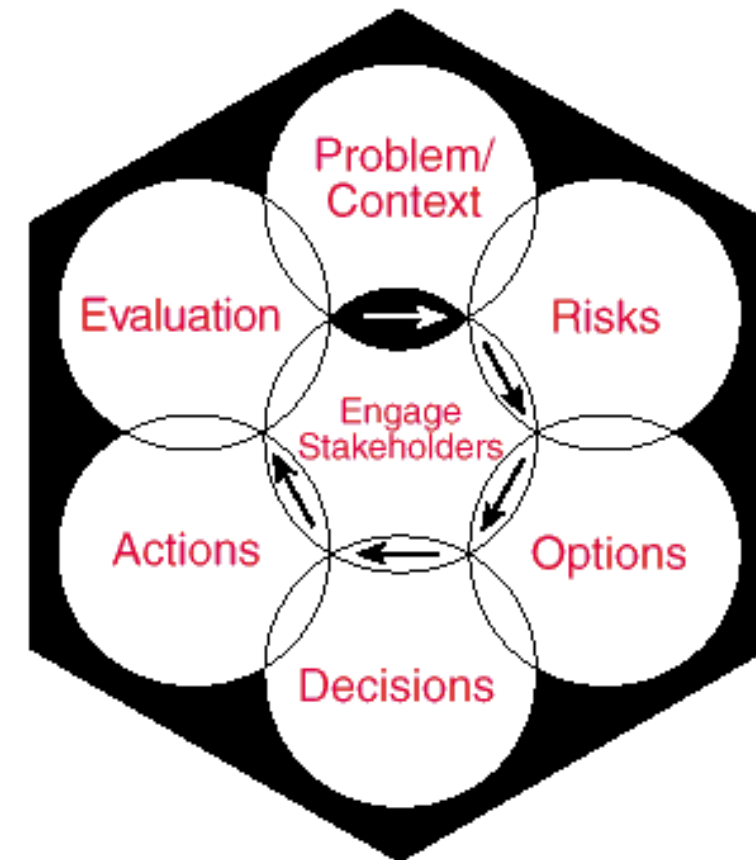


FIGURE 1-2. A schematic representation of the risk decision process.

President's Commission 1997 – Risk in Context



Key Factors in Defining Understanding

HOW information can be accessed

WHAT information is needed

WHEN the decision process is open to new information

WHAT options there are to be involved

Need **CONTEXT** for information for risk framework

Community-Based Participatory Research Project

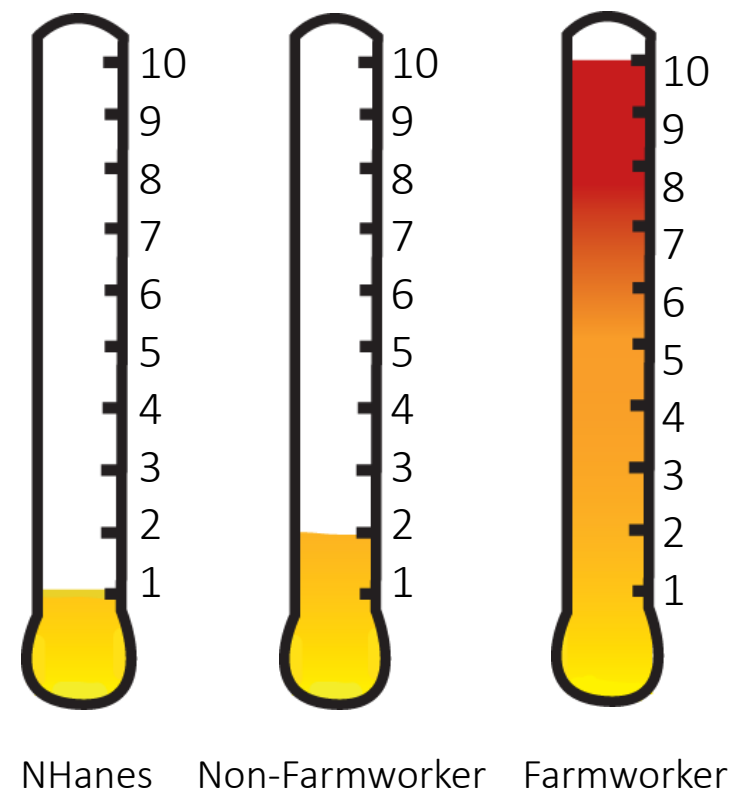


**Center for Child Environmental Health Risks Research at
the University of Washington
Presented by:
Beti Thompson, Ph.D.**

Involving the Community

- Formed Community Advisory Board (CAB) at onset of project (1999)
 - Thompson B, Coronado G, et al Identifying constituents to participate in a project to control pesticide exposure in children of farmworkers. Environmental Health Perspectives, 2001;109:443-448. PMCID: PMC1240563
- CAB advised us along the way
 - Suggested collection of vehicle dust (take-home pathway)
 - Suggested hypotheses for second study
 - Suggested importance of working closely with community members
 - Thompson B, Coronado GD, et al Pesticide take-home pathway among children of agricultural workers: study design, methods, and baseline findings. Journal of Occupational and Environmental Medicine, 2003;45:42-53. PMID: 12553178

Presenting Urinary Metabolite Data at Forum



Results of Dissemination

- Over 90% of participants have continued in our study
- Results
 - When participants were asked what they learned they were able (80 to 90 % correct responses) to identify details about the message and levels of exposure in their bodies as well as exposure for their children
- Handouts
 - 80% or more of participants remembered the handouts
- Protective Practices
 - 89% or higher answered all protective practices questions correctly

Participants are eager to contribute



"Why do we do research? Well, to learn how to prevent illness and all of that."

--Male non-farmworker

"I participate to help others, so maybe they could detect [cancer] earlier if I helped."

--Male farm worker

"I am proud that I can collaborate on research that will help future generations, in this case, for pesticides."

--Male non-farm worker



Why Participate?

"I know the importance of sometimes getting that information of what the pesticides contain and what they can do to people....These findings are important."

--Female farmworker

"It's good to learn about this exposure. [The promotora] told me that the field where I work has many chemicals, and I can bring them home and things there could become contaminated. I didn't know that."

--Male farmworker



"I decided to participate because I wanted to know: if I don't work in the field, is it a little bit dangerous [referring to pesticide exposure] to live in the Valley? I wanted to know what was in my blood."

--Female non-farmworker

Mussel Watch Program- Example of Longitudinal Study Citizen Data Collection



Collection of Zebra mussels in great Lakes

- NOAA describes the goal of Mussel Watch as “to support ecosystem-based management through an integrated nationwide program of environmental monitoring, assessment and research to describe the status and trends of our nation’s estuaries and coasts.”^[3] Mussel Watch is a program that monitors the health of bivalves, mussels and clams for contaminants along the coasts of the United States. This program was launched in 1986 and since then is the longest government-run monitoring program that has national influence.^[3]
- Starting in 2000, the scientists that NOAA sent out to collect the mussels changed companies and the Mussel Watch program began employing citizen scientists to collect the mussels; this approach saved a good deal of money for the program.
- Since 1986, NOAA’s Mussel Watch has consistently studied and monitored 300 sites around the country for over 100 organic and inorganic pollutants in sediments, oysters, and mussels.

Measuring Air Pollution for Individuals – Examples Where Citizen Access to Sensors and Databases Have Lead to Individual Household and Community Actions



<http://newatlas.com/citisense-air-quality-monitor/25512/>



Edmund Seto

Research in progress



San Ysidro Community-Based Air Monitoring Study at the California-Mexico Border

Posted on [September 1, 2016](#)



Funded by the Office of Environmental Health Hazard Assessment of CalEPA, my research group has partnered with Casa Familiar and San Diego State University to conduct a 2-year community-based air monitoring study in the San Ysidro community at the CA-Mexico border.

Motivated by the need to better inform CalEnviroScreen — an Environmental Justice tool developed by CalEPA to map communities disproportionately impacted by environmental health hazards, the study will combine local knowledge from community residents with air pollution monitoring tools and methods provided by academic partners to conduct a year of intensive

monitoring within the border community.

Border communities, such as San Ysidro, may face air pollution impacts not felt by other CA communities and existing monitors may not be adequate to measure this impact. Being close to the international border may result in exposure to air pollution from lines of idling vehicles at the Ports of Entry, trade-related commercial trucks, and transport of pollutants from Mexico.

<http://setoresearch.dyndns.org/website/researchblog/>

Ban Fracking on Public Lands

Big oil and gas companies are threatening our public lands, including some iconic national treasures. Food & Water Watch is organizing to pass a ban on fracking on public lands.

Food & Water Watch is organizing in communities across the country to pass an immediate ban on fracking on public lands in Congress, which is the only way to truly protect these treasured places, and is a critical step in protecting the climate on which we all depend. **Join us in telling Congress to pass a ban on fracking on public lands.**

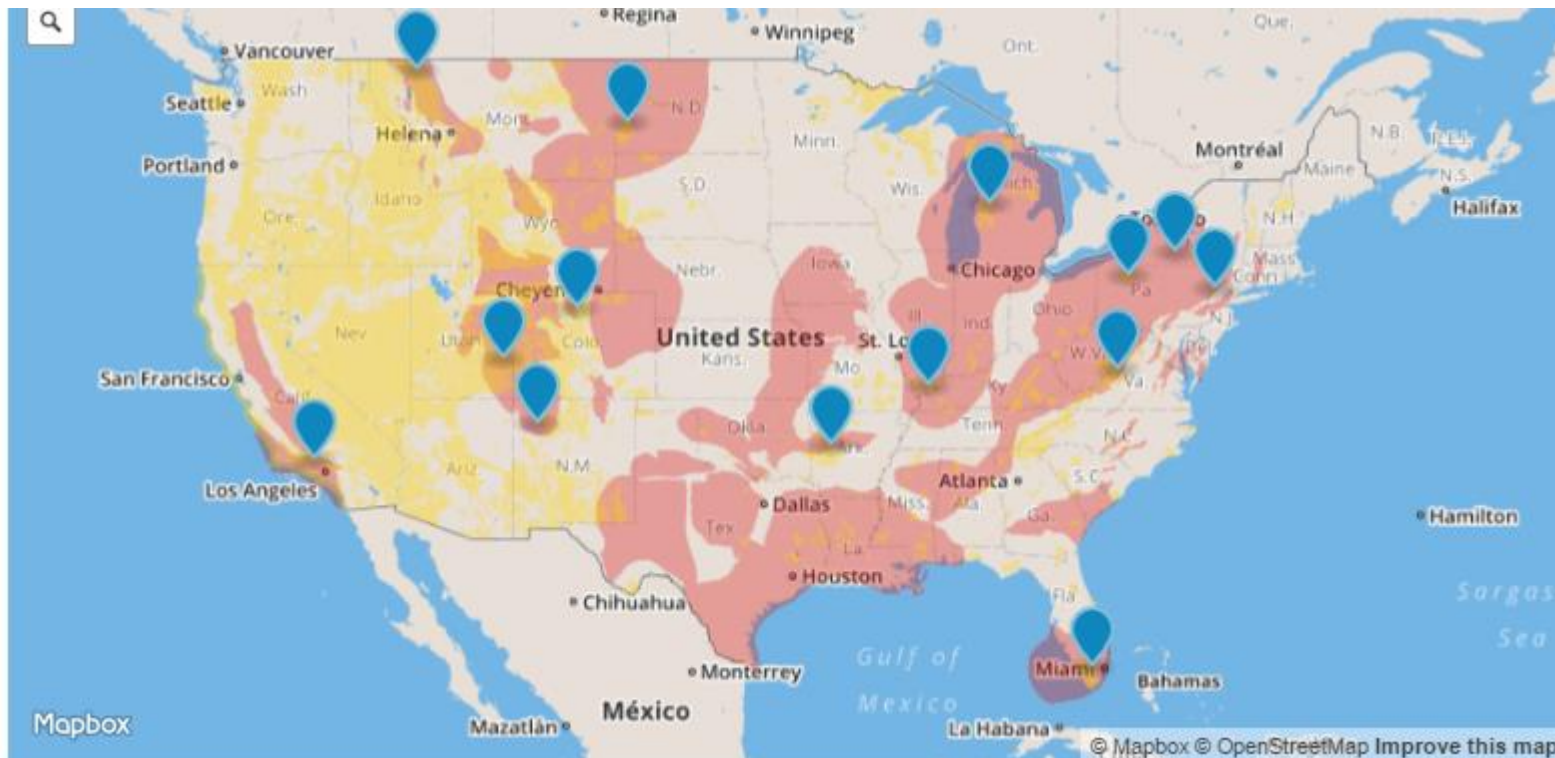


Don't let Big Oil and Gas frack
our public lands.



Fracking has already caused serious damage to our public lands

Millions of acres have already been leased by oil and gas companies – and could expand to 200 million acres. **These are just a few of the parks that could potentially be affected.** This is bad for the air, this is bad for the water, and this is bad for tourism. Accidental spills of toxic waste, air pollution, earthquakes, and drinking water contamination are just some of the known dangers of drilling; none of this is acceptable on the public lands or around National Parks that are near and dear to people's hearts. Even worse, fracking accelerates climate change, which is a severe threat to our public lands and our entire planet.



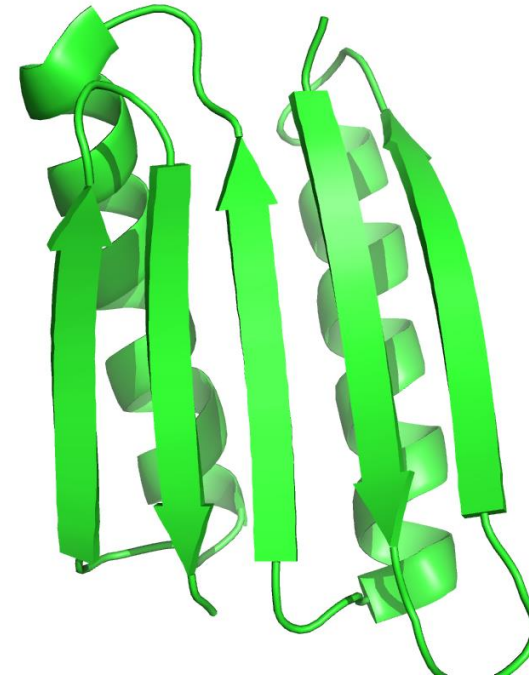
Sources: Esri, National Atlas of the United States, United State Energy Information Administration and the United States Geological Survey

Synthetic Biology

- Synthetic biology is an interdisciplinary branch of biology and engineering. The subject combines various disciplines from within these domains, such as biotechnology, evolutionary biology, genetic engineering, molecular biology, molecular engineering, systems biology, biophysics, and computer engineering.
- For example "an emerging discipline that uses engineering principles to design and assemble biological components".[1]
- The definition of synthetic biology is debated, not only among natural scientists and engineers but also in the human sciences, arts and politics.[3]
- One popular definition[4] is "designing and constructing biological modules,[5] biological systems, and biological machines for useful purposes." However, the functional aspects of this definition are rooted in molecular biology and biotechnology.[6]

Bioethics and Security

- In addition to numerous scientific and technical challenges, synthetic biology raises ethical issues and biosecurity issues. The ethical issues exist for countries, scientists, and citizens but there are varying expectations for ethics infrastructure and code among these use groups.



The Top7 protein was one of the first proteins designed for a fold that had never been seen before in nature.

Meet Taha A. Kass-Hout, M.D., M.S. Chief Health Informatics Officer Director of the Office of Health Informatics



Dr. Kass-Hout joined FDA in March 2013 as the Agency's first Chief Health Informatics Officer and in 2015 also became Director of its [Office of Health Informatics](#). With nearly two decades of expertise in driving innovation in health informatics and technology, Dr. Kass-Hout provides long- and short-term strategic, operational, and tactical planning activities for the public and private sectors. He brings agile development and [user-experience design \(UX\)](#) practices to the government to demonstrate results early and often, and apply accountability to those efforts that are not meeting expectations. His responsibilities include serving as [Ex Officio to the Office of the National Coordinator for Health Information Technology \(ONC\)](#) for topics that address patient electronic health record interoperability, big data, and privacy in health care. Dr. Kass-Hout also serves as the chair of the [Scientific and Research Domain](#) Steering Committee across the U.S. Department of Health and Human Services (DHHS).

<http://www.fda.gov/AboutFDA/CentersOffices/ucm349836.htm>

Humanitarian Tracker

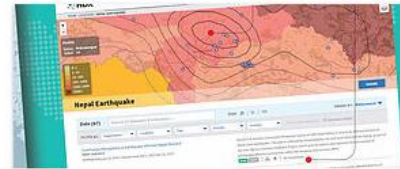
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We are a **501c3 non profit forum** that connects and **empowers citizens** using **innovation in technology** to support **humanitarian causes**



Report from Syria: Fusing Citizen & Digital Diplomacy. CPD Blog, Hend Alhinnawi, 08/19/2016.

"Today is World Humanitarian Day. Over the past five years, thousands of ordinary citizens in Syria have risked their lives to save others and tell the world what is happening on the ground in their country." Photo by David Scales



L'alleanza tra la comunità tech, designer e Onu Mappe, dati e applicazioni aiutano sia i migranti sia gli interventi in situazioni di crisi umanitaria come il terremoto in Nepal, Il Sole 24 Ore, Alessia Maccaferri, 03/15/2016.

The Alliance between the Tech Community, Designers and UN... "It [Syria Tracker] is an important resource for anyone who wants to know something about what is happening in the country affected by war."



Wanted: Tech Superstars to Drive Government Innovation. NextGov, TechInsider, 03/11/2016. Latanya Sweeney and Dan Tangherlini.

"an example from civil society, the nongovernmental organization Humanitarian Tracker is using crowdsourced reports to get a better understanding of when and where violence is happening in places such as Syria."

devex
Do Good. Do It Well.™

We know more about epidemics than ever before. Now what?

By Elizabeth Dickinson | @edickinsonbeth | 08 August 2016

1 2 3 4 5 6 7 8 9 10



A group of community health workers working with the United Nations Population Fund were trained to use CommCare, a mobile health application that allows the collection of data while monitoring Ebola contact in Guinea. The Ebola epidemic elevated data monitoring tools from a niche corner of public health to center stage. Photo by: 1stCIV Campaign / CC BY-NC-ND

We know more about epidemics than ever before. Now what? Devex, Elizabeth Dickinson, 08/08/2016.

"The first reports started coming in by mobile phone. Concerned users in Syria opened up the website of HumanitarianTracker.org and filled out a basic web form. Someone was sick; it looked like polio."

The key to spotting the outbreak was what Kass-Hout calls the data "mosaic effect."

Humanitarian Tracker

December 3, 2015

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Impact » Impact 360 » Global Motherhood » This Week » Inspiring Leaders » What's Working » Small Businesses » What's Working » Purpose » Photo » Community Power

THE BLOG Featuring fresh takes and real-time analysis from HuffPost's signature lineup of contributors

mid on the 6:00
Sling
Renee Coker
Lawrence B. Williams
Ari Shavit

Mariana Pearl by @marianap1
Award-winning writer and managing editor of @HuffPost FOR CHANGE

Syria Tracker: Women Dying in Numbers
Posted: 12/03/2015 7:25 pm EST | Updated: 2 hours ago

3 0

Facebook Twitter YouTube Google+

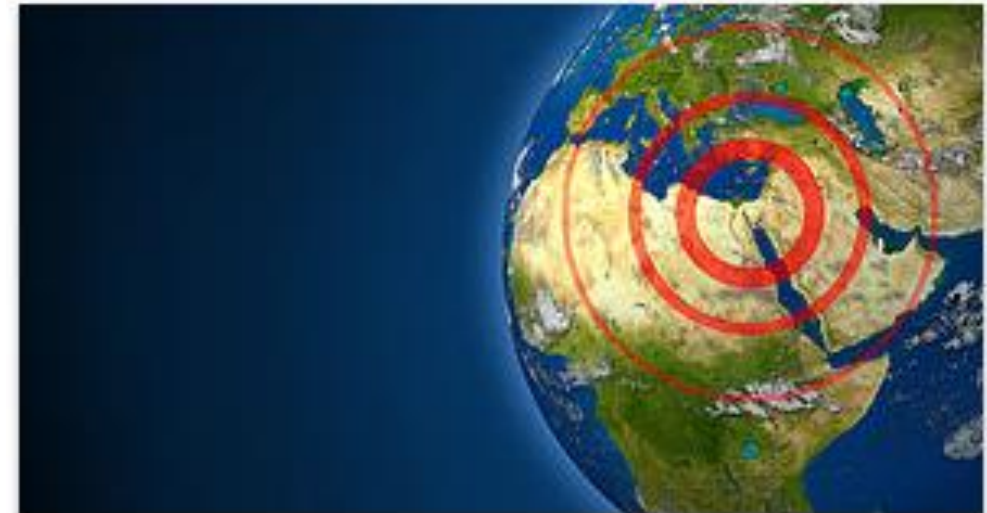
SUGGESTED FOR YOU

Let's American President Eisenhower
writes: "I hate war as only a soldier who has lived it can, only as one who has seen its brutality, its futility, its stupidity." Many lessons have been or could have been learned in war. We know that war cannot be without a deceptive and hateful narrative. We know that wars kill indiscriminately and that women and children are its lawless and nameless

Prince Harry Dedicates New Children's Center To Princess Diana

Syria Tracker: Women Dying in Numbers.
Posted: Huff Post, 12/03/2015 7:25 pm EST.

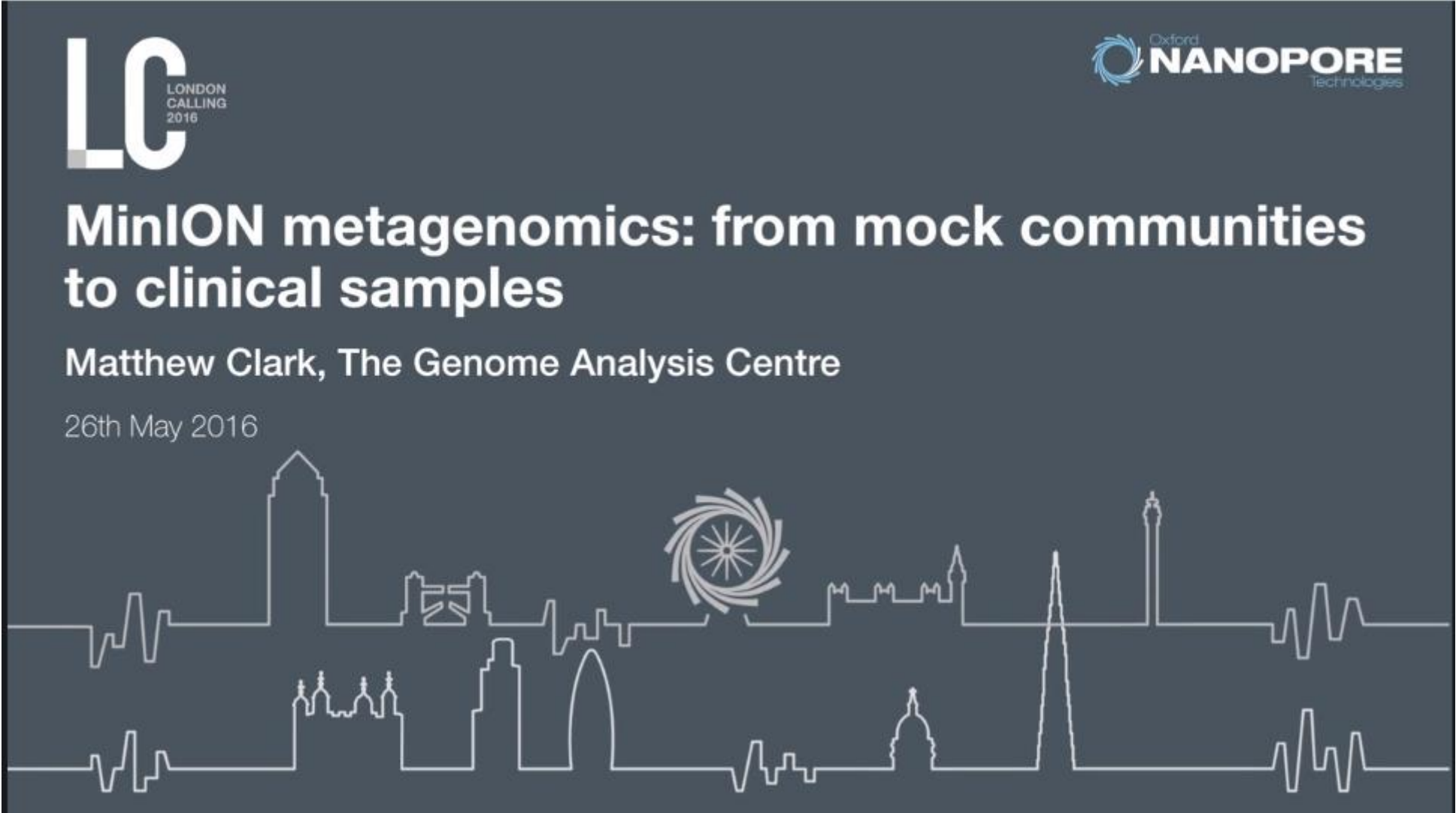
"Unsurprisingly, patterns show a steady rise in the proportion of female deaths over the course of the conflict. It went from less than 1% in April 2011 to over 18% today suggesting targeted killing."



Can Big Data Help the Syrian Conflict, iCrunch Data News. Lavanya Rathnam 10/08/2015

"...Big Data has just entered the Syrian sphere. More collaborations & innovative tools using Big Data combined with political will from developed countries can sure help Syrians to return back to their country and live in peace."

MinION metagenomics: from mock communities to clinical samples | Matthew Clark, The Genome Analysis Centre, from [Oxford Nanopore](#)



The poster features a dark blue background. In the top left corner is the 'LC LONDON CALLING 2016' logo. In the top right corner is the 'Oxford NANOPORE Technologies' logo. The main title 'MinION metagenomics: from mock communities to clinical samples' is centered in large white font. Below it, the speaker's name 'Matthew Clark, The Genome Analysis Centre' and the date '26th May 2016' are listed. The bottom of the poster is decorated with a white line-art illustration of a city skyline, including a prominent circular structure resembling a MinION sequencer.

LC LONDON CALLING 2016

Oxford **NANOPORE** Technologies

MinION metagenomics: from mock communities to clinical samples

Matthew Clark, The Genome Analysis Centre

26th May 2016

Lessons Learned from Citizen Science

- Citizen involvement is an essential part of Public Health research
- Citizen science often is answering important but different questions than scientists are answering and this can cause a disconnect
- Citizens have a right to know, understand and contribute to science
- Big data methods offer new approaches for validation and data collection
- New technologies of biosensors and real time field analyzers offers citizens new highly technical options for data collection
- New tools are needed to facilitate use and interpretation of many of these new technologies
- Community based participatory research can enrich science discovery

Community Intervention



After a series of presentations made in second and third grade classrooms, students were invited to enter a coloring contest. Winning entries were included in a calendar. In this drawing the woman tells the man to wash his own clothes, because she's going to a dance...and she reminds him to leave his boots outside.

Photo: Gloria Coronado

Acknowledgements

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Melinda Vredevoogd

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Ginger Armbrust
Micaela Parker
Robin Kodner
Chris Berthiaume
Adrian Marchetti
Rita Peterson

UW School of Pharmacy

Yvonne Lin

UW Microbiology

Roger Bumgarner
Rob Hall

UW Genomics

Debbie Nickerson
Jay Shendure

UC Irvine

James Swanson



NIEHS
National Institute of
Environmental Health Sciences

Pacific Northwest Center for
Human Health and Ocean Studies
University of Washington





What does that symbol mean?

Controlled vocabularies and vocabulary services

Simon Cox

12 September 2016

LAND & WATER / WRM / ENVIRONMENTAL INFORMATICS

www.csiro.au



This talk, my approach

- ~Technical
- Long term research interest = **interoperable data**
- Don't paint grand pictures – *sorry, not my thing*
- Focus on **small things that can make a big difference**

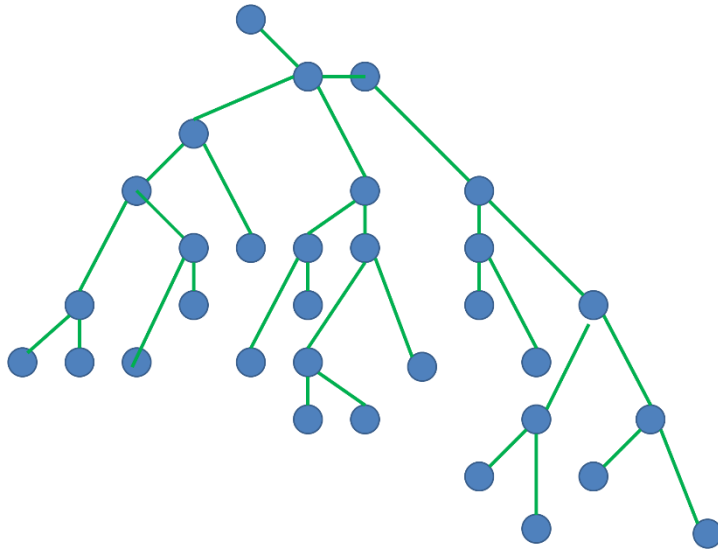
Unpacking data



Unpacking data



Unpacking data



Unpacking data



Nitrogen
Newtons
North
Noon
Neutral
November
Moles
No!

One symbol, many meanings

One symbol, many meanings

Glass Size	115 ml 4 oz	140 ml 5 oz	170 ml 6 oz	200 ml 7 oz	225 ml 8 oz	255 ml 9 oz	285 ml 10 oz	425 ml 15 oz	575 ml 20 oz
<i>NSW</i>	-	Pony	-	Seven	-	-	Middy	Schooner	Pint
<i>NT</i>	-	-	-	Seven	-	-	Handle	Schooner	-
<i>QLD</i>	-	Small Beer	-	-	Glass	-	Pot	-	-
<i>SA</i>	-	Pony	-	Butcher	-	-	Schooner	Pint	-
<i>TAS</i>	Small Beer	-	A Beer or Six	-	Eight	-	Ten or Pot	-	-
<i>VIC</i>	-	Pony	Small	Glass	-	-	Pot	Schooner	-
<i>WA</i>	Shetland Pony	Pony	Bobbie	Glass	-	-	Middy	Schooner	Pot

Beer measures in Australia

Many symbols, one meaning?

“nitrogen”

“dissolved nitrogen”

“Total nitrogen, water, filtered, milligrams per liter”

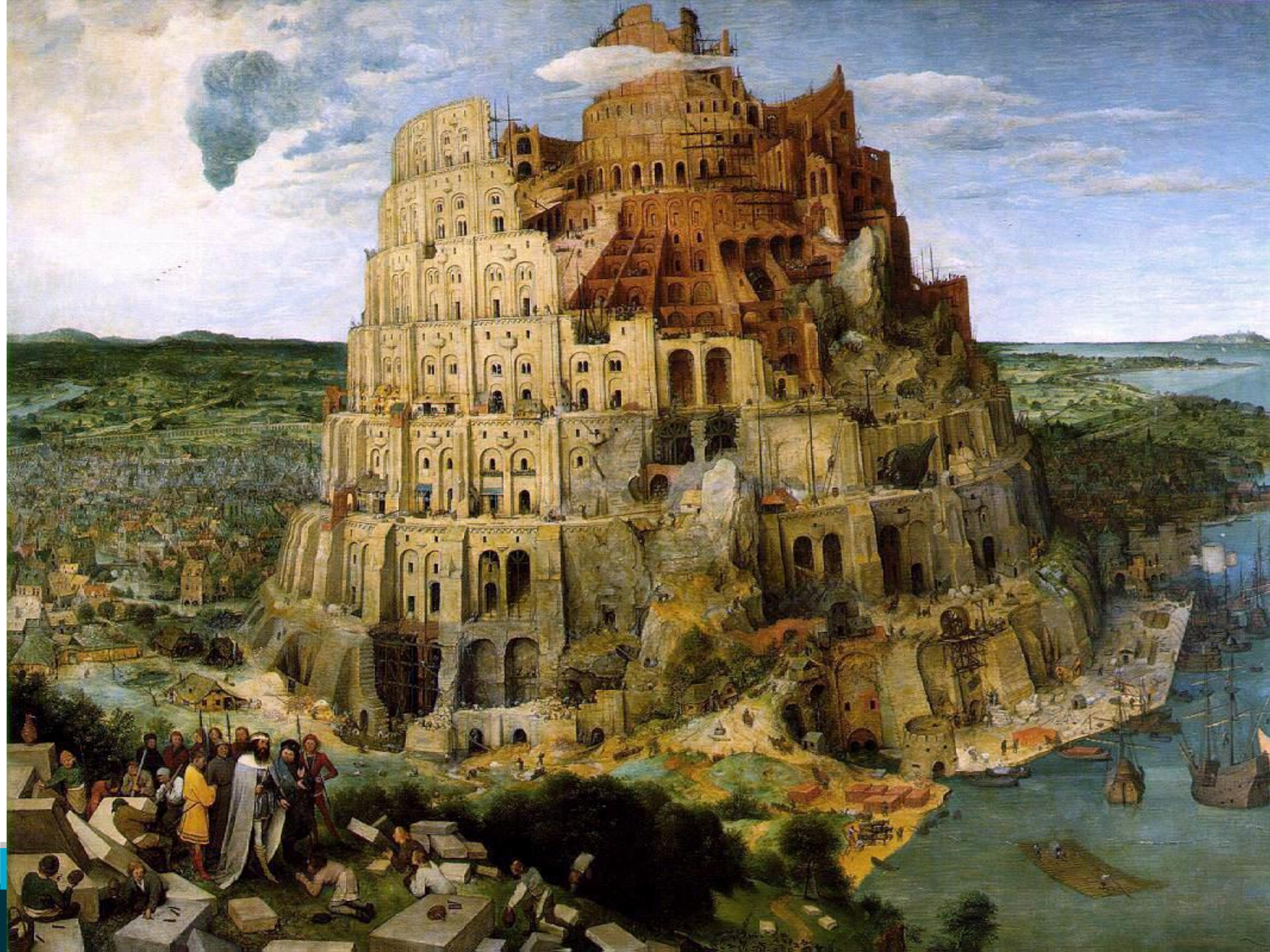
“Concentration of nitrogen (total) per unit volume of the water body [dissolved plus reactive particulate phase] by oxidation and colorimetric autoanalysis”

“Concentration of nitrogen (total) per unit mass of the water body [dissolved plus reactive particulate <GF/F phase] by filtration and high temperature Pt catalytic oxidation”

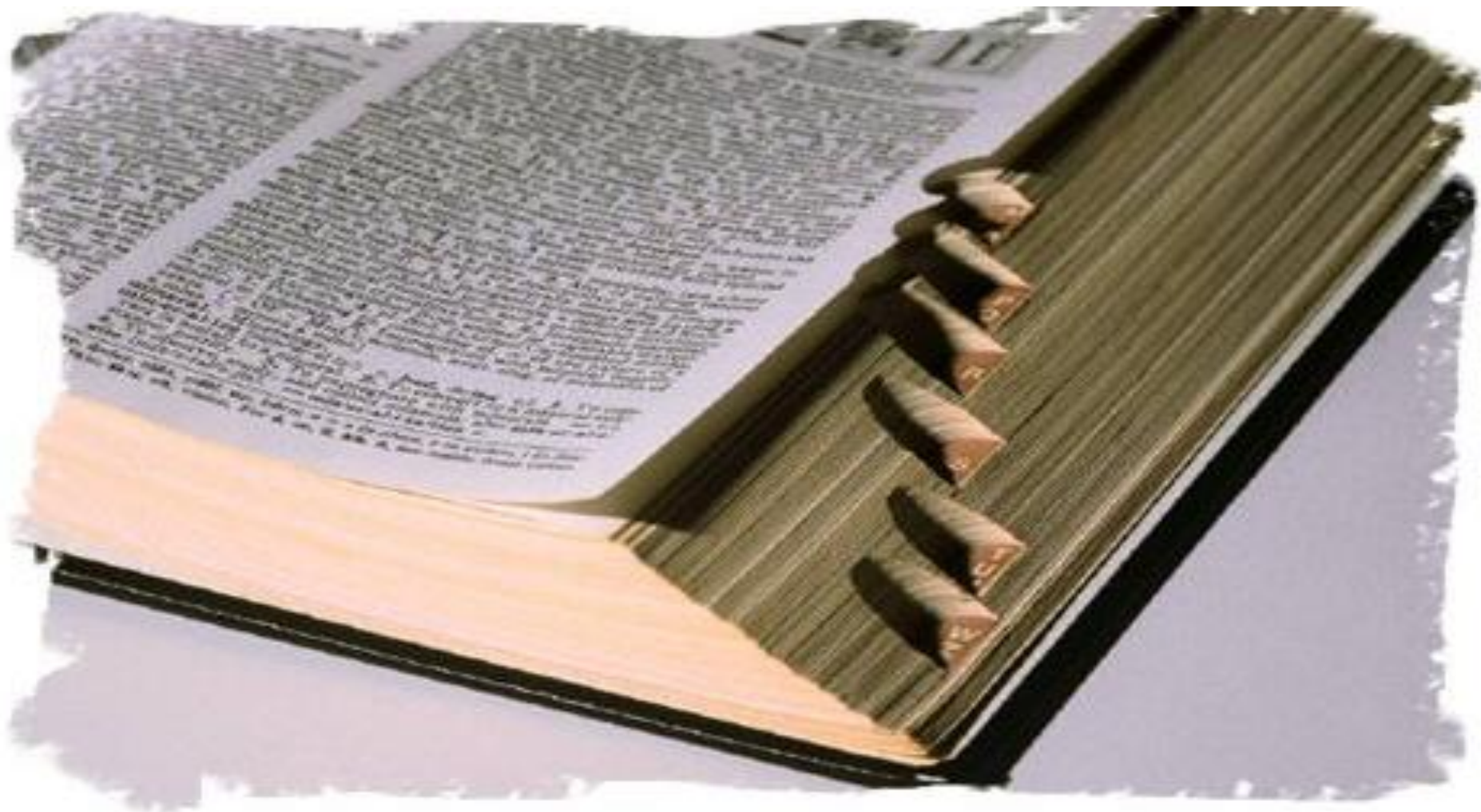
“Concentration (moles or mass) of total nitrogen (i.e. nitrogen in all chemical forms) in suspended particulate material per unit volume of the water column.”

“Concentration of nitrogen (total) {'PON'} per unit volume of the water body [particulate 2-10um phase] by filtration, acidification and elemental analysis”

“Dissolved total and organic nitrogen concentrations in the water column”



Controlled vocabularies



Widely needed common vocabularies

- *Units of measure*
- Observable properties
- Analytes, chemical substances
- Taxa
- *Units of measure*
- Instruments, sensors, platforms
- Geologic timescale
- Keywords
- ...
- *Units of measure*

Where can we get them from?

BIPM - SI base units

www.bipm.org/en/measurement-units/base-units.html

Bureau

International des

Poids et

Mesures

- the intergovernmental organization through which Member States act together on matters related to measurement science and measurement standards.

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> You are here: measurement units > SI base units

Base units

→ The SI base units are a choice of seven well-defined units which by convention are regarded as dimensionally independent:

→ metre, m

The metre is the length of the path travelled by light in vacuum during a time interval of 1/299 792 458 of a second.

Practical realization

Evolution of the definition

CCL

[SI Brochure]

→ kilogram, kg

The kilogram is the unit of mass; it is equal to the mass of the international prototype of the kilogram.

Practical realization

[SI Brochure]

→ second, s

The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom.

Practical realization

Secondary representations

Work at the BIPM

CCTF

[SI Brochure]

→ ampere, A

The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 m apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre.

Practical realization

Work at the BIPM

CCEM

Summary

→ On the future revision of the SI

→ Brief history of the SI

→ Base units

→ SI prefixes

Table on a web page

www.bipm.org/en/publications/si-brochure/metre

2014

Bureau
International des
Poids et
Mesures

– the intergovernmental organization through which Member States act together on matters related to measurement science and measurement standards.

ABOUT US WORLDWIDE METROLOGY INTERNATIONAL EQUIVALENCE MEASUREMENT UNITS SERVICES PUBLICATIONS MEETINGS

SI Brochure: The International System of Units (SI) [8th edition, 2006; updated in 2014]

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Mises en pratique

→ Unit of length (metre)

SI Brochure, Section 2.1.1.1

The 1889 definition of the metre, based on the international prototype of platinum-iridium, was replaced by the 11th CGPM (1960) using a definition based on the wavelength of krypton 86 radiation. This change was adopted in order to improve the accuracy with which the definition of the metre could be realized, the realization being achieved using an interferometer with a travelling microscope to measure the optical path difference as the fringes were counted. In turn, this was replaced in 1983 by the 17th CGPM (1983, Resolution 1) that specified the current definition, as follows:

The metre is the length of the path travelled by light in vacuum during a time interval of $1/299\,792\,458$ of a second.

It follows that the speed of light in vacuum is exactly 299 792 458 metres per second, $c_0 = 299\,792\,458$ m/s.

The original international prototype of the metre, which was sanctioned by the 1st CGPM in 1889, is still kept at the BIPM under conditions specified in 1889.

The symbol, c_0 (or sometimes simply c), is the conventional symbol for the speed of light in vacuum.



Metrology area:

AUV

EM

L

M

PR

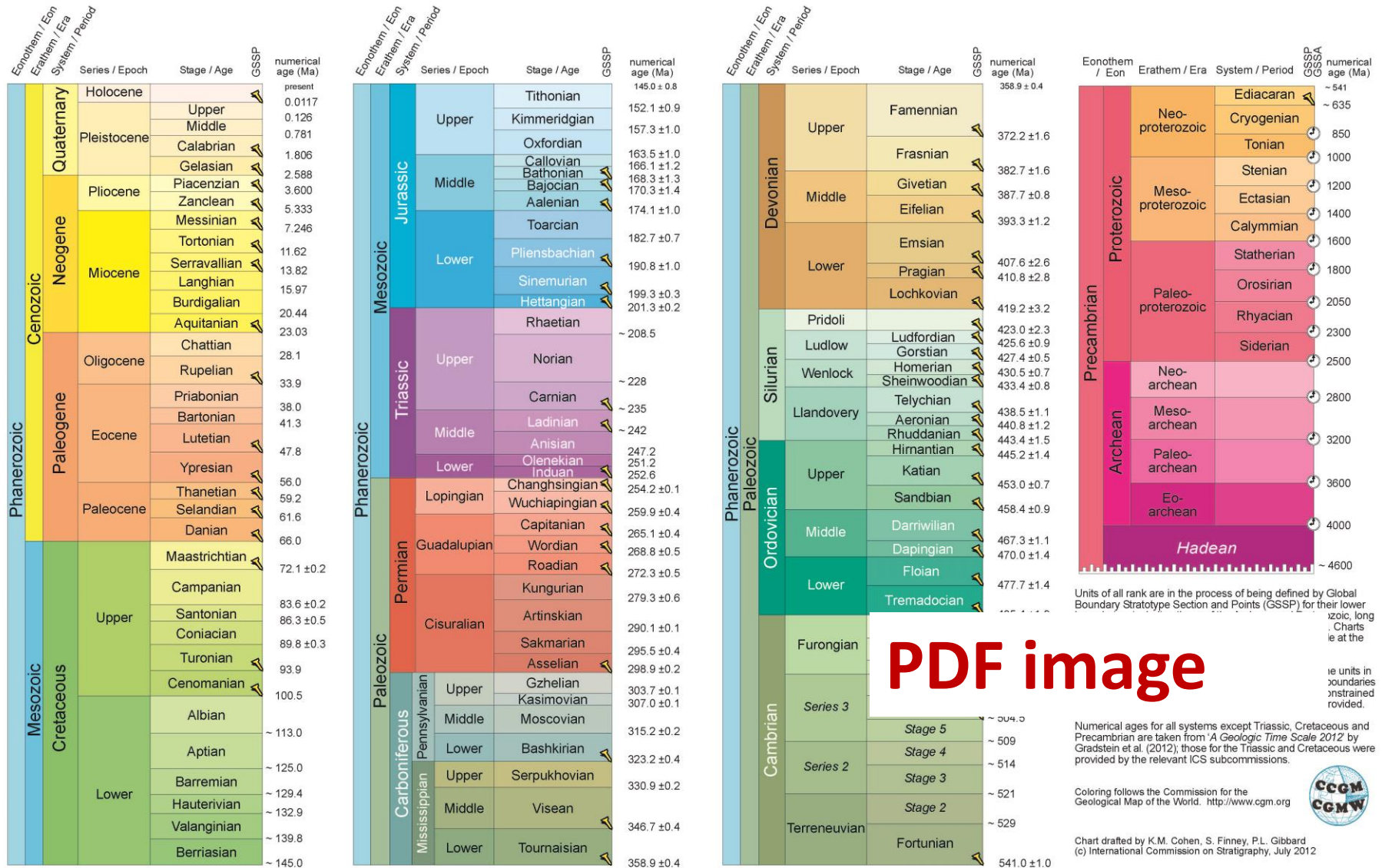
QM

RI

T

TF

U



PDF image

Base units

→ The SI base units are a choice of seven well-defined units which by convention are regarded as dimensionally independent:

↘ metre, m

The metre is the length of the path travelled by light in vacuum during a time interval of $1/299\,792\,458$ of a second.

[[SI Brochure](#)]

- ⊗ Practical realization
- ⊗ Evolution of the definition
- ⊗ CCL

↘ kilogram, kg

The kilogram is the unit of mass; it is equal to the mass of the international prototype of the kilogram.

[[SI Brochure](#)]

- ⊗ Practical realization
- ⊗ The name "kilogram"
- ⊗ Work at the BIPM
- ⊗ CCM

↘ second, s

The second is the duration of $9\,192\,631\,770$ periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom.

[[SI Brochure](#)]

- ⊗ Practical realization
- ⊗ Secondary representations
- ⊗ Work at the BIPM
- ⊗ CCTF

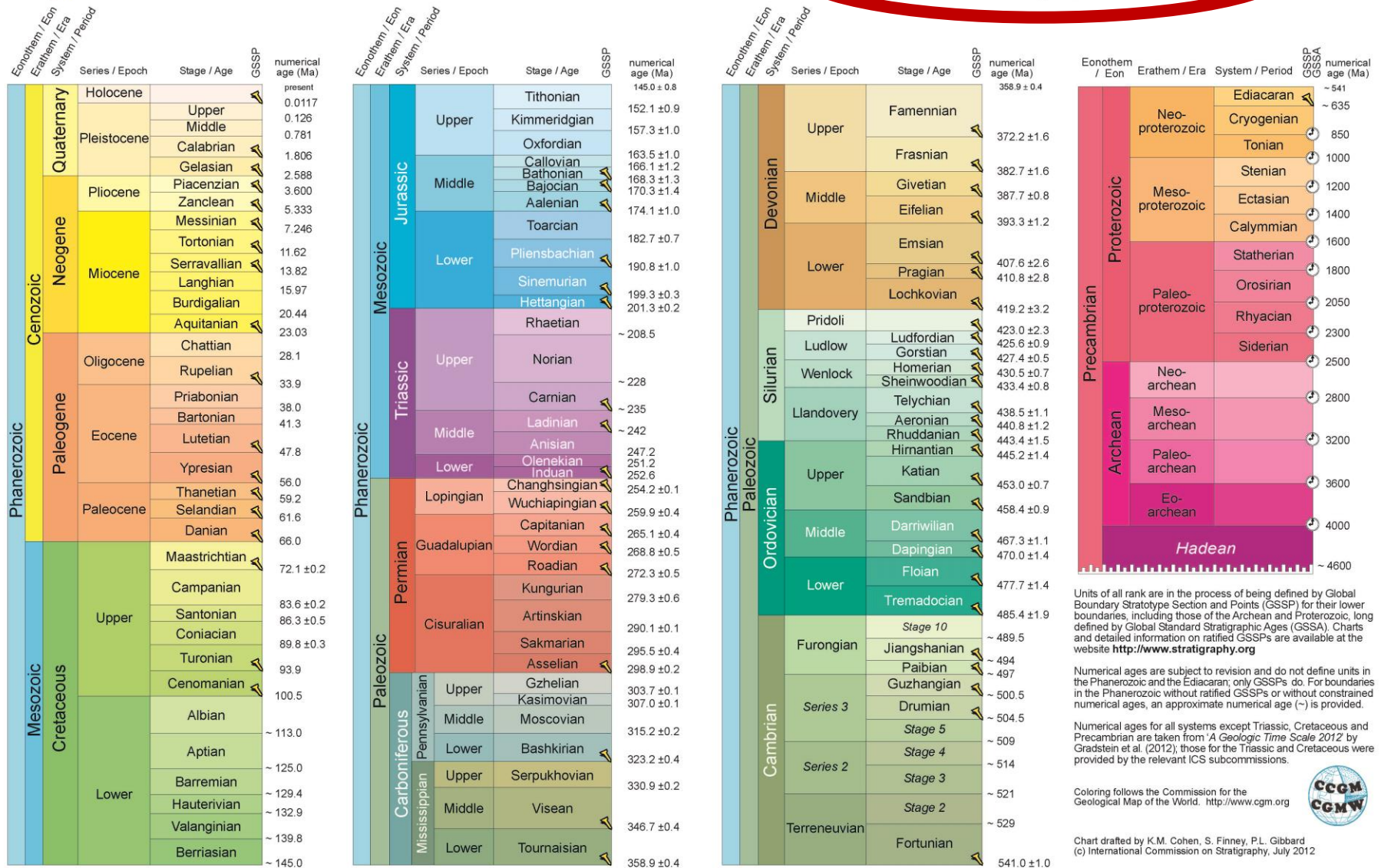
↘ ampere, A

The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 m apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre

- ⊗ Practical realization
- ⊗ Work at the BIPM
- ⊗ CCEM

↘ Summary

- ⊗ On the future revision of the SI
- ⊗ Brief history of the SI
- ⊗ Base units
- ⊗ SI prefixes



We can't always trust the official custodians ...

I've been giving a version of this talk since 2011 ...

Notable initiatives standardizing & publishing controlled vocabularies

- Library of Congress
- MMI/IOOS
- NERC Vocab Service
- OGC, WMO
- Bioportal, OBO Foundry
- Agrovoc, GACS
- Research Vocabularies Australia
- data.gov.au

Library of Congress Subjects

id.loc.gov/authorities/subjects.html

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Library of Congress Subject Headings

Search

Enter Keyword or Phrase

All

LC Subject Headings

LC Name Authority File

LC Classification

LC Children's Subject Headings

Search

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Details

Visualization

Library of Congress Subject Headings

Library of Congress Subject Headings (LCSH) has been actively maintained since 1898 to catalog materials held at the Library of Congress. By virtue of cooperative cataloging other libraries around the United States also use LCSH to provide subject access to their collections. In addition LCSH is used internationally, often in translation. LCSH in this service includes all Library of Congress Subject Headings, free-floating subdivisions (topical and form), Genre/Form headings, Children's (AC) headings, a validation strings* for which authority records have been created. The content includes a few name headings (personal and corporate), such as William Shakespeare, Jesus Christ, and Harvard University, and geographic headings that are added to LCSH as they are needed to establish subdivisions, provide a pattern for subdivision practice provide reference structure for other terms. This content is expanded beyond the print issue of LCSH (the "red books") with inclusion of validation strings.

*Validation strings: Some authority records are for headings that have been built by adding subdivisions. These records are the result of an ongoing project to programmatically create authority records for valid subject strings from subject heading strings found in bibliographic records. The authority records for these subject strings were created so that the entire string could be machine-validated. The strings do not have broader, narrower, or related terms.

URI(s)

- > <http://id.loc.gov/authorities/subjects>
- > <http://id.loc.gov/authorities#conceptscheme>

Instance Of

- > [MADS/RDF MADSScheme](#)
- > [SKOS ConceptScheme](#)

Scheme Members

- > [LCSH Collection - Authorized Headings](#)
- > [LCSH Collection - General Collection](#)
- > [LCSH Collection - Children's Headings](#)
- > [LCSH Collection - Term Permitted to be Indirectly Subdivided Geographically](#)
- > [LCSH Collection - May Subdivide Geographically](#)
- > [LCSH Collection - Term Permitted to be Directly Subdivided Geographically](#)
- > [LCSH Collection - Subdivisions](#)
- > [LCSH Collection - Topic Subdivisions](#)
- > [LCSH Collection - GenreForm Subdivisions](#)
- > [LCSH Collection - Temporal Subdivisions](#)
- > [LCSH Collection - Geographic Subdivisions](#)
- > [LCSH Collection - Language Subdivisions](#)

Alternate Formats

**Please Note: LC Classification entries are not included in general search results. You must explicitly select LC Classification in order to search the scheme. This is temporary while the impact of adding LCC to the current system is better understood.

Cox | Vocabularies & vocabulary services

MMI – inventory of vocabularies and services

MMI Vocabularies References | X

https://marinemetadata.org/conventions/vocabularies

Marine Metadata Interoperability

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MAIN NAVIGATION

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Vocabularies References

A vocabulary is a set of terms (words, codes, etc.) that are used in a specific community. Vocabularies provide a mechanism for communication- be it written, oral or electronic- because the meaning of the terms are known and agreed upon by the community members. Read more on vocabularies...

MMI provides references to vocabularies that it is aware of, including a description, link to the vocabulary, and an informal characterization of its maturity, in some cases. If you would like to see a reference added, please [contact us](#) or [sign up for an MMI account](#) and add it yourself. You may also search all references.

Title	Description	Reference Type	Reference Topics
ACT Sensors List	List of sensors developed by the Alliance for Coastal Technologies	Vocabularies	Sensors, Instruments and Platforms
Alexandria Digital Library (ADL) Gazetteer	Gazetteer services provided by Alexandria Digital Library from Map and Imagery Lab, Davidson Library, University of California, Santa Barbara (UCSB).	Vocabularies	Guide Reference Topics Controlled Vocabularies
Argo Instrument List	Instrument code list from Argo	Vocabularies	Vocabularies and/or Ontologies Tool Topics
Argo Parameters and quality control code lists	List of parameter and quality control codes from Argo	Vocabularies	Vocabularies and/or Ontologies Tool Topics
Biodiversity Information Standards (TDWG): Vocabularies and Ontologies	Collection of vocabularies and ontologies from TDWG for biodiversity	Vocabularies	Convention Topics Species
BODC (British Oceanographic Data Centre) Units	The BODC units table, consisting of all the units codes used in BODC parameter lists.	Vocabularies	Vocabularies and/or Ontologies Tool Topics
BODC Instruments List	List of instruments used by the British Oceanographic Data Centre	Vocabularies	Vocabularies and/or Ontologies Tool Topics
BOG CTD Bottle Data Field Names	MBAR's Biological Ocean Group (BOG) CTD Bottle Data Field Names	Vocabularies	Convention Topics Parameter Description
BOG CTD Profiling Data Field Names	MBAR's Biological Ocean Group (BOG) CTD Profiling Data Field Names	Vocabularies	Convention Topics Parameter

UPCOMING EVENTS

No upcoming events available

[more](#)

METADATA COMMUNITY NEWS

- X-DOMES EarthCube Grant includes funding for ORR
- ESIP Federation Funds ORR Grant
- Marine Metadata project transitions from Google Code
- MMI's ORR Ontology Repository Chosen for ODM2 Project

[More news...](#)

Tweets about marinemetaddata

 Carlos A. Ru... @caruedav

@marinemetadata
twitter.com/geometadata/s t...

21 Jul

 Carlos A. Ru... @caruedav

big messy data
#marinemetadata
twitter.com/cognitivepolic

04 May

 knowlengr Retweeted

 Carlos A. Rueda @caruedav

W3C and OGC publish 1st public working draft on Spatial Data on the Web Best Practices

[Embed](#) [View on Twitter](#)

INTERESTING READS

UK NERC Vocabulary Service

“NVS”

The screenshot shows a web browser window with the URL <http://vocab.nerc.ac.uk/collection/>. The page displays a list of related vocabularies and their details. A red box highlights the URI <http://vocab.nerc.ac.uk/collection/P07/current/> for the 'Climate and Forecast Standard Names' vocabulary.

Related:- <http://vocab.nerc.ac.uk/collection/I01/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P01/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P07/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P09/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P35/current/>
RegisterOwner:- **British Oceanographic Data Centre**
comment:- **Governance for vocabularies used within the data centre**
RegisterManager:- **British Oceanographic Data Centre**

URI: <http://vocab.nerc.ac.uk/collection/P07/current/>
title:- **Climate and Forecast Standard Names**
alternative:- **CF Standard Names**
description:- **Terms used for definitive but not necessarily comprehensive descriptions of measured phenomena in the CF conventions (a content standard for data stored in NetCDF).**
creator:- **Climate and Forecast Standard Names Committee**
publisher:- **Natural Environment Research Council**
date:- **2016-07-20 02:00:03.0**
versionInfo:- **35**
sameAs:- <http://vocab.nerc.ac.uk/collection/B39/current/>
sameAs:- <http://vocab.nerc.ac.uk/collection/I01/current/>
sameAs:- <http://vocab.nerc.ac.uk/collection/P02/current/>
sameAs:- <http://vocab.nerc.ac.uk/collection/P04/current/>
sameAs:- <http://vocab.nerc.ac.uk/collection/P07/current/>
sameAs:- <http://vocab.nerc.ac.uk/collection/P64/current/>
Broader:- <http://vocab.nerc.ac.uk/collection/A05/current/>
Broader:- <http://vocab.nerc.ac.uk/collection/P02/current/>
Broader:- <http://vocab.nerc.ac.uk/collection/P04/current/>
Broader:- <http://vocab.nerc.ac.uk/collection/P07/current/>
Broader:- <http://vocab.nerc.ac.uk/collection/P25/current/>
Broader:- <http://vocab.nerc.ac.uk/collection/P64/current/>
Narrower:- <http://vocab.nerc.ac.uk/collection/P04/current/>
Narrower:- <http://vocab.nerc.ac.uk/collection/P07/current/>
Narrower:- <http://vocab.nerc.ac.uk/collection/P64/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P02/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P04/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P06/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P07/current/>
Related:- <http://vocab.nerc.ac.uk/collection/P64/current/>
RegisterOwner:- **Climate and Forecast Standard Names Committee**
comment:- **Formal vocabulary specialist group within the governance of the Climate and Forecast Community Metadata Standard.**
RegisterManager:- **British Oceanographic Data Centre**

URI: <http://vocab.nerc.ac.uk/collection/P08/current/>
title:- **SeaDataNet Parameter Disciplines**
alternative:- **SeaDataNet Disciplines**

"Soils" in LCSH

id.loc.gov/authorities/subjects/sh85124396.html

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Search Search Loc.gov GO

The Library of Congress > Linked Data Service > LC Subject Headings

Soils

From [Library of Congress Subject Headings](#)

Details Visualization Suggest Terminology

Soils

Here are entered works on natural soils. Works on plant growing media which include both natural soils and artificial media are entered under [Plant growing media.] Works on growing media which do not contain natural soils are entered under [Plant growing media, Artificial.] Works on growing media for potted plants are entered under [Potting soils.]

URI(s)
> <http://id.loc.gov/authorities/subjects/sh85124396>

> <http://id.loc.gov/authorities/sh85124396#concept>

Instance Of

- > [MADS/RDF Topic](#)
- > [MADS/RDF Authority](#)
- > [SKOS Concept](#)

Scheme Membership(s)
> [Library of Congress Subject Headings](#)

Collection Membership(s)

- > [LCSH Collection - Authorized Headings](#)
- > [LCSH Collection - General Collection](#)
- > [LCSH Collection - May Subdivide Geographically](#)

Variants

- >  Earth (Soils)
- >  Mold, Vegetable
- >  Mould, Vegetable
- >  Soil
- >  Vegetable mold

Broader Terms

- >  [Agricultural resources](#)
- >  [Plant growing media](#)
- >  [Regolith](#)

Narrower Terms

- >  [Acid soils](#)
- >  [Acrisols](#)
- >  [Alfisols](#)

“Soil” in NVS

← → ↺ 🏠 vocab.nerc.ac.uk/collection/A02/current/Soil/

⬆ -- Soil --

URI	http://vocab.nerc.ac.uk/collection/A02/current/Soil/
Identifier ()	SDN:A02::Soil
Preferred label (en)	Soil
Alternative label ()	
Definition (en)	Soil is the naturally occurring, unconsolidated or loose covering of broken rock particles and decaying organic matter on the surface of the Earth, capable of supporting life.
Version Info ()	1
Deprecated()	false
Broader	http://vocab.nerc.ac.uk/collection/A03/current/Geophysical/
Broader	http://vocab.nerc.ac.uk/collection/A01/current/Mitigation_Strategies_and_Preparedness/
Broader	http://vocab.nerc.ac.uk/collection/A01/current/Sediment_Budget/
Broader	http://vocab.nerc.ac.uk/collection/A04/current/Soils/
Narrower	http://vocab.nerc.ac.uk/collection/A04/current/Soils/
Date ()	2011-08-15 11:58:51.0

“Soil” in
NVS

again

vocab.nerc.ac.uk/collection/P22/current/16/	
↑ -- Soil --	
URI	http://vocab.nerc.ac.uk/collection/P22/current/16/
Identifier ()	SDN:P22::16
Preferred label (en)	Soil
Preferred label (fr)	Sols
Preferred label (pt)	Solo
Preferred label (es)	Suelo
Alternative label ()	
Definition (en)	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.
Definition (fr)	Sols et sous-sol caractérisés selon leur profondeur, texture, structure et teneur en particules et en matières organiques, pierrosité, érosion, le cas échéant pente moyenne et capacité anticipée de stockage de l'eau.
Definition (pt)	Solo e subsolo caracterizado de acordo com a profundidade, textura, estrutura e conteúdo das partículas e material orgânico, carácter pedregoso, erosão, eventualmente declive médio e capacidade estimada de armazenamento de água.
Definition (es)	Suelo y subsuelo, caracterizados según su profundidad, textura, estructura y contenido de partículas y material orgánico, pedregosidad, erosión y, cuando proceda, pendiente media y capacidad estimada de almacenamiento de agua.
Version Info ()	1
Deprecated()	false
Broader	http://vocab.nerc.ac.uk/collection/A04/current/Soils/
Narrower	http://vocab.nerc.ac.uk/collection/P02/current/WCWT/
Narrower	http://vocab.nerc.ac.uk/collection/P02/current/GWAM/
Narrower	http://vocab.nerc.ac.uk/collection/A04/current/Soils/
Date ()	2009-07-30 13:25:19.0

“Soil” in
Open
Geospatial
Consortium
/def/

Linked Data - Object View X

def.seegrid.csiro.au/sissvoc/ogc-def/resource?uri=http://www.opengis.net/def/waterml/2.0

SISSVoc Powered by ELDA

OGC Definitions Service

html | json | rdf | text | ttl

Soil

<http://www.opengis.net/def/waterml/2.0/medium/Soil>

label	Soil
definition	Particles of broken rock that have been altered by chemical and mechanical processes that include weathering and erosion; the depth of regolith that influence and have been influenced by plant roots
type	Concept
in scheme	OGC Definitions / OGC Definitions Concept Scheme
is defined by	?artifact_id=47130
is primary topic of	Soil
same as	[soil] same as Soil
see also	2.0
source	2.0
status	item currently valid

Find Concepts

Exact label
Text within label

View

> all > description > basic

- ★ pref label
- ★ label
- ★ definition
- ★ type
- ★ in scheme
- ★ is defined by
- ★ is primary topic of
- ★ same as > same as
- ★ see also
- ★ source
- ★ status

Viewer

This is the SPARQL query that was generated to pull together the data that is provided about the selected item. You can modify it here and re-run the query but you may find more options at the endpoint's page.

```
DESCRIBE  
<http://www.opengis.net/def/waterml/2.0/medium/Soil>
```


OntoBiotope

Summary Classes Properties Notes Mappings Widgets

Jump To:

- [-] bacteria habitat
 - [-] agricultural habitat
 - [-] aquaculture habitat
 - [-] artificial environment
 - [-] bacteria associated habitat
 - [-] experimental medium
 - [-] food
 - [-] habitat wrt chemico-physical property
 - [-] living organism
 - [-] medical environment
 - [-] natural environment habitat
 - [-] air
 - [-] animal habitat
 - [-] aquatic environment
 - [-] area with climate property
 - [-] area with epidemiologic property
 - [-] environmental matter
 - [-] subterrestrial habitat
 - [-] terrestrial habitat
 - [-] **soil**
 - [-] terrestrial landscape
 - [-] thermal area
 - [-] volcanic area
 - [-] part of living organism
 - [-] planet

Details Visualization Notes (0) Class Mappings (1)

Preferred Name	soil
Synonyms	soilborne
ID	http://purl.obolibrary.org/obo/OBT_000133
has_exact_synonym	soilborne
id	OBT:000133
label	soil
notation	OBT:000133
prefLabel	soil
treeView	terrestrial habitat
subClassOf	terrestrial habitat

“Soil” in
Agroportal /
OntoBiotope

Environment Ontology

Summary Classes Properties Notes Mappings Widgets

Jump To:

- continuant
 - independent continuant
 - anatomical entity
 - material entity
 - chemical entity
 - collection of organisms
 - ecoregion
 - ecozone
 - environmental feature
 - environmental material
 - anthropogenic environmental material
 - clay
 - emulsion
 - foam
 - gaseous environmental material
 - gravel
 - lava
 - liquid environmental material
 - magma
 - mineral material
 - mud
 - organic material
 - particulate matter
 - sand
 - material anatomical entity

“Soil” in
Agroportal /
ENVO

Details	Visualization	Notes (0)	Class Mappings (1)
---------	---------------	-------------	----------------------

Preferred Name	soil
Synonyms	regolith
Definitions	'In engineering terms, soil is referred to as regolith, or loose rock above the 'solid geology'. Soil is commonly referred to as "earth" and the term "dirt" should be restricted to displaced soil.' https://en.wikipedia.org/wiki/Soil " The upper limit of soil is the soil and air, shallow water, live plants, or plant materials that have decompose. Areas are not considered to have soil if the surface is covered by water too deep (typically more than 2.5 meters) for the plants. The lower boundary that separates soil from the nonsoil is difficult to define. Soil consists of horizons near the Earth's surface to the underlying parent material, have been altered by the interaction of relief, and living organisms over time. Commonly, soil grades at its base to hard rock or to earthy materials virtually devoid of animals, roots, or biological activity. For purposes of classification, the lower boundary is arbitrarily set at 200 cm." Soil taxonomy, 2nd Ed., quoted in http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nr142p2_054280 Soil is an environmental material which is composed of minerals, varying proportions of sand, silt, and clay, such as humus, gases, liquids, and a broad range of resident microorganisms.
ID	http://purl.obolibrary.org/obo/ENVO_00001998
comment	'In engineering terms, soil is referred to as regolith, or loose rock above the 'solid geology'. Soil is commonly referred to as "earth" and the term "dirt" should be restricted to displaced soil.' https://en.wikipedia.org/wiki/Soil " The upper limit of soil is the soil and air, shallow water, live plants, or plant materials that have decompose. Areas are not considered to have soil if the surface is covered by water too deep (typically more than 2.5 meters) for the plants. The lower boundary that separates soil from the nonsoil is difficult to define. Soil consists of horizons near the Earth's surface to the underlying parent material, have been altered by the interaction of relief, and living organisms over time. Commonly, soil grades at its base to hard rock or to earthy materials virtually devoid of animals, roots, or biological activity. For purposes of classification, the lower boundary is arbitrarily set at 200 cm." Soil taxonomy, 2nd Ed., quoted in

Environment Ontology

[Summary](#)
[Classes](#)
[Properties](#)
[Notes](#)
[Mappings](#)
[Widgets](#)

Jump To:

- alga
- + amount of carbon atom in environmental material
- + amount of nitrogen atom in environmental material
- + concentration of of carbon atom in environmental material
- + concentration of of nitrogen atom in environmental material
- ecozone
- + environmental condition
- + environmental disposition
- + environmental feature
- environmental material
 - + anthropogenic environmental material
 - clay
 - emulsion
 - + foam
 - + gaseous environmental material
 - gravel
 - + lava
 - + liquid environmental material
 - magma
 - + mud
 - + organic material
 - + particulate matter
 - + sand
 - scree
 - + silt
 - + soil
 - + stone
 - + tephra
 - + volcanic ash
 - + volcanic material
 - + volcanic rock
 - environmental role
 - + environmental system

“Soil” in
Bioportal /
ENVO

Details	Visualization	Notes (0)	Class Mappings (42)
---------	---------------	-------------	-----------------------

Preferred Name	soil
Synonyms	regolith
Definitions	'In engineering terms, soil is referred to as regolith, or loose rock above the 'solid geology'. Soil is commonly referred to as "earth" the term "dirt" should be restricted to displaced soil.' https://en.wikipedia.org/wiki/Soil " The upper limit of soil is the soil and air, shallow water, live plants, or plant materials that have decompose. Areas are not considered to have soil if the surface is covered by water too deep (typically more than 2.5 meters) for the plants. The lower boundary that separates soil from the nonsoil is difficult to define. Soil consists of horizons near the Earth's surface the underlying parent material, have been altered by the interaction and living organisms over time. Commonly, soil grades at its low rock or to earthy materials virtually devoid of animals, roots, or o biological activity. For purposes of classification, the lower bound arbitrarily set at 200 cm." Soil taxonomy, 2nd Ed., quoted in http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=11311 Soil is an environmental material which is primarily composed of proportions of sand, silt, and clay, organic material such as humu and a broad range of resident micro- and macroorganisms.
ID	http://purl.obolibrary.org/obo/ENVO_00001998
comment	'In engineering terms, soil is referred to as regolith, or loose rock above the 'solid geology'. Soil is commonly referred to as "earth" the term "dirt" should be restricted to displaced soil.' https://en.wikipedia.org/wiki/Soil " The upper limit of soil is the soil and air, shallow water, live plants, or plant materials that have decompose. Areas are not considered to have soil if the surface is covered by water too deep (typically more than 2.5 meters) for the plants. The lower boundary that separates soil from the nonsoil is difficult to define. Soil consists of horizons near the Earth's surface the underlying parent material, have been altered by the interaction and living organisms over time. Commonly, soil grades at its low rock or to earthy materials virtually devoid of animals, roots, or o biological activity. For purposes of classification, the lower bound arbitrarily set at 200 cm." Soil taxonomy, 2nd Ed., quoted in http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=11311

Summary Classes Properties Notes Mappings Widgets

virology:Soil Microbiology

“Soil” in Bioportal / MeSH

Biodiversity Ontology

Summary Classes Properties Notes Mappings Widgets

Jump To:

- Class_1
 - ClimaticCondition
 - Collect
 - Ecosystem
 - Entity
 - Environment
 - GeographicalCoordinate
 - Imp
 - InstitutionResearch
 - Luminosity
 - MaterialEntity
 - AbioticEntity
 - Air
 - Soil**
 - TypeSoil
 - TypeWater
 - Water
 - BioticEntity
 - Faun
 - Flora
 - Microbiota
 - Taxon
 - TypeVegetation
 - Vegetation
 - Mod
 - Spa
 - Type
 - Type
 - Vinc

Details	Visualization	Notes (0)	Class Mappings (34)
---------	---------------	-------------	-----------------------

Preferred Name	Soil
ID	http://www.owl-ontologies.com/BiodiversityOntologyFull.owl#Soil
prefixIRI	Soil
prefLabel	Soil
subClassOf	AbioticEntity
disjointWith	Water

“Soil” in
Bioportal /
Biodiversity
Ontology

Material

Summary Classes Properties Notes Mappings Widgets

Jump To:

Details

Visualization

Notes (0)

Class Mappings (35)

- Ejecta
- Regolith
- Rock
- RockBody
- Sediment
 - Alluvium
 - Boulder
 - Clast
 - Clay
 - Cobble
 - Colluvium
 - Debris
 - Gibber
 - Gravel
 - HydrogenousSediment
 - Loam
 - Loess
 - MarineSediment
 - Mud
 - Peat
 - Sand
 - Silt
 - Soil
 - TerrigenousSediment
- D
- LivingEntity
- MaterialThing

Preferred Name	Soil
ID	http://sweet.jpl.nasa.gov/2.3/matrSediment.owl#Soil
prefLabel	Soil
subClassOf	Sediment

“Soil” in
Bioportal /
SWEET

Alphabetical

Hierarchy

Groups

- physiographic features
 - continental shelves
 - estuaries
 - fiords
 - inland waters
 - lagoons
 - land cover
 - lawns and turf
 - soil
 - soil air
 - soil morphological features
 - soil properties
 - soil types
 - chemical soil types
 - climatic soil types
 - cultural soil types
 - ecological soil types
 - genetic soil types
 - acrisols
 - andosols
 - cambisols
 - chernozems
 - Entisols
 - ferralsols
 - fluvisols
 - gleysols
 - greyzems
 - histosols
 - hydromorphic soils
 - Inceptisols
 - kastanozems
 - lateritic soils
 - luvisols
 - mollisols
 - podzols
 - red soils
 - solonetz
 - ultisols
 - vertisols
 - lithological soil types
 - physiographic soil types

physiographic features > land cover > soil

PREFERRED TERM

soil

TYPE

Topic

DEFINITION

Complex mixture of inorganic minerals (i.e., mostly clay, silt, and sand), decaying organic matter, water, air, and living organisms. Mezcla compleja de minerales inorgánicos (principalmente arcilla, cieno y arena), materia orgánica en descomposición, agua, aire y organismos vivos.

BROADER CONCEPT

land cover

NARROWER CONCEPTS

soil air
soil morphological features
soil properties
soil types
soil water

RELATED CONCEPTS

edaphic factors
losses from soil
pedology
soil amendments
soil analysis
soil biology
soil chemistry
soil classification
soil compaction
soil conservation
soil degradation
soil formation
soil fumigation
soil fungi
soil injection
soil management
soil physics
soil pollution

The concept 'soil'

<http://id.loc.gov/authorities/subjects/sh85124396>

<http://vocab.nerc.ac.uk/collection/A02/current/Soil/>

<http://vocab.nerc.ac.uk/collection/P22/current/16/>

<http://www.opengis.net/def/waterml/2.0/medium/Soil>

http://purl.obolibrary.org/obo/OBT_000133

http://purl.obolibrary.org/obo/ENVO_00001998

<http://purl.bioontology.org/ontology/MESH/D012987>

<http://www.owl-ontologies.com/BiodiversityOntologyFull.owl#Soil>

<http://sweet.jpl.nasa.gov/2.3/matrSediment.owl#Soil>

<http://purl.bioontology.org/ontology/CSP/2733-0816>

<http://id.agrisemantics.org/gacs/C113>

...



GACS

Global Agricultural Concept Scheme

- **Harmonized** –
FAO/Agrovoc
CAB thesaurus
Nat. Ag. Lib. thesaurus
- 15000 concepts,
clean hierarchy

How can we use GACS?

The screenshot shows the GACS Beta website interface. The browser address bar displays 'browser.agrisemantics.org/gacs/en/groups'. The website has a navigation bar with 'GACS Beta', 'Content language' set to 'English', and a 'Search' button. On the left, there are tabs for 'Alphabetical', 'Hierarchy', and 'Groups'. Under 'Alphabetical', a list of categories is shown: CA GENERAL, FA PHYSICAL SCIENCES, JA EARTH SCIENCES, LA LIFE SCIENCES, PA APPLIED SCIENCE AND TECHNOLOGY, and WA SOCIAL SCIENCES AND HUMANITIES. The main content area is titled 'Vocabulary information' and contains a table with the following details:

TITLE	GACS Beta Global Agricultural Concept Scheme Core
DESCRIPTION	The Global Agricultural Concept Scheme (GACS) is a hub for concepts related to agriculture, in multiple languages, for use in Linked Data. The idea for GACS emerged out of discussions at the World Congress of IAALD, the International Association of Agricultural Information Specialists, in July 2013. The Food and Agricultural Organization of the United Nations (FAO), CAB International (CABI), and the National Agricultural Library of the USA (NAL) agreed in October 2013 to explore the feasibility of developing a shared concept scheme by integrating their three thesauri: the AGROVOC Concept Scheme, the CAB Thesaurus (CABT), and NAL Thesaurus (NALT). In the GACS vision, the integration of these three thesauri is but the first step towards the realization of a hub that links to and from the concept schemes beyond the initial three, and in multiple language areas.
CREATOR	Global Agricultural Concept Scheme working group
CONTRIBUTOR	CAB International Food and Agriculture Organization of the UN National Agricultural Library
SOURCE	AGROVOC CAB Thesaurus NAL Thesaurus
LAST MODIFIED	Monday, May 9, 2016 14:47:21
TYPE	http://www.w3.org/2004/02/skos/core#ConceptScheme

Below the table, there are two sections: 'Resource counts by type' and 'Term counts by language'.

Resource counts by type

Type	Count
Concept	15422
• Chemical	1772
• Organism	4398
• Product	932
• Geographical	540
• Topic	7780
Collection	145

Term counts by language

Language	Preferred terms	Alternate terms	Hidden terms

Keywords?

Simon

https://devdata.environment.csiro.au

Data Store links: Home Datasets Index Register a dataset User Guide Licences Welcome, cox075, Log out

Register a Dataset

You are not listed as a Data Coordinator or a BA Developer therefore you can see the form below for interest's sake but will not be able to register datasets.

Please [contact the Repo team](#) if you feel there is an error.

Registration Form

Registrant:	Cuddy, Susan	* The person registering the dataset
Custodian ^{ref}	- Digital Nat Facilities & Collections Executive Director - Environment Energy & Resources Executive Director - Future Industries Executive Director - Science Strategy & People Deputy Chief Executive - Finance & Services Chief Finance Officer	* Party that accepts accountability and responsibility for the dataset and ensures appropriate care and maintenance of the dataset. Please select the correct role from the CSIRO Organisational Structure
Dataset Title:	MDB-9wt05	* A brief descriptive sentence for the dataset. Title must be at least 5 characters long.
Licence:	CSIRO Data Licence	* Please select the correct licence for the dataset. If unknown select Pending
Copyright Notice:	(c) CSIRO 2015	* Entity for attribution in relation to the dataset
Abstract	Murray-Darling basin	A description of the dataset, its development, use, quality and any other relevant contextual information
Keywords		Terms to assist with classifying the dataset which will aid in its discovery
Contributors		Party contributing to the dataset. Currently only CSIRO Officers accepted
External Links		URL's that may add context to the dataset
Publish Date		The date the dataset was published
Data:	Choose a file to upload: Choose file No file chosen	* Select a single zip file containing the whole dataset.

REST API ...

- Swagger documentation

The screenshot shows the Swagger documentation for the Skosmos API. The page is titled "finto" and "Skosmos API". It provides a detailed description of the API's purpose and usage, including information about the data format (JSON-LD) and the supported MIME types. The documentation is organized into sections: "Global methods", "Vocabulary-specific methods", and "Concept-specific methods". Each section contains a table of API endpoints with their HTTP methods and descriptions. The "Global methods" section lists endpoints for retrieving vocabularies, searching, and getting data. The "Vocabulary-specific methods" section lists endpoints for getting data for a specific vocabulary. The "Concept-specific methods" section lists endpoints for getting data for a specific concept, including broader, narrower, and related concepts. The page also includes a "VALID" button and a "BASE URL" field.

api.finto.fi/doc/#/Global_methods

finto

Skosmos API

The Skosmos REST API is a read-only interface to the data stored on the vocabulary server. The URL namespace is the base URL of the Skosmos instance followed by `/rest/v1/`.

Most methods return the data as UTF-8 encoded JSON-LD, served using the `application/json` MIME type. The data consists of a single JSON object which includes JSON-LD context information (in the `@context` field) and one or more fields which contain the actual data. Some methods (`data`) return other formats (RDF/XML, Turtle, RDF/JSON) with the appropriate MIME type.

The API supports Cross-Origin Resource Sharing by setting the Access-Control-Allow-Origin HTTP header to `"*"` for all requests.

The API supports the JSONP convention of appending a callback parameter to any URL. The returned data will then be wrapped in a JavaScript function call using the function name provided as the callback parameter value. JSONP wrapped data will be served using the `application/javascript` MIME type.

Global methods

Show/Hide | List Operations | Expand Operations

GET	/vocabularies	Available vocabularies
GET	/search	Search concepts and collections by query term
GET	/data	RDF data of the requested concept
GET	/types	Information about the types (classes) of objects contained in all vocabularies

Vocabulary-specific methods

Show/Hide | List Operations | Expand Operations

Concept-specific methods

Show/Hide | List Operations | Expand Operations

GET	/vocabulary/data	RDF data of the whole vocabulary or a specific concept
GET	/vocabulary/label	Preferred label for the requested concept
GET	/vocabulary/broader	Broader concepts of the requested concept
GET	/vocabulary/broaderTransitive	Broader transitive hierarchy for the requested concept
GET	/vocabulary/narrower	Narrower concepts of the requested concept
GET	/vocabulary/narrowerTransitive	Narrower transitive hierarchy for the requested concept
GET	/vocabulary/related	Related concepts of the requested concept
GET	/vocabulary/children	Narrower concepts of the requested concept
GET	/vocabulary/groupMembers	Members of the requested concept group
GET	/vocabulary/hierarchy	Hierarchical context of the requested concept

[BASE URL: /rest/v1 , API VERSION: v1]

VALID { }

... can
support
remote
UI



Simon

https://devdata.environment.csiro.au

Data Store links: Home Datasets Index Register a dataset User Guide Licences Welcome, cox075, Log

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Dataset Title:	MDB-9wt05	* A brief descriptive sentence for the dataset. Title must be at least 5 characters long.
Licence:	CSIRO Data Licence	* Please select the correct licence for the dataset. If unknown select Pending
Copyright Notice:	(c) CSIRO 2015	* Entity for attribution in relation to the dataset
Abstract	Murray-Darling basin	A description of the dataset, its development, use, quality and any other relevant contextual information
Keywords	semiarid climate soil	Terms to assist with classifying the dataset which will aid in its discovery
Contributors ^{ref}		Party contributing to the dataset. Currently only CSIRO Officers accepted
External Links		URL's that may add context to the dataset
Publish Date		The date the dataset was published
Data:	Choose a file to upload: [no file chosen]	Select a single zip file containing the whole dataset.

- acid soils
- age of soil
- agricultural soils
- alkaline soils
- alluvial soils
- andosols
- arable soils
- arid soils
- basaltic soils
- biological activity in soil
- vertisols

Why use GACS in this case?

- Principle of re-use vs copy/clone/corrupt
- GACS has reliable governance, plausible mandate, likely stability
- Quality of curation, appropriate scope
- Committed to linked data principles, stable URI for each Concept
- Well documented, stable API

How did I know about GACS?

- Personal/professional network
- Prior experience (SKOSMOS review)
- RDA Interest Group on Agricultural Data

What have I told you?

Symbols in data are **ambiguous** - must be defined in **lists or vocabularies**

Key vocabularies not published effectively – units of measure!

Notable initiatives (re-)publishing controlled vocabularies as **linked open data**

... but still much duplication

Web APIs allow re-use of controlled vocabularies by **remote applications**



[ABOUT RDA](#) [GET INVOLVED](#) [GROUPS](#)

Vocabulary Services Interest Group

Task Group Proposal

Coordinating Data Standards amongst Scientific Unions

- **Data standards are critical components of global data infrastructure**
 - they enable online discovery, sharing and programmatic access to data
- **There is little coordination in the development of scientific data standards**
 - Between the individual Science Unions and the international community
 - Between the Unions and the developers of metadata standards and data structures (e.g., RDA).
- **There is an urgency to develop a unified approach to standards development**
 - In order to reduce replication of effort and proliferation of incompatible practices.
- **Coordinating data standards is a high priority goal at an international level**
 - If at a basic level we are able to discover and access data from across, and beyond the various science domains, then we can ensure that data from all Science Unions to be used in transdisciplinary projects
 - Particularly in the context of the need to tackle the most pressing environmental and societal issues facing humanity (e.g., Future Earth).
- **We propose the following actions:**
 - Ask each Union to establish a Commission on or identify a group that are point of contact
 - Provide a web-accessible page that provides links to repositories of standards
 - Identify and publicise best practice examples
 - Promote the need for, and benefits of, adherence to standards to the scientific community

Thank you

Land and Water

Simon Cox
Research Scientist

t +61 3 9545 2365
e simon.cox@csiro.au
w www.csiro.au

LAND AND WATER
www.csiro.au

