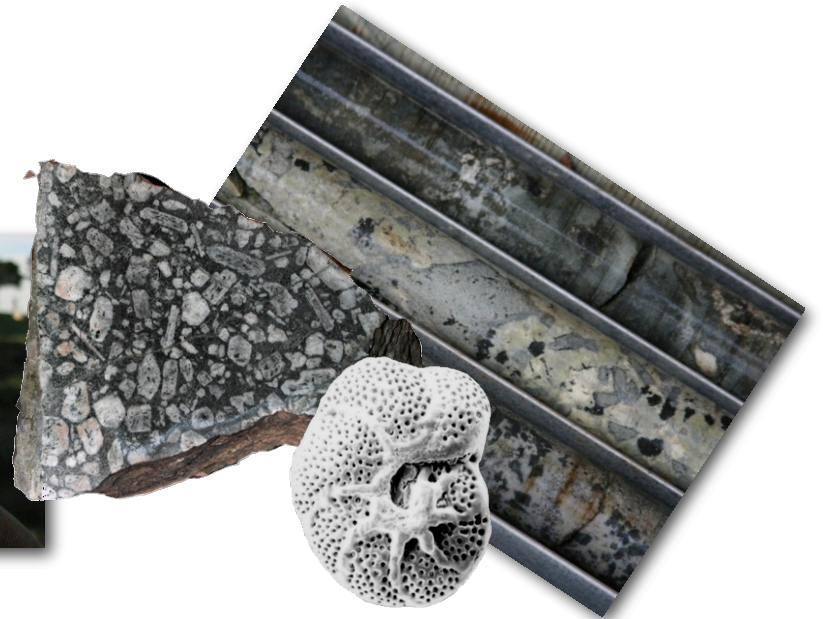




# IGSN: International Geo Sample Number

Unambiguous Citation of Physical Samples

Kerstin Lehnert, Jens Klump, Lesley Wyborn et al.



# Why we need PIDs for samples

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- **Discovery & Access for Re-use and Reproducibility**
  - Samples need virtual representations.
  - PIDs need to resolve to these virtual representations.
- **Sample Citation**
  - Sample collectors need to get credit for the intellectual effort and resources they put into their collection, preparation, and curation.
- **Data Integration**
  - Sample data are highly dispersed because a single sample is often studied in many different labs and over long periods of time with data published in multiple articles.
  - The utility of these data is substantially higher when combined.
- **Sample Management**
  - Tracking of samples & sub-samples

- Globally unique and persistent identifier for physical samples in the Earth Sciences
  - guaranteed to be unique via a centralized control mechanism.
  - resolves to virtual sample representations (sample metadata profiles) managed at federated IGSN Allocating Agents.

**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**

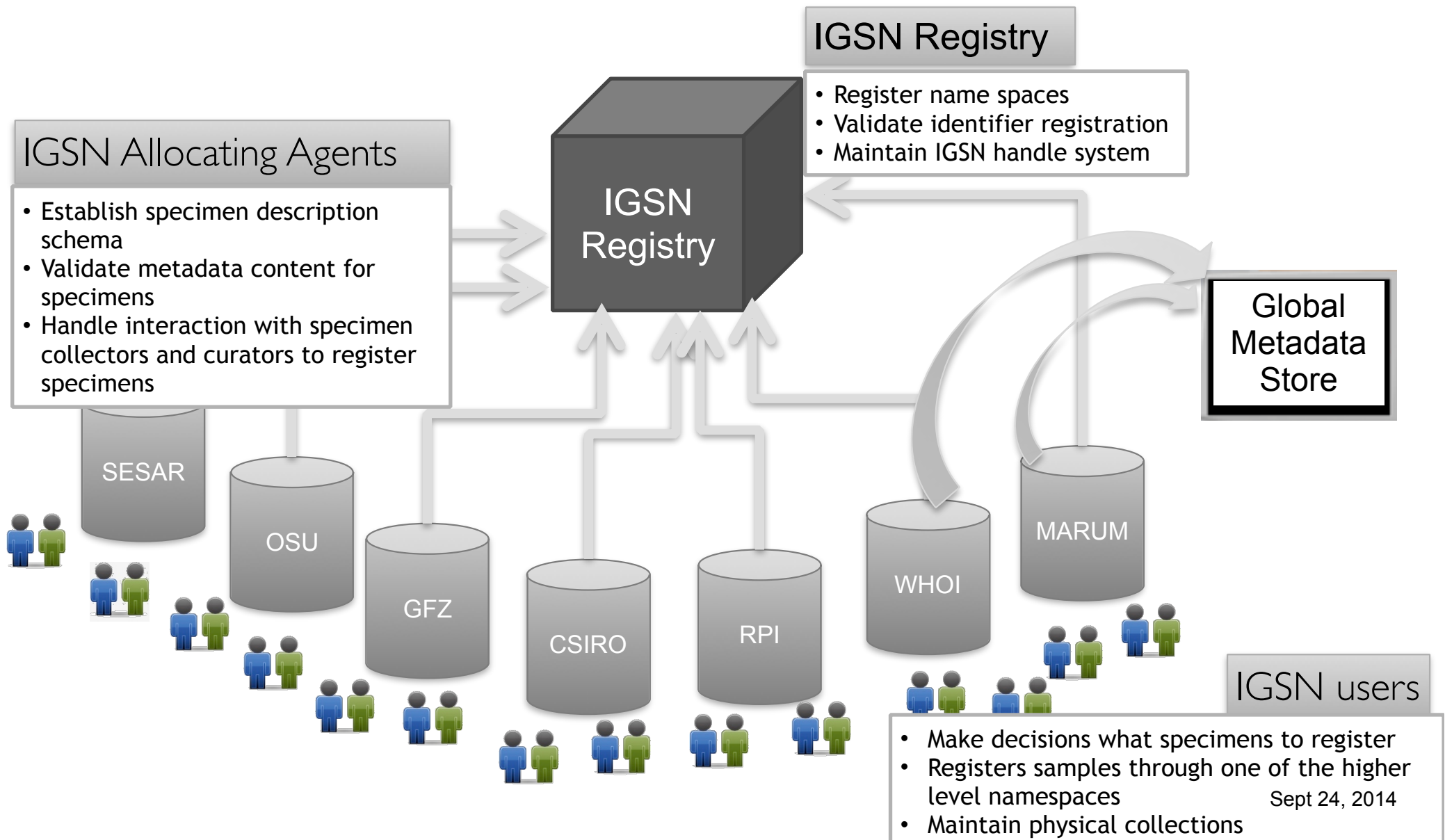
Material:	Mineral
Classification:	Malachite
Field Name:	Not Provided
Description:	Not Provided

# IGSN History

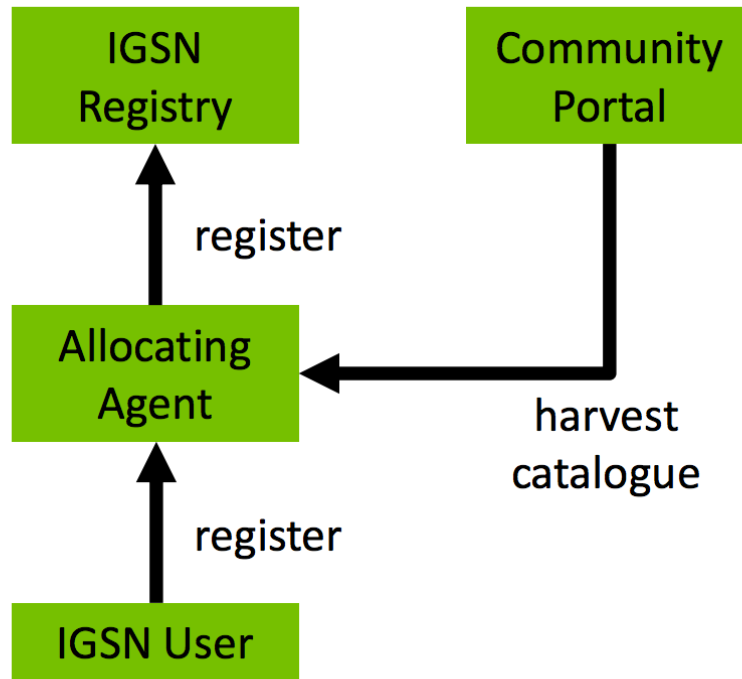
- Development started in 2004
  - US NSF funded
  - Initially centralized architecture
  - Registration services at SESAR
- International organization established in 2011
  - Modeled after DataCite
  - IGSN e.V. registered as non-profit in Germany
  - Currently 15 members (US, Germany, Australia)
- Distributed architecture implemented & evolving
  - Central registry at GFZ Potsdam completed in 2014
- Publishers recommend IGSN for sample citation
  - Coalition for Publishing Data in the Earth & Space Sciences COPDESS
  - AAAS workshop on ‘Reproducibility in the Field Sciences’



# IGSN Roles



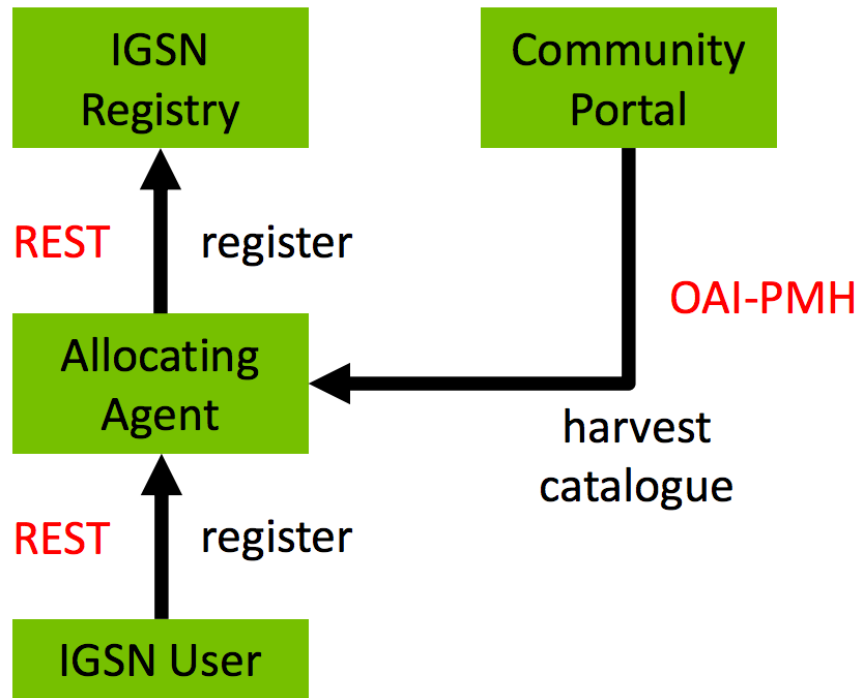
# IGSN System Overview



- Client registers sample with Agent:
  - Administrative metadata
  - Descriptive metadata
- Agent registers sample with IGSN:
  - Administrative metadata
- Agent offers catalogue through OAI-PMH interface:
  - Descriptive metadata
- Communities harvest metadata into portals.



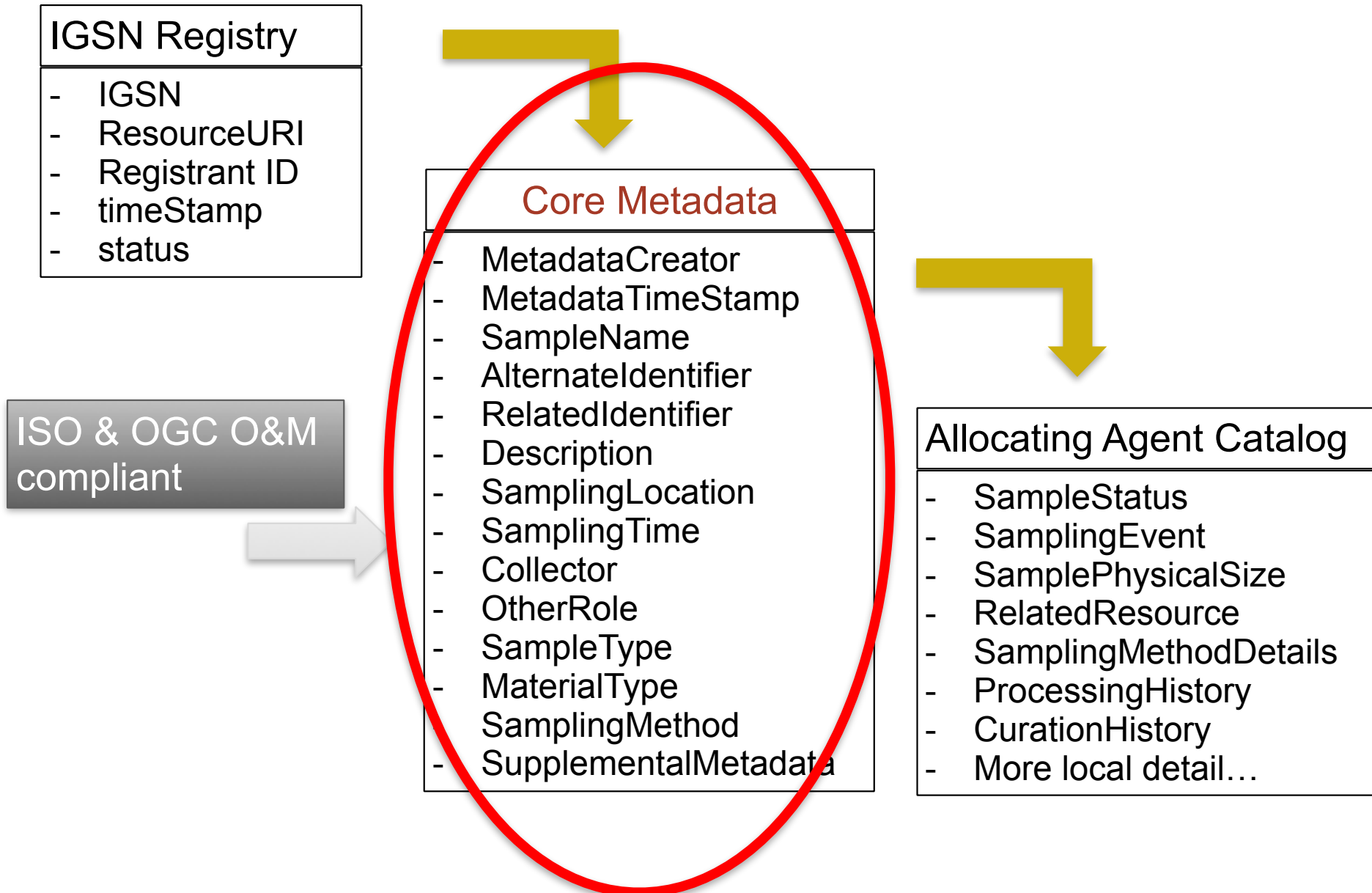
# IGSN Metadata



Remember: OAI-PMH is a protocol, not a profile!

- The separation of administrative and descriptive metadata is a learning from setting up DataCite.
- Metadata in a common service can be:
  - Least common denominator
  - All-encompassing with lots of optional elements
- Communities of practice define their metadata as an extension of a core set of metadata.

# IGSN Metadata Levels





# New IGSN Metadata Kernel


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- Proposal to be developed by technical committee and published through GitHub. One month hearing period on schema proposal.
- Schema (beta) online by 15 Nov 2015 for discussion at IGSN General Assembly at AGU (13 Dec 2015).
- Publish xsd file at [schema.igsn.org](http://schema.igsn.org)
- Version changes need to be approved by the General Assembly.
- Subsequent changes to be communicated through [tech@igsn.org](mailto:tech@igsn.org) and proposed through GitHub.

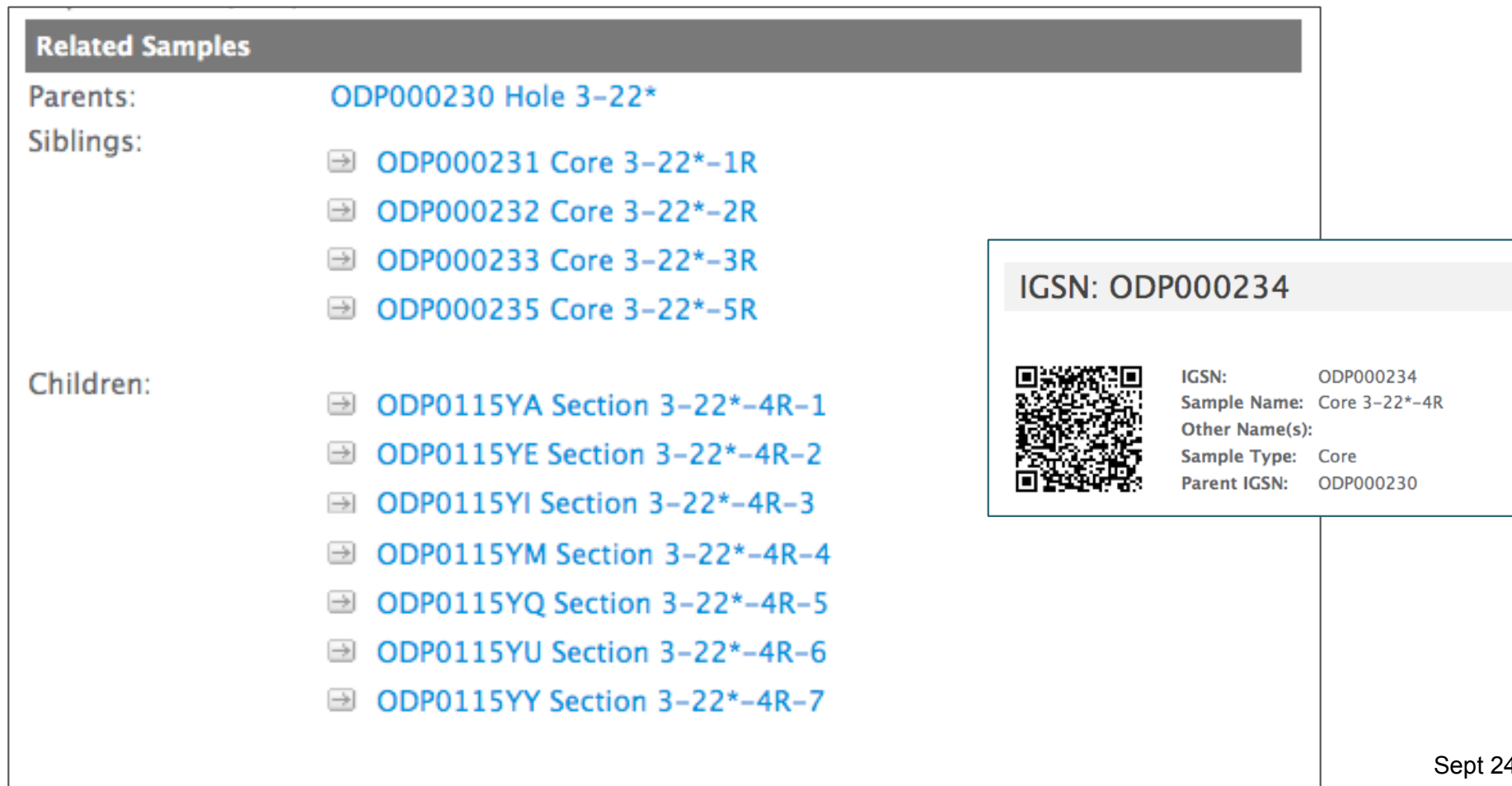
- Adopting existing vocabularies
  - Observations Data Model (ODM2)
  - om-lite - OWL implementation of O&M
  - Geoscience Terminology Working Group (CGI)
  - Australian National Data Service (ANDS)
- Get IGSN vocabularies into governed and controlled name spaces.
  - e.g. Commission for the Management and Application of Geoscience Information (CGI - Commission of International Union of Geological Sciences)?

# IGSN Metadata

- Identification
  - Sample name(s), registrant
- Description
  - Material, classification, age, size, comments
- Geospatial information (if applicable)
  - Geographical names, coordinates
- Collection
  - Expedition/cruise, platform, date, collector, technique
- Archiving/access
  - Physical location of sample (repository), contact
- Relationship to other (sub-)samples

IGSN: ECS00000A	
	IGSN: ECS00000A Sample Name: HLY0805-DR1-001 Other Name(s): Sample Type: Individual Sample Parent IGSN: ECS000001
Description	
Material:	Not Provided
Classification:	Not Provided
Field Name:	Not Provided
Description:	interbedded sandstone/mudstone (light ochre layer, coarse volcanic sand, manganese crust)
Age (min):	Not Provided
Age (max):	Not Provided
Collection Method:	Dredging
Collection Method Description:	Not Provided
Size:	15 x 9 x 3 cm
Geological Age:	Not Provided
Geological Unit:	Not Provided
Comment:	Not Provided
Purpose:	Not Provided
Geolocation	
Latitude:	81.4148
Longitude:	-151.9654
Elevation:	-3266
Nav Type:	Not Provided
Physiographic Feature:	Not Provided
Name Of Physiographic Feature:	Not Provided
Location Description:	Not Provided
Locality:	Not Provided
Locality Description:	Not Provided
Country:	Not Provided
State/Province:	Not Provided
County:	Not Provided
City:	Not Provided
Collection	
Field Program/Cruise:	HLY0805
Platform Type:	Ship
Platform Name:	USCGC HEALY
Platform Description:	Not Provided
Launch Type:	Not Provided
Launch Platform Name:	Not Provided
Launch ID:	Not Provided

# Sample Genealogy



# Linking DOI & IGSN

12	RelatedIdentifier	Identifiers of related resources.		0-n	The format is open. *** Use this property to indicate subsets of properties, as appropriate.
12.1	relatedIdentifierType	The type of the RelatedIdentifier.	A	Req	<i>Controlled List</i> Allowed values: ARK DOI EAN13 EISSN Handle ISBN ISSN ISTD LISSN LSID PURL UPC URL URN



## DataCite Metadata Schema for the Publication and Citation of Research Data

Version 2.2

July 2011

doi:10.5438/0005

Sept 24, 2014



Geochimica et Cosmochimica Acta

Volume 122, 1 December 2013, Pages 101–126



# IGSN: Linking Samples, Data, & Publications

## Climate dependence of feldspar weathering in shale soils along a latitudinal gradient

Ashlee L. Dere<sup>a</sup>, Timothy S. White<sup>a, b</sup>, Richard H. April<sup>c</sup>, Brian Reynolds<sup>d</sup>, Thomas E. Miller<sup>e</sup>, Elizabeth P. Knapp<sup>f</sup>, Larry D. McKay<sup>g</sup>, Susan L. Brantley<sup>a, b</sup>

Show more

<http://dx.doi.org/10.1016/j.gca.2013.08.001>

IGSN: SSH000STR



IGSN: SSH000STR  
 Sample Name: ald-10-01  
 Other Name(s):  
 Sample Type: Individual Sample  
 Parent IGSN: Not Provided

Description

Material: Rock  
 Classification: Not Provided  
 Field Name: shale  
 Description: rock outcrop sample  
 Age (min): Not Provided  
 Age (max): Not Provided  
 Collection Method: rock hammer  
 Collection Method Description: Not Provided  
 Size: Not Provided  
 Geological Age: Not Provided  
 Geological Unit: Not Provided  
 Comment: Not Provided  
 Purpose: CZO Shale Transect

Geolocation

Latitude: 52.470683  
 Longitude: -3.69255  
 Elevation: 323.088  
 Nav Type: Not Provided  
 Physiographic Feature: stream bed  
 Name Of Physiographic Feature: Not Provided  
 Location Description: Plynlimon forest, Wales, shale Severn stream bed  
 Locality: Not Provided  
 Locality Description: Not Provided  
 Country: United Kingdom  
 State/Province: Wales  
 County: Not Provided  
 City: Not Provided

Collection

Table 2.

Major elemental chemistry of shale collected across the transect and corresponding depth of sample (d) where applicable. All rock samples were collected at local outcrops with the exception of PlynQ-RF and ALD-10-158, which were recovered from the bottom of soil pits. PlynQ-RF is a weathered shale chip recovered from the bottom of the augered core.

Site	Sample name	IGSN <sup>a</sup>	d (m)	Al (%)	Ca (%)	Fe (%)	K (%)	Mg (%)	Mn (%)	Na (%)	P (%)	Si (%)	Ti (%)	Zr (ppm)
Wales	PlynQ-RF	SSH000GG	0.35	12.0	0.04	6.77	3.15	1.41	0.43	0.57	0.04	25.1	0.82	164
	ALD-10-01	SSH000STR		11.8	0.03	6.40	2.96	1.36	0.33	0.68	0.04	26.3	0.82	154
	ALD-10-02	SSH000STS		11.0	0.01	5.77	2.88	1.23	0.21	0.61	0.04	27.1	0.71	137
	ALD-10-03	SSH000STT		11.8	0.01	6.73	2.87	1.47	0.23	0.62	0.05	24.4	0.90	175
	ALD-10-04	SSH000STU		11.6	0.05	6.45	2.66	1.63	0.13	0.77	0.06	25.9	0.83	215
	ALD-10-06	SSH000STW		11.9	0.05	6.17	2.91	1.53	0.21	0.76	0.06	24.8	0.85	186
	ALD-10-07	SSH000STX		11.7	0.01	6.45	2.93	1.33	0.29	0.62	0.05	24.3	0.90	210
	ALD-10-08	SSH000STY		11.9	0.02	6.82	2.94	1.50	0.62	0.62	0.06	24.9	0.89	185
	ALD-10-09	SSH000STZ		11.2	0.07	6.51	2.77	1.41	0.27	0.64	0.06	24.1	0.84	167
	ALD-10-33	SSH000SUO		11.7	0.04	6.32	2.97	1.41	0.21	0.64	0.06	24.1	0.85	165



# NanoSIMS results from olivine-hosted melt embayments: Magma ascent rate during explosive basaltic eruptions

Alexander S. Lloyd<sup>a</sup>, Philipp Ruprecht<sup>a, 1</sup>, Erik H. Hauri<sup>b, 2</sup>, William Rose<sup>c, 3</sup>, Helge M. Gonnermann<sup>d, 4</sup>, Terry Plank<sup>a, 5</sup>

## 3. Methods

### 3.1. Sample preparation

During sample preparation, special care was taken to consider the size of each pyroclast and the effect on post-eruptive cooling. Samples were divided into three sizes: volcanic ash (particles with a diameter < 2 mm); lapilli (diameter between 2 mm and 64 mm), and volcanic bombs (clasts with a diameter > 64 mm). The ash sample (VF-132 - IGSN: ASL000001) was sieved without crushing, and loose olivine grains were selected from 250-500  $\mu\text{m}$  and from 500-1000  $\mu\text{m}$  size fractions. The lapilli sample (VF-129 - IGSN: ASL000002) was collected as a mix of ash and lapilli ranging in size from 30 mm to less than 0.1 mm. Only pyroclasts greater than 20 mm in diameter were selected, and of this set, the five largest lapilli were chosen. The bomb sample (VF-137B - IGSN: ASL000003) was selected from a diverse collection for its uniform spherical shape and relatively large size (60-mm diameter). The bomb was cut so that the material sampled for olivine-hosted embayments was derived from the inner  $20 \times 20 \times 20 \text{ mm}^3$  of the bomb. The vesiculation in these pyroclasts was relatively uniform between clast types and ranged from 40% to 55% (estimated by bubble size distribution techniques, Gray A.L., pers comm, 2012); groundmass color was observed to be consistent among all the samples.

- URN type: name space (governed) + name string
  - Until July 2014: 3 digit name space + 6 digits string
  - Since 2014: Hierarchical name spaces (domain & subdomain)
    - 2- or 3-digit name spaces for large-scale users
    - 4- to 5-digit name spaces for users with small number of samples
- New: Number of digits can be extended to accommodate requirements of Allocating Agents
  - example: Bremen Core Repository: name space 'BCR' + 7 numbers
- Protocols are specific to Allocating Agents.

IGSN	Name	Sub space	String
<i>IGSN:ODP0HY78F</i>	<i>ODP</i>		<i>0HY78F</i>
<i>IGSN:BCR2345678</i>	<i>BCR</i>		<i>2345678</i>
<i>IGSN:IDELG54F7</i>	<i>ID</i>	<i>ELG (project)</i>	<i>54F7</i>
<i>IGSN:IEKAL8G4V</i>	<i>IE</i>	<i>KAL (indiv.user)</i>	<i>8G4V</i>

# Integration with Handle System

```
http://dokuwiki.gfz-potsdam.de/datawiki/doku.php?id=igsn:syntax
```

The Handle value is concatenated by the following rule:

```
<prefix>/<igsn>
```

resulting in

```
Example (Handle): 10273/SSH000SUA
```

where <prefix> is 10273 and <igsn> is the value (IGSN) assigned by an [Allocating Agent](#).

This identifier can be resolved to the URL of the metadata page of the sample through any handle resolver, e.g.  <http://hdl.handle.net> by adding the URL of the resolver before the handle.

```
Example (URL): http://hdl.handle.net/10273/SSH000SUA
```

The example given above follows the [recommended practice](#) for IGSN names. IGSN user [communities](#) may adopt their own IGSN formats, if necessary.



## The IGSN Handbook

Version 0.3, 2014-07-31

Edited by Jens Klump(1), Kerstin Lehnert (2), Leslie Hsu(2)

(1) CSIRO Mineral Resources Flagship, Kensington WA, Australia

(2) Lamont-Doherty Earth Observatory, Columbia University, Palisades NY, USA

### 2. IGSN for Investigators

What Investigators need to know about using [IGSN](#)

### 3. IGSN for Curators

What sample curators need to know about [IGSN](#)

### 4. IGSN for Data Centres

What data [centres](#) need to know about IGSN

### 5. IGSN for Allocating Agents

What Allocating Agents and prospective members need to know about their role in [IGSN](#)

Becoming an IGSN Allocating Agent

New working group has just been established to review and revise current documentation.



# geosamples.org: Tools for Users

MySESAR

[Back to SESAR Home](#)

**My Home**

[My Samples](#)

[My Groups](#)

[Sample Registration](#)

[Transfer Ownership](#)

[Search](#)

[My Profile](#)

[Logout](#)

## My Home

Welcome, Kerstin Annette Lehnert

### REGISTRATION

- > [Register an individual sample](#)
- > [Download batch registration template](#)
- > [Upload my batch samples](#)

### SAMPLES

- > [Search sample catalog](#)
- > [View/Edit my samples](#)
- > [View/Edit my groups](#)

### MY ACCOUNT

- > [Edit my Profile](#)
- > [Transfer my samples to another user](#)
- > [Pending transfer requests](#)

## Pending Batch Registrations

There is a total of 0 batch registration(s) awaiting processing

## Registered Samples Summary

You have a total of 2 [registered samples](#) in SESAR.

📁 [1 Grab](#)

📁 [1 IndividualSample](#)



# Participate!

- As an IGSN user
  - Get a user account at [www.earthcube.org](http://www.earthcube.org)
  - Register your samples
  - Use the IGSN in the lab (see publications)
- As an IGSN Allocating Agent
  - Become a member of the IGSN e.V.
  - Establish
- As a member of the GEOSAMPLES community
  - Join the EarthCube Special Interest Group on Physical Samples
  - Stay tuned for the EarthCube RCN proposal GEOSAMPLES



**Physical Samples as Part of Cyberinfrastructure**  
Created by 0rdyn5vhh5csa [View Groups](#)

**INFORMATION**

The Special Interest Group "Physical Samples as part of Cyberinfrastructure" brings together a community that is concerned with physical samples collected in the Earth Sciences and their integration with digital data and information infrastructure into an Internet of Samples. The objective of this group is to establish standards and best practices for the registration and identification of samples, their documentation, and their curation to ensure discovery, access, and preservation of both the physical samples and of the virtual representation of the samples in digital data systems.

Members: **51**  
Latest Activity: **Oct 29, 2013**

**MEMBERS (51)**

# IGSN Use

