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ECLIPS
e Drill

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RESEARCH INTEGRITY

Liberating field science samples and data

Promote reproducibility by moving beyond "available upon request"

iSamples

An EarthCube Research Coordination Network

EARTHCUBE

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GENERAL INFORMATION
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The Internet of Samples aims to break down research barriers

Published: February 17, 2016

The Internet of Things may be all the rage, but a group of scientists that met recently at the Renaissance Computing Institute (RENCI) wants to add the Internet of Samples (iSamples) to your radar.

Across the world, scientists engage in research that requires them to collect physical samples, which are often unique and difficult to acquire. Think of samples from the moon, core samples of the Earth, or those collected by submersibles sent to the depths of the ocean.

PID for Samples: IGSN

- Discovery & Access for Re-use and Reproducibility
- Sample Citation
- Data Integration
- Sample Management

IGSN = International Geo Sample Number

IGSN: GMY00007W

IGSN:	GMY00007W
Sample Name:	TN182_47_002
Other Name(s):	
Sample Type:	Individual Sample
Parent IGSN:	GMY00001B

Description

Material:	Rock
Classification:	Igneous>Plutonic>Mafic
Field Name:	gabbro, hornblende gabbro
Description:	mafic plutonic rock

IGSN: SSH00001H

IGSN:	SSH00001H
Sample Name:	SPMS01 40-50 cm
Other Name(s):	
Sample Type:	Terrestrial Section
Parent IGSN:	SSH000002

Description

Material:	Soil
Classification:	Sedimentary
Field Name:	Not Provided
Description:	Bulk

IGSN: HRV003M16

IGSN:	HRV003M16
Sample Name:	103543
Other Name(s):	
Sample Type:	Individual Sample
Parent IGSN:	Not Provided

Description

Material:	Mineral
Classification:	Malachite
Field Name:	Not Provided
Description:	Not Provided

IGSN Adoption

AGU is promoting use of new open community identifiers, such as International Geo Sample Numbers (IGSNs) for field samples like this coral. Today, AGU and seven other publishers have committed to including ORCIDs, a researcher identifier, in all published papers starting in 2016. Credit: ©Lamont-Doherty Core Repository

By Brooks Hanson 7 January 2016

Openly shared identification codes, such as digital object

"… AGU Publications also strongly encourages use of other identifiers in our journal papers. International Geo Sample Numbers (IGSNs) uniquely identify items, such as a rock sample, a piece of coral, or a vial of water taken from the natural environment, and provide important, consistent information about these samples."

Hanson, B. (2016), AGU opens its journals to author identifiers, Eos, 97, doi:10.1029/2016EO043183. Published on 7 January 2016.

iSamples @

Primary Challenges

or Why Samples Need NDS

- Incentives & tools for scientists to fulfill data & metadata sharing requirements
- Scalability and sustainability of infrastructure
  - Digital & physical repositories, software applications, etc.
- Coordination & integration with other disciplines

A Year Ago at NDS …

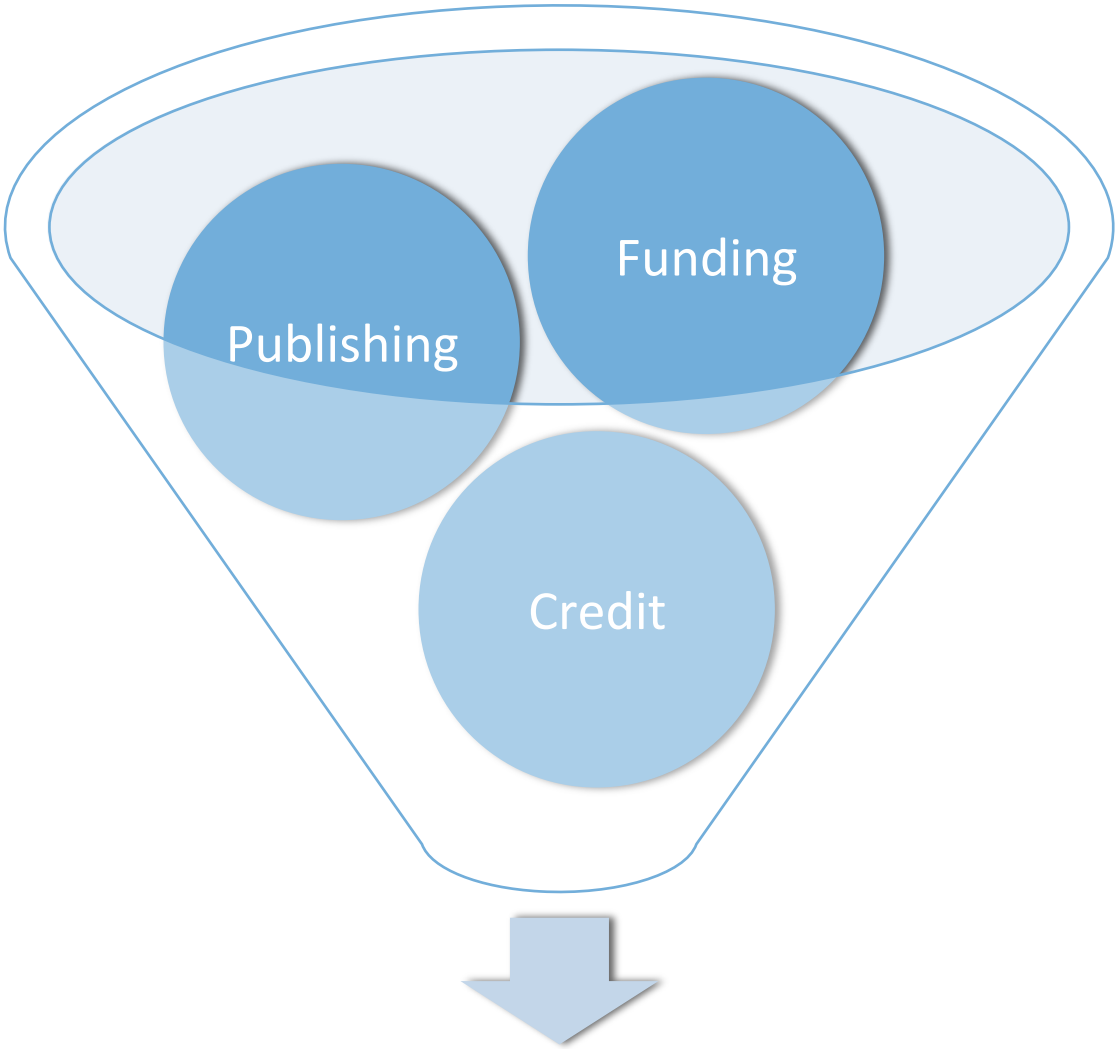
Internet of Samples: Why?

- Physical samples need to be linked to the digital data generated by their study.
  - ***Reproducibility!*** Access to the physical samples is required to verify & reproduce observations.
  - ***Re-usability!*** Access to information about samples is required for proper evaluation & interpretation of sample-based data.
- Physical samples need to be shared broadly for use & re-use.
  - Samples are often expensive to collect (drilling, remote locations).
  - Many samples are unique and irreplaceable.
  - Re-analysis augments utility of existing data.
  - Samples often serve in ways that the collectors and repositories could not have imagined.

Some Challenges

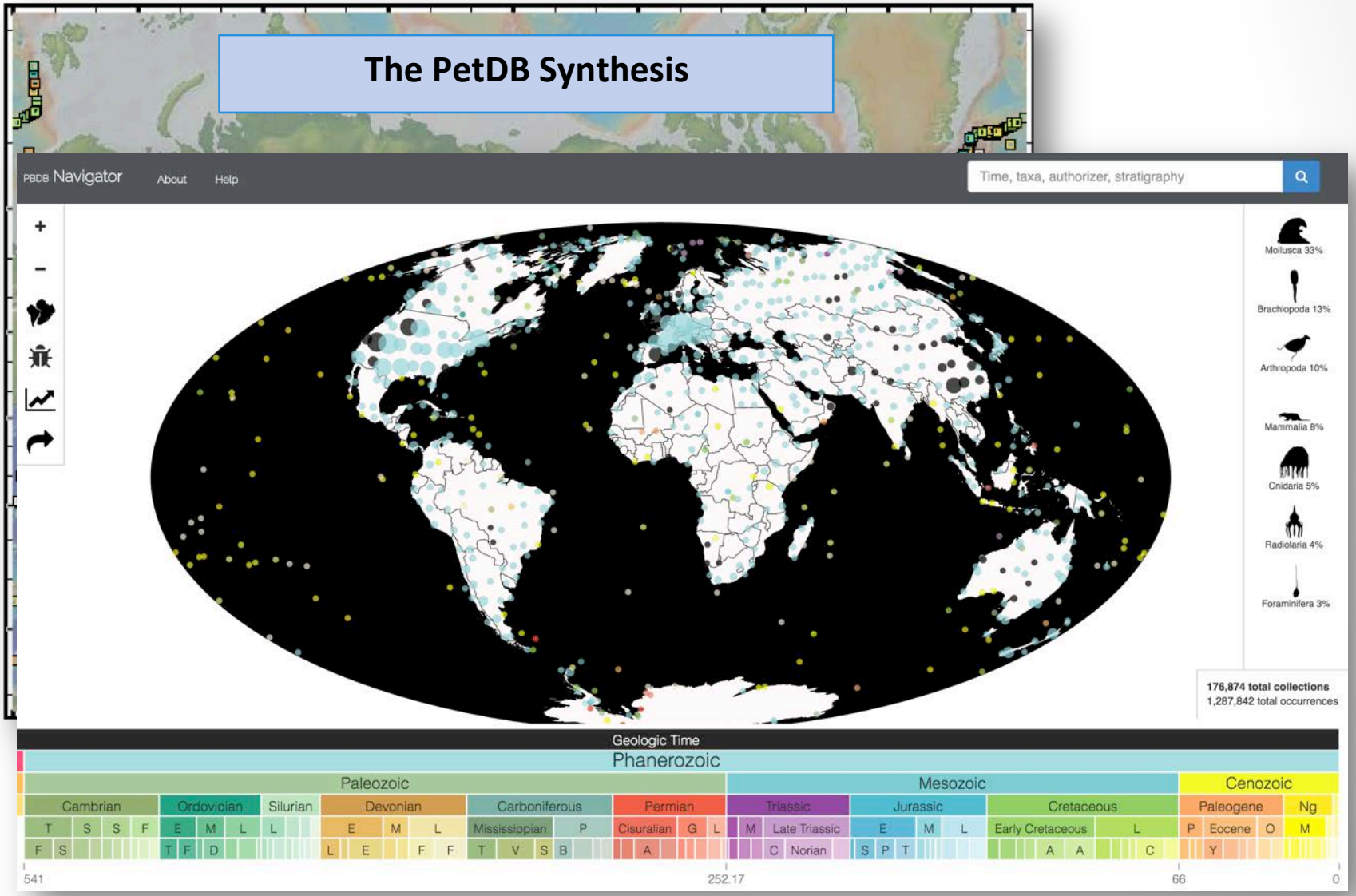
- *Widespread disagreement regarding data and sample availability and metadata*
- *Scientists and technical staff do not know how to create relevant metadata; lack of support by funding agencies.*
- *Repositories need to provide user-friendly software and training to field teams to overcome resistance to sharing data and samples.*

- Researchers want to produce knowledge in new directions and to get credit for their contributions.
- Funders want to see greater value from their investment.
- Journals want to facilitate reproducible science.
- Repositories want to support their communities and streamline data fl ow.



Culture Change

Big Science from Samples



Training and Development