ISRIC
World Soil Information

Physical collections of ISRIC World Soil Information

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Content

About ISRIC

ISRIC physical collections (soil reference collection)
- Purpose & value
- Collection management
- Use and accessibility
- Metadata standards

ISRIC history and collections

Founded in 1966 as the ‘International Soil Museum’ (linked to the FAO soil map of the world project); initiative of the ISSS, adopted by UNESCO General Council (1964)

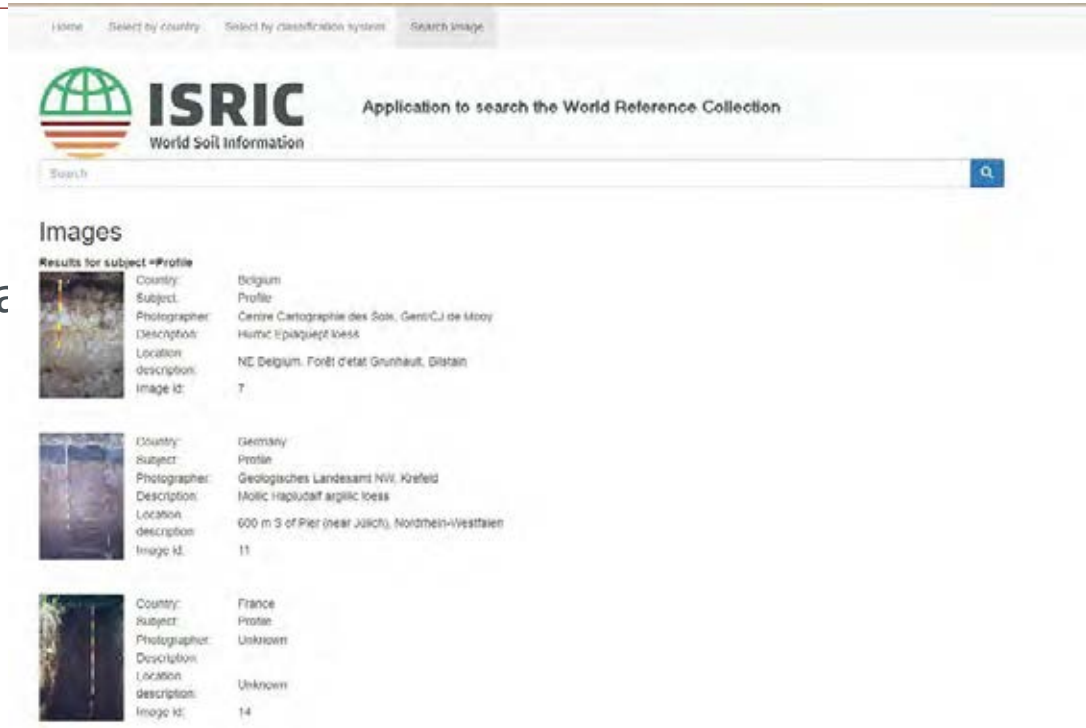
In the museum, students and scientists would be able to learn from these different types of soils from around the world. In addition, the museum could act as an international reference centre for soil data.

Became the “International Soil and Information Reference Centre” (ISRIC) in 1984

ISC World Data Centre for Soils (since 1989)

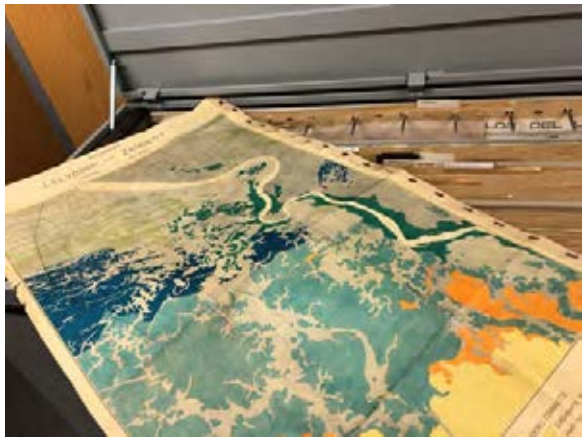
World Soil Reference Collection

- Unique collection of soil materials:
    - 1100 soil monoliths (> 75 countries)
    - 5000 soil samples with physical and chemical data
    - 3500 thin sections
    - photographic documentation
- Collected and analysed in a **consistent** way
- 75% is considered as **reference** soils: complete description, monolith with accompanying sample material, data from certified, reference lab, characteristic of the map units of the FAO Soil Map of the world.
- Used for a wide variety of purposes across the world (research & education)

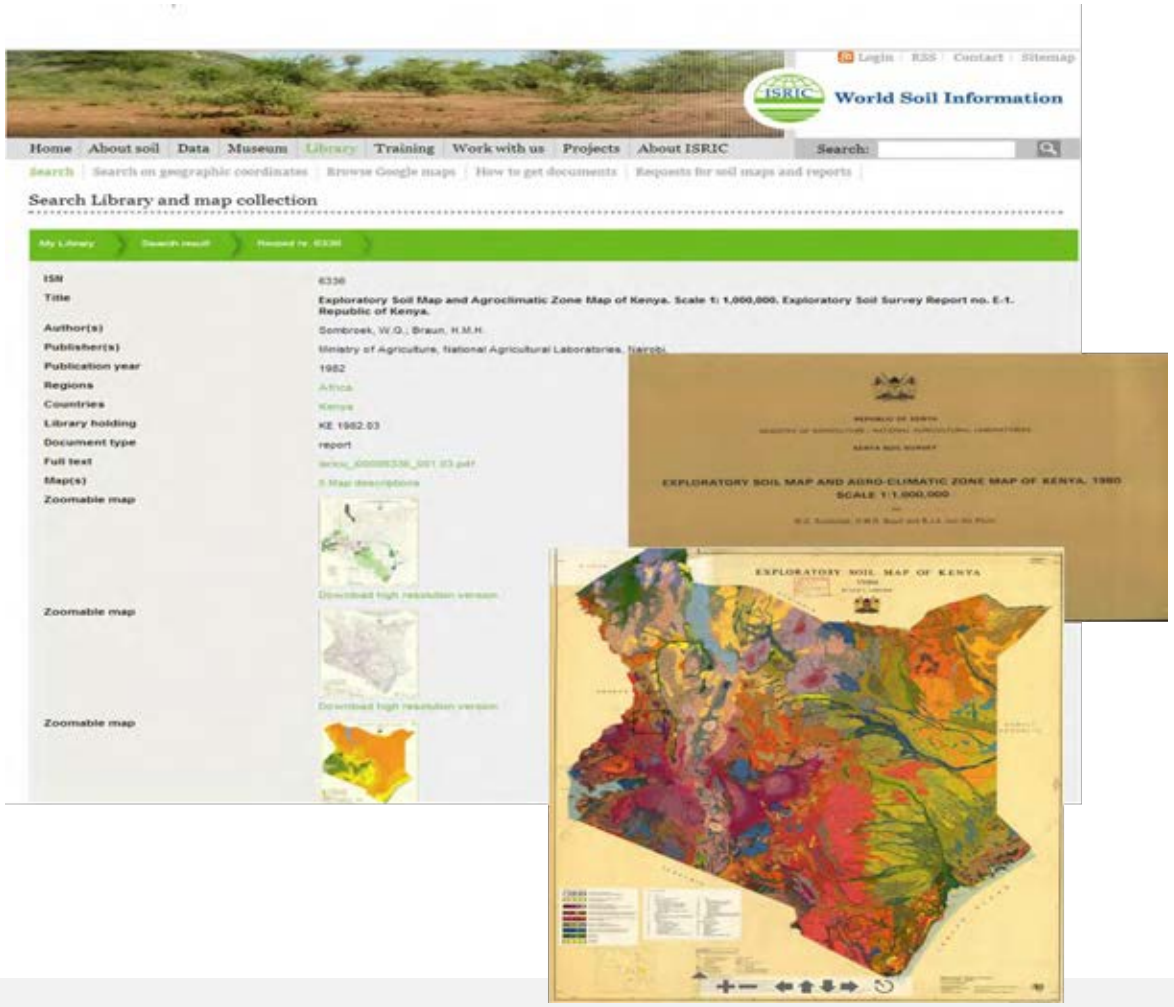


World Soil Reference Collection

ISRIC Soil Library for maps and reports



Objects	Nr
Maps	15970
Reports	9120
Links	351
Books	246



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Purpose and use of soil reference collections

Document the environment through physical samples, description and analysis
Vital for understanding soils, properties and functions
Provides clues about formation, variation, functions, and human influence

Base-line against which new observations can be compared and to produce predictive models
E.g. impact of land management, acid rain, pollution, climate change

Safeguarding soil reference profiles; providing the basis for taxonomy.

Soil monoliths are used for education in the world soil museum

Reference soil samples: site and soil description and soil chemical and physical properties. Sample material is available for research on request (e.g. pre- and post Chernobyl comparison, heavy metal content, DNA analyses, pollen research).









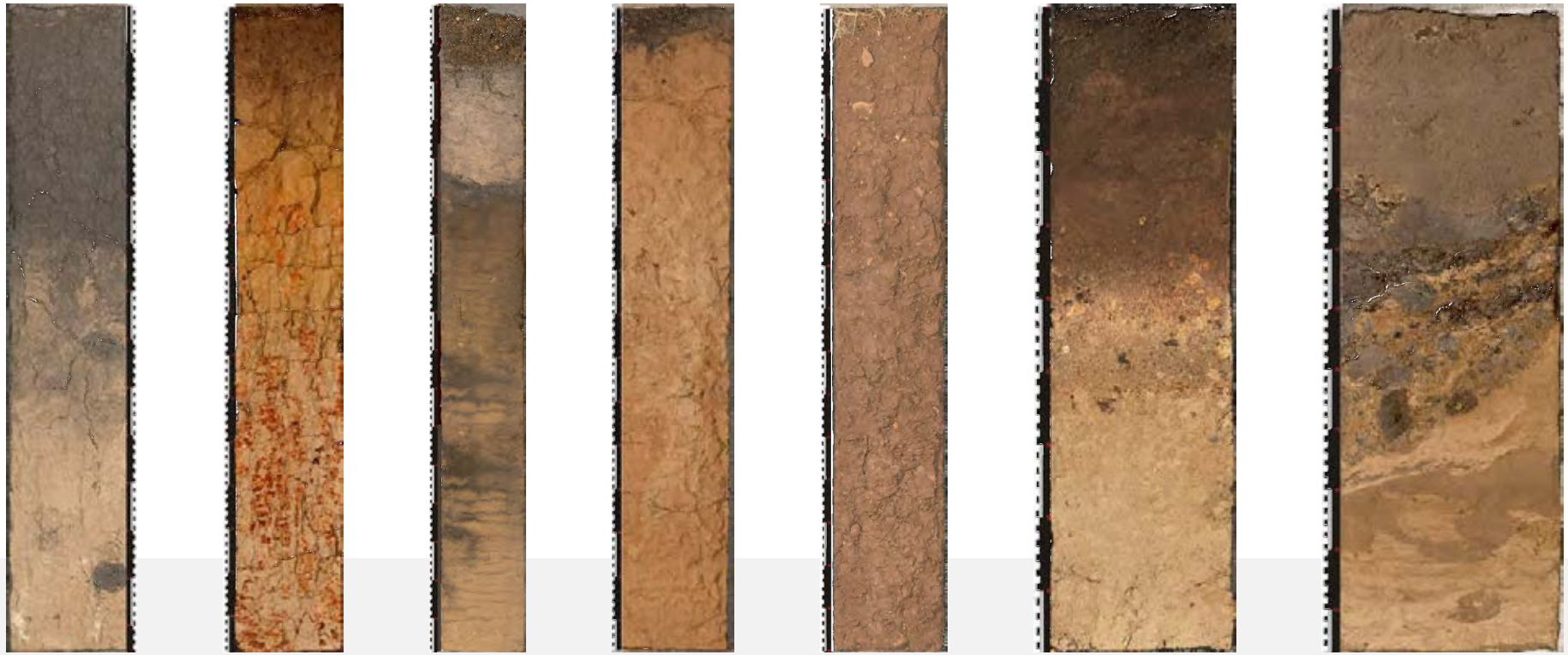


Monolith preparation

Undisturbed soil columns, sampled from a profile wall, are impregnated with a glue to conserve the soil for display purposes.

Monolith photography and assessment

- High-resolution photograph taken from each monolith in the collection
- Physical state monitored. Monoliths RDF (Radio-frequency identification) chipped.
- Unique identifier of all objects (monoliths, samples and thin sections) is based on the country (two digit ISO country code) and follow number. E.g. NL 041



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ID 004
ID 021
BR 023

Soil sample registration, archiving and analysis

- Reference soil samples stored in new containers, labelled, barcoded, registered.
- New samples processed, send to Kellogg Soil Survey lab of the USDA-NRCS, US for chemical analyses. Physical analyses done in Wageningen

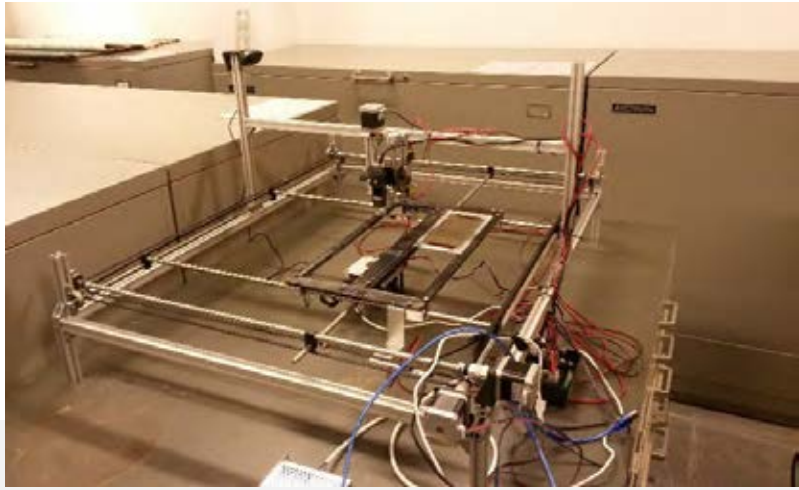
Micromorphology collection

Micromorphological collections at ISRIC:

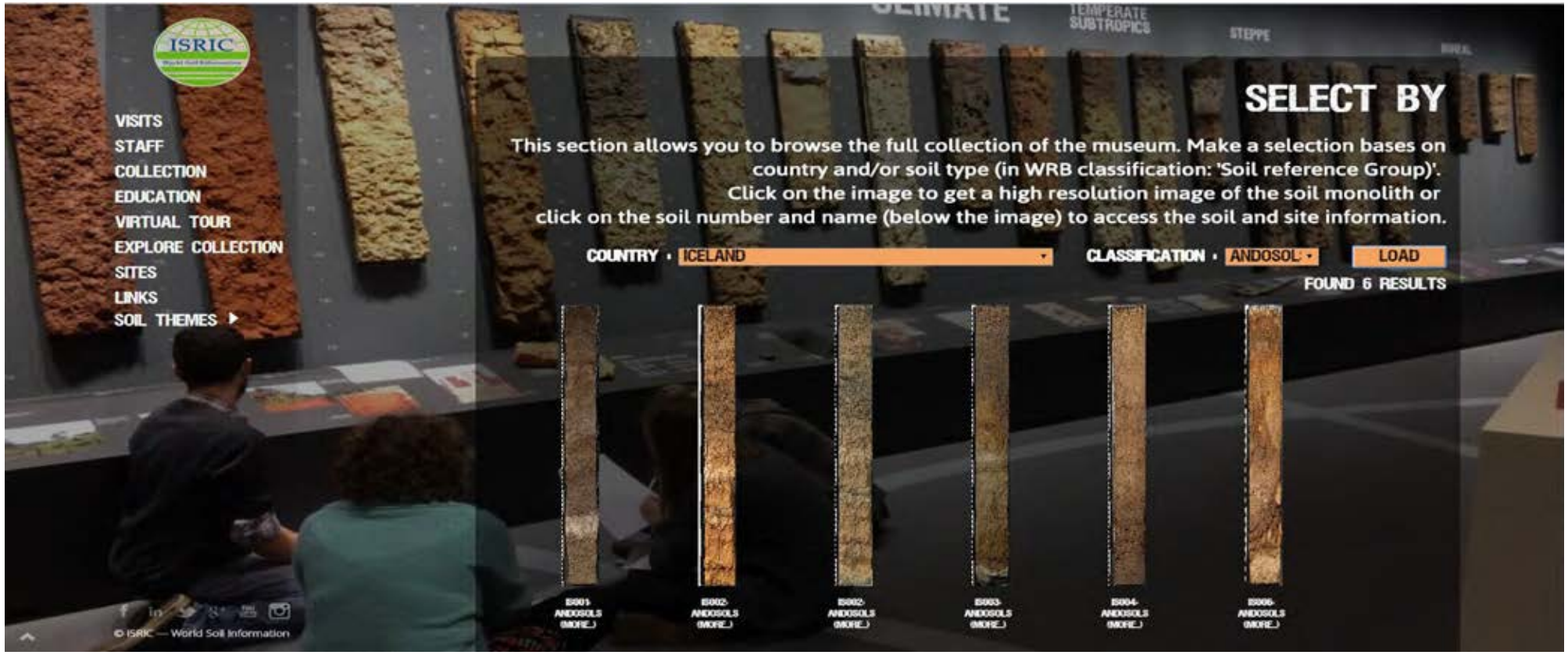
- Thin sections related to the reference collection
- Orphaned collection of thin sections from various institutions

Accessibility:

- On request inspection and loan
- Digitization of thin sections from reference collection
- Verification of documentation (also in the process of scanning)
- Data imported in the institutional database WoSIS.
- Investigate new technologies to make the thin sections available to users (remotely controlled inspection)



The World Soil Reference Collection



https://wsm.isric.org

Collection management

Much and continued work to fill gaps created by incomplete procedure in acquisition in the past.

Many partial information sources (excel sheets) for parts of the collection: integration required

Accountability and traceability of what is where and who did/does what is limited

SPECTRUM 5.0 policies and procedures are under study and will be formulated for management of our collection

Use and accessibility of the reference collections

Use and accessibility of collections

Soil samples: material made available for relevant research
-decisions on ad-hoc basis, limited quantity, above a minimum threshold of sample left, only for new and relevant research. A finite resource.

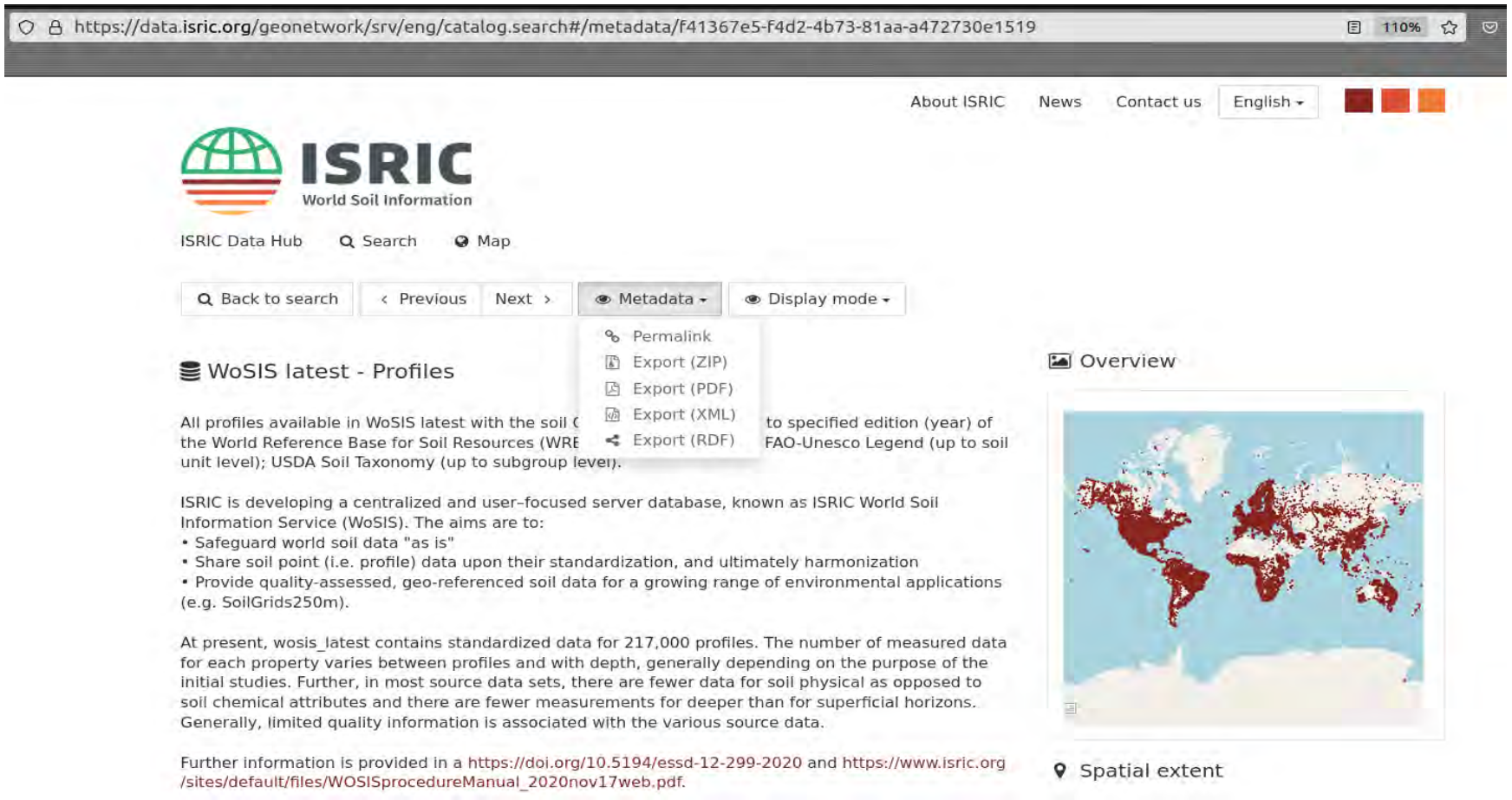
Monoliths: display in the world soil museum. Monolith store can be accessed on request, monolith loan to other museums when they meet exposition standards (under contract and insurance). Some objects are on long term loan.

Thin sections: On request inspection and loan.

Metadata of spatial datasets

- ISRIC maintains a catalogue of spatial datasets via data.isric.org
- Data.isric.org is a generic ISRIC catalogue implementing **iso19139** standard for (spatial) metadata, with **Dublin Core** metadata via an oai-pmh endpoint (geonetwork)
- For every metadata record a DOI is created.
- Museum monolith collection as part of WOSIS dataset. WOSIS dataset with a specifc DOI.

Metadata of spatial datasets



https://data.isric.org/geonetwork/srv/eng/catalog.search#/metadata/f41367e5-f4d2-4b73-81aa-a472730e1519

Embedded image metadata

- All images published by ISRIC include metadata embedded in the image file.
- Monolith Picture Collection to be released as a dataset. With associated profile information, image licensing and asstribution.
- Possible 25816 tags with 16503 unique tag names. IPTC/XMP also supports Dublin Core

The tables listed below give the names of all tags recognized by ExifTool. They contain a total of 25816 tags, with 16503 unique tag names.

Tag Table Index

JPEG	Leaf	PanasonicRaw	BMP	FLAC	WTV
EXIF	Minolta	SigmaRaw	RPG	Ogg	DICOM
IPTC	Motorola	Lytro	PICT	Vorbis	FITS
XMP	Nikon	JUMBF	EXR	Opus	HTML
GPS	NikonCustom	FlashPix	MNG	Theora	Palm
GeoTiff	NikonCapture	MPF	FLIF	APE	Torrent
PLUS	Nintendo	Stim	DjVu	Audible	EXE
ICC_Profile	Olympus	ScaladoTIFF	DPX	MPC	LNK
PrintIM	Panasonic	GoPro	OpenEXR	MPEG	Font
Photoshop	Pentax	Qualcomm	ZISRAW	M2TS	VCard
Apple	PhaseOne	JpegXR	MRC	H264	Text
MIEStandard	Reconyx	JSON	LIF	QuickTime	RSRC
Canon	Sanyo	CBOR	MIFF	Matroska	Rawzor
CanonCustom	Samsung	FLIR	PCX	MOI	ZIP
CanonVRD	Ricoh	APP12	PGF	MXF	RTF
Casio	Sigma	APCP	PSP	DV	OOXML
DJI	Sony	DarwinCore	PhotoCD	Flash	iWork
FLIR	SonyIDC	PrintIM	Radiance	Real	ISO
FujiFilm	Unknown	ExifByteOrder	PFM	Red	MacOS
GE	DNG	Microsoft	PDF	BPG	Extra
HP	CanonRaw	GIMP	PostScript	DICOM	Composite
JVC	KyoceraRaw	MIE	ID3	AIFF	Shortcuts
Kodak	MinoltaRaw	GIF	ITC	ASF	MWG

Embedded image metadata

UPLOAD ANOTHER IMAGE

Metadata takes **9.34 KB (76.1%)** of this image and **includes location data.** To protect your privacy, download this image without metadata by clicking the button below.

REMOVE METADATA

Location

Altitude	282 m Above Sea Level
Latitude	50 deg 37' 0.12" N
Longitude	5 deg 55' 0.01" E

Image metadata

Name	BE-001.jpg
File size	12.3 KB (12570 bytes)
File type	JPEG
MIME type	image/jpeg
Image size	32 x 148 (0.005 megapixels)
Color space	sRGB
Created	July 21, 2021 06:13

Copyright

Artist	Theo Jacob
Copyright	https://creativecommons.org/licenses/by/4.0/legalcode
By-line	ISRIC - World Soil Information
Copyright notice	https://www.isric.org/about/data-policy

HistoryWhen	2022-08-24 14:58:06 +0200
ImageDescription	ISRIC monolith picture BE-001. WRB-2016 classification: Alisol. WOSIS profile_id: 69872. profile_uuid: be1771fe-b8f2-11e4-90de-8851fb5b4e87
ImageHeight	148
SpecialInstructions	Full profile report: https://isis.isric.org/monoliths/reference-soil-be001
SubfileType	Reduced-resolution image
ThumbnailImage	Binary data 3268 bytes

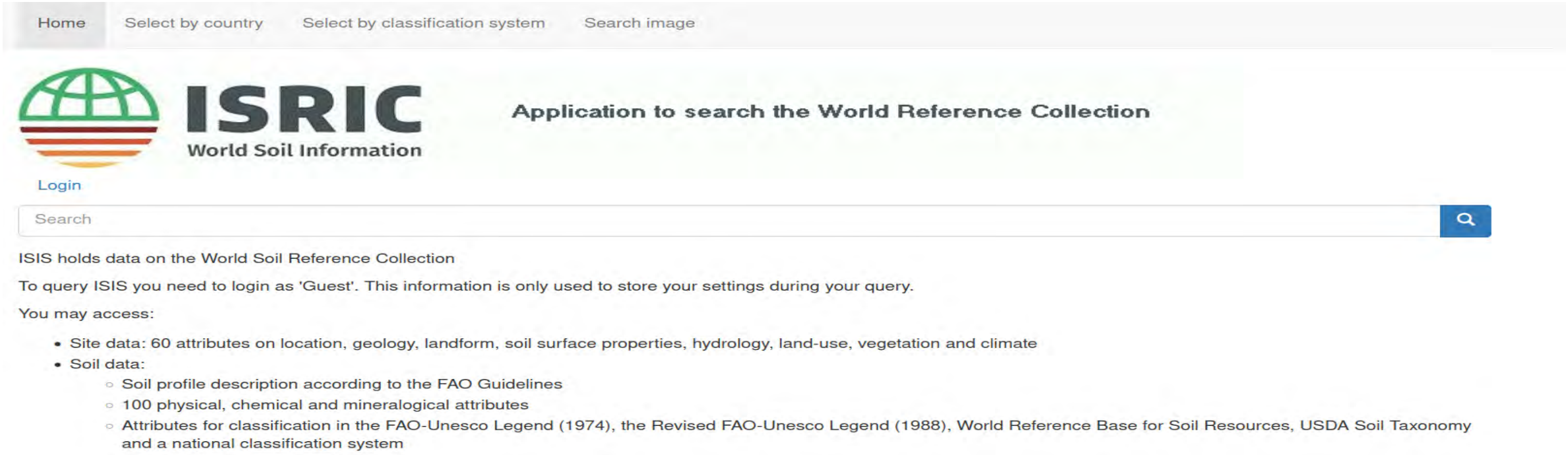
https://isis.isric.org/monoliths/reference-soil-be001

Embedded image metadata

- All images associated with URL that can be used as DOI
- https://isis.isric.org/monoliths/reference-soil-be001 has soil profile information related to picture
- Not the best URI as we include country names (that may change)
- Looking into implementing better URL structure (new ISRIC policy)

Collection objects metadata

- Partially advertised on the web via https://isis.isric.org
- Currently no common metadata format.
- No harvest or query endpoint.



Collection objects metadata: the future

- Select a suitable **meta-data** ontology:
  - CDWA
  - MUSEUMDAT
  - CIDOC CRM
  - Object ID
  - Europeana Data Model (EDM)
  - …
- **Semantic Web** approach
  - Synergies with **GloSIS** and **INSPIRE**
- New ISRIC **URI policy**
  - Information and asset identifiers;
  - Beyond web pages and projects.

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More information:

wsm.isric.org

www.isric.org

Metadata standards (Interoperability)

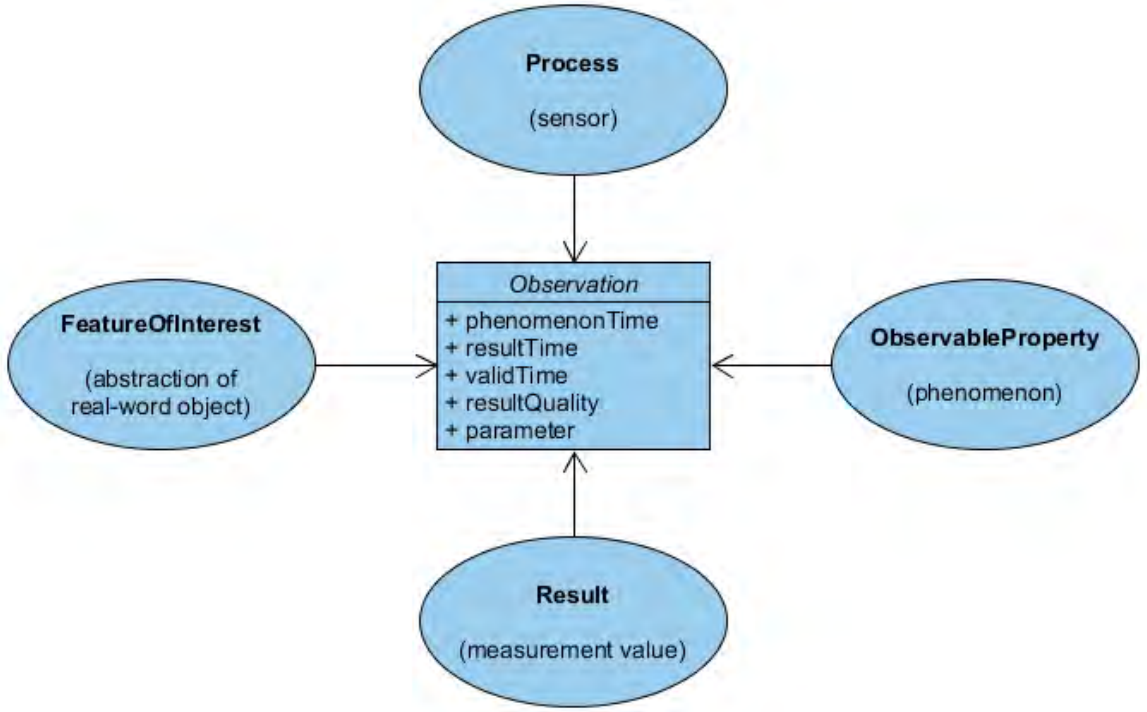
- Data structure of the metadata model (MARC, Dublin Core, iso19139 ...)
- Data value describe the codelists to be used (WRB classification)
- Data content describe how the codelist values populate the data structure (how to reference WRB within MARC/DC)
- Data format standards, how the content is encoded in a file (xml, json, rdf)

- Metadata exchange/harvest standards (oai-pmh, CSW, Opensearch)

Source: https://www.getty.edu/publications/intrometadata/setting-the-stage/

Dedicated standards to describe samples

- Our collections are mainly real world samples (monoliths, thin sections)
- Standards exist to describe Observations, Measurements & Samples; eg SOSA (used in GLOSIS RDF) or OMS (used in ISO28258/INSPIRE)
- ISRIC is in the process of adopting the OMS standards in its data publications.



World Reference Base for Soil Resources

- International System for naming soils
- Governed by International Union of Soil Sciences
- A global classification system for soils, including landscape and landuse
- Based on the Legend (FAO-Unesco, 1974) and the Revised Legend (FAO, 1988) of the Soil Map of the World (FAO-Unesco, 1971-1981)

- WRB is a pdf document. Recent initiatives to publish the contents of the pdf as RDF (SKOS) so it can be referenced from metadata.

Metadata of scientific publications

- Scientific publications of ISRIC are published via the WUR library following the DataCite metadata model
- For every record a DOI is created