



Implementing INSPIRE: the BRGM road trip INSPIRE Conference

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Implementing INSPIRE: the BRGM road trip

Mickaël Beaufils, Sylvain Grellet



BRGM in one slide



- > French Geological Survey
- > 1000 people in 5 main départements: water, georessources, natural risks assessment, laboratories & IT
- > An active contributor for interoperability in the geosciences

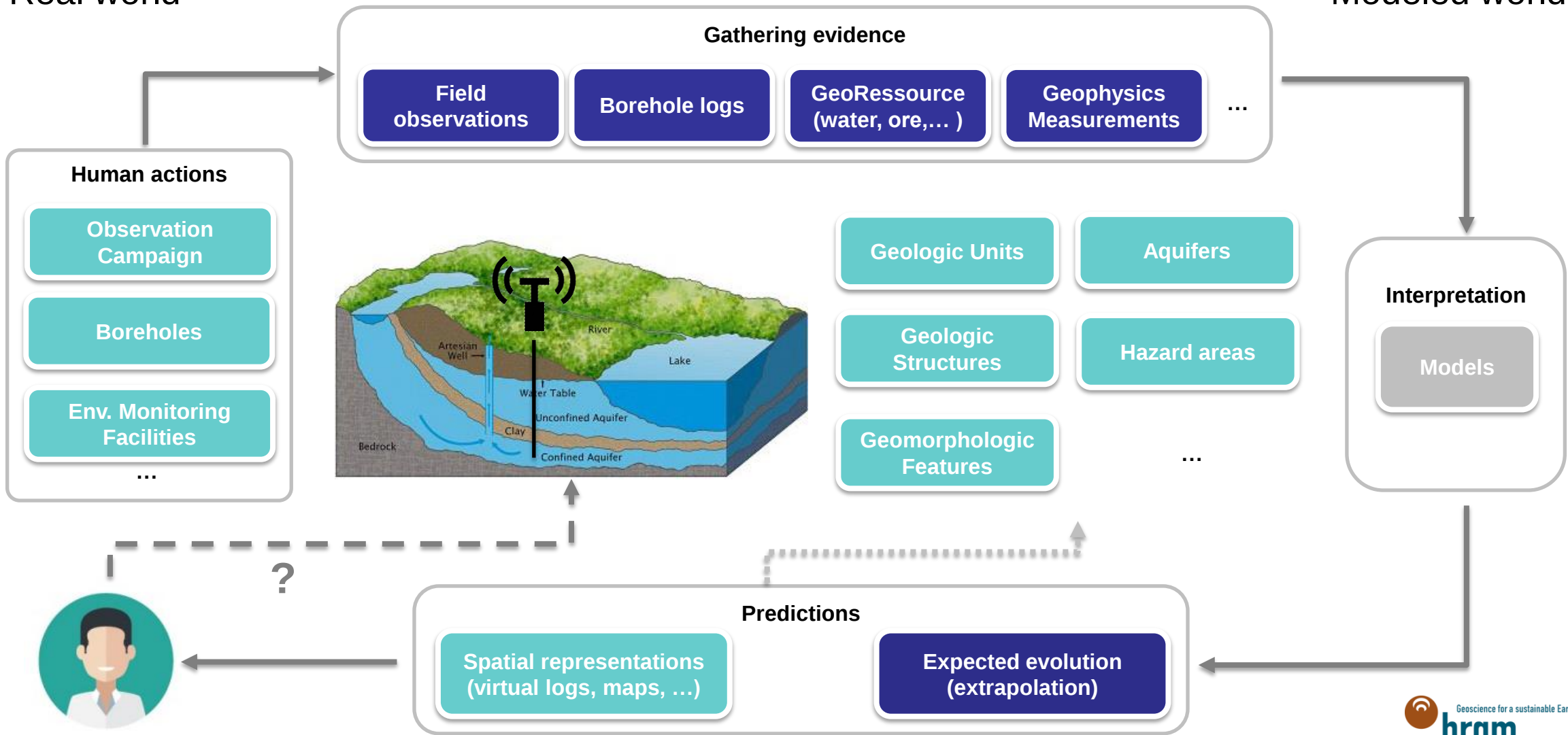


Main use case: understanding the subsurface

Legend: Features Observations

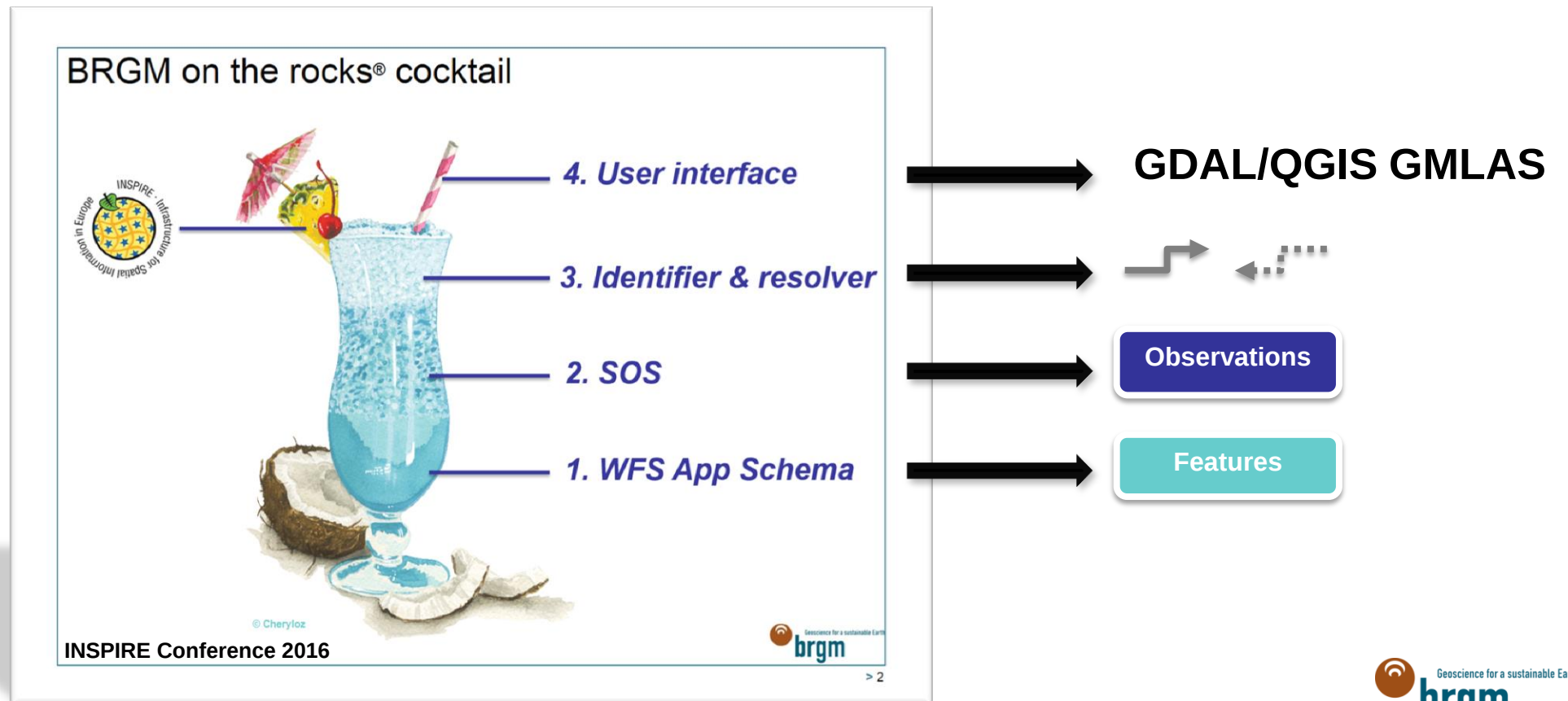
Real world

Modeled world

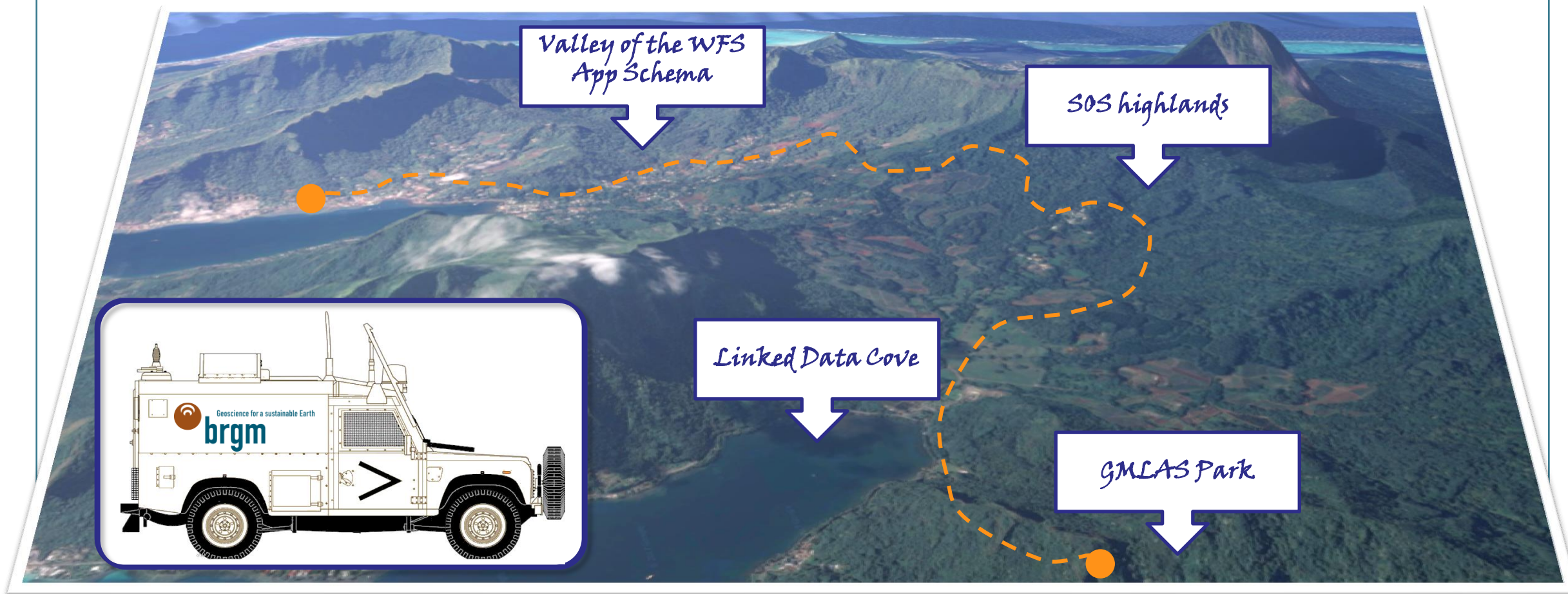


An Information System to fulfill that use case

- > Serving data through interoperable web services (in conformance with INSPIRE)
- > Linking data through derefferencable persistent identifiers
- > Providing tools to work with those data



Roadmap of the trip



WFS App Schema to provide features

> Implementation

- Decision to use GeoServer and its AppSchema extension and to contribute to its enhancement



> Feedback

- AppSchema configuration is tricky
 - Diffusion of « HowTo » for Borehole abstract description in EPOS-IP H2020 Project
- GetFeatureById is OK
 - But what is needed is a GetFeatureByIdentifier
- GetFeatures with filters is not satisfying
 - Very long response time (when not crashing)
- Performance issues
 - with on the fly mapping (eg. CONCAT)
 - Workaround: specific tables are set for WFS AppSchema (however this is data duplication)
 - when serving millions of instances
 - Workaround: currently planning to finance a connection to SolR index

SOS to provide O&M

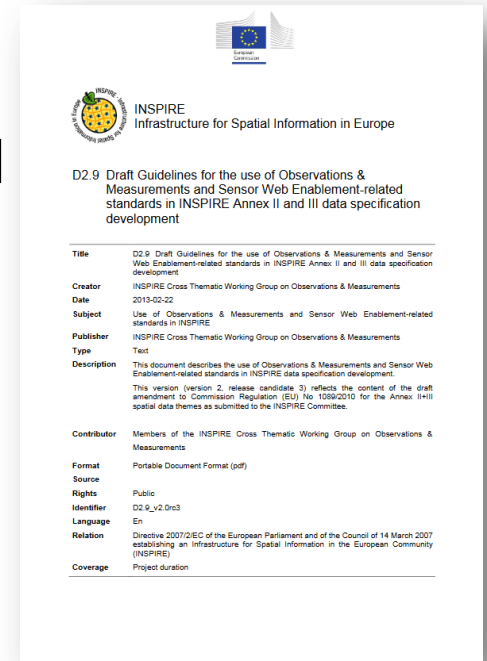
> BRGM is editor of « D2.9 Guidelines for the uses of O&M + SWE in INSPIRE »

> Implementation

- Based on 52°North solution (with specific developments)
- One webapp is deployed per observation property (groundwater levels, geologic logs, ...)

> Feedback

- 52°North solution has its own database schema
 - Data duplication from raw data base (yet MaterializedViews)
- User feedback: Limitations with filters
 - Filter on result is not yet possible according of OGC specs (eg. GetBoreholeLogs that cross that lithology)
- Reusing the REST API and JSON encoding for lot of applications



Identifiers and Linked Data

> Rationale

- Persistent identifiers on observation and domain features are the glue in an interoperable system
- Core idea is to put a URI as a first class element instead of the OGC getFeature/getObservation request

<http://ressource.brgm-rec.fr/obs/RawEarthMaterialLog/BSS001REWW>

Rewrite in proxy mode

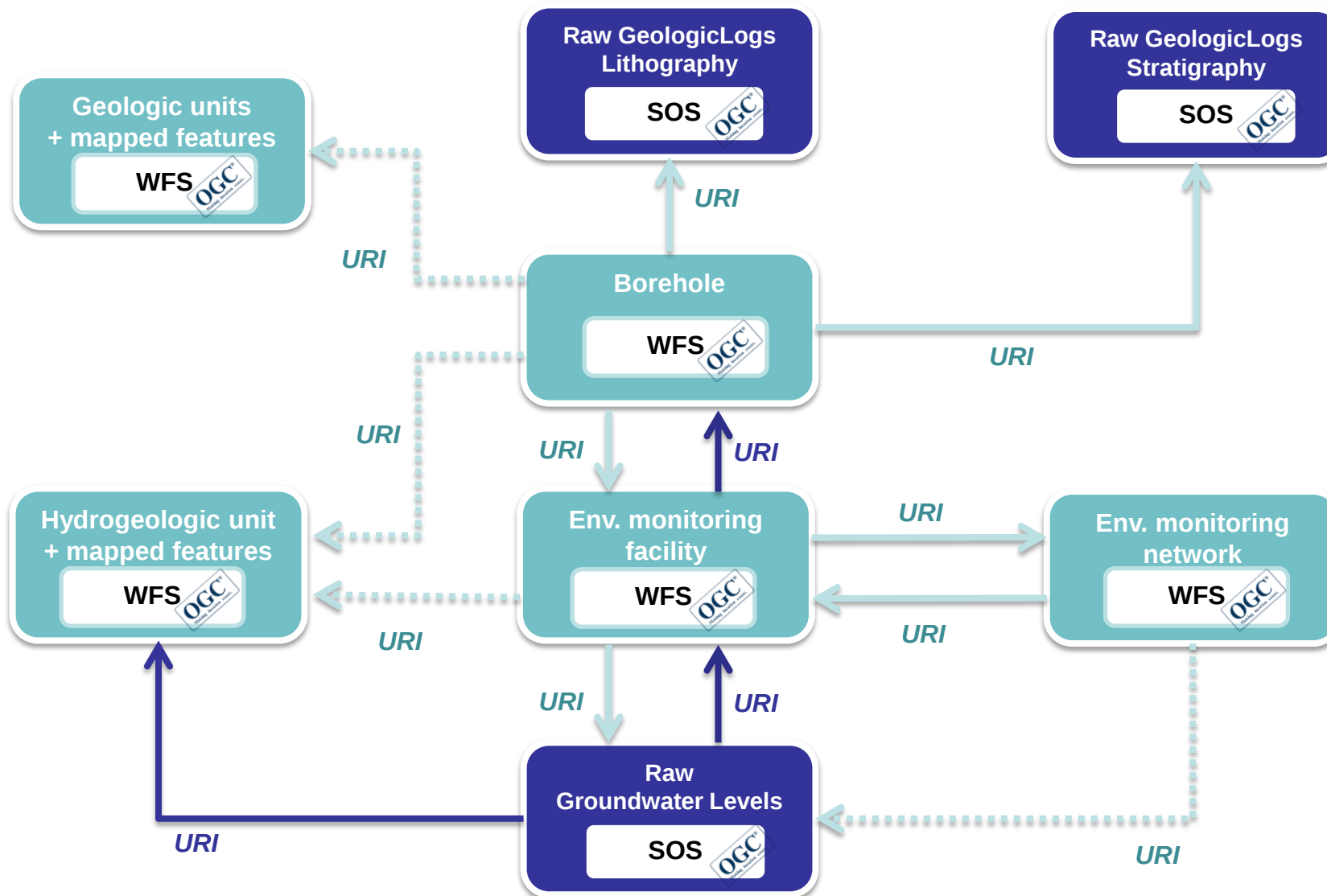
<http://192.168.6.208/52n-sos-raw-geologiclogs/service?service=SOS&version=2.0.0&request=GetObservationById&observedproperty=earthmaterial&observation=http://ressource.brgm-rec.fr/obs/RawEarthMaterialLog/BSS001REWW>

- This is too often overlooked in INSPIRE discussions (should resolve vs shall) !

> Implementation

- Apache mod_rewrite : to « translate » the URI in the OGC service requests

BRGM data services (v2017)



GML Application Schema suite

> Funded by BRGM and European Environment Agency (Copernicus)

> GMLAS: the converter

- As part of GDAL
- Offer converting functionalities developed to handle Complex Features
- (e.g. Convert GML App Schema files in PostGIS and SQLite format)



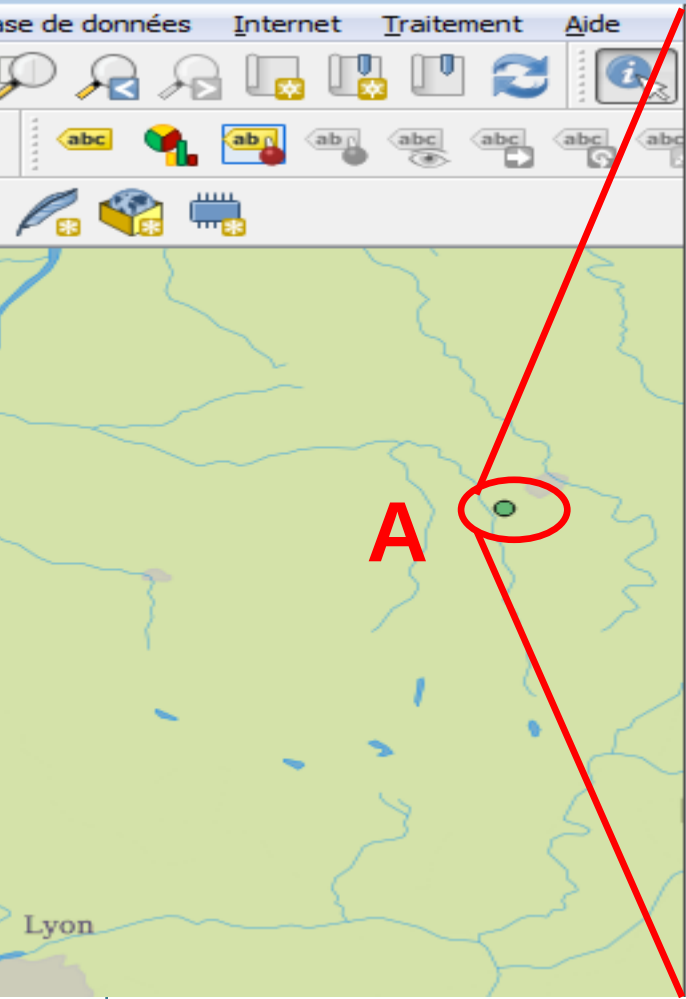
> GMLAS Toolbox: the client

- A plugin for QGIS
- Available for testing through OSGEO4W (AdvancedInstall/qgis-dev 2.99)
- Github : https://github.com/BRGM/gml_application_schema_toolbox



QGIS GML Application Schema Toolbox

Borehole



The screenshot shows the QGIS interface. On the left, a map of a region around Lyon is displayed. A green point is marked on the map, circled in red, and labeled with a large red 'A'. A red line originates from this point and points towards the attribute table on the right.

The attribute table on the right is titled "BoreholeView (points) - Attributs d'entités". It shows the following data for the selected point:

fid	Value
http://ressource.brgm-rec.fr/data/BoreholeView/BSS001REWW	
Element	Value
@gml:id	BSS001REWW
gml:description	Borehole description
gml:identifier	http://ressource.brgm-rec.fr/data/BoreholeView/BSS001REWW
@codeSpace	http://www.ietf.org/rfc/rfc2616
gml:name	Forage BSS001REWW
gsmlp:identifier	http://ressource.brgm-rec.fr/data/Borehole/BSS001REWW
gsmlp:purpose	http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/hydrogeologicalSurvey
@xlink:href	http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/hydrogeologicalSurvey
@xlink:title	levÃ© hydrogÃ©ologique, gestion de lâ€™eau
gsmlp:status	http://resource.europe-geology.eu/vocabs/BoreholeStatus/drillingCompleted
@xlink:href	http://resource.europe-geology.eu/vocabs/BoreholeStatus/drillingCompleted
@xlink:title	drilling completed
gsmlp:drillingMethod	http://resource.europe-geology.eu/vocabs/DrillingMethod/hydraulic_rotary_drilling
@xlink:href	http://resource.europe-geology.eu/vocabs/DrillingMethod/hydraulic_rotary_drilling
@xlink:title	hydraulic rotary drilling
gsmlp:operator	BRGM (PIEZOMETRIE)
gsmlp:driller	INTRAFOR-COFOR
gsmlp:drillEndDate	1974-11-30Z
gsmlp:startPoint	http://resource.europe-geology.eu/vocabs/BoreholeStartPoint/naturalLandSurface
@xlink:href	http://resource.europe-geology.eu/vocabs/BoreholeStartPoint/naturalLandSurface
@xlink:title	natural land surface
gsmlp:inclinationType	http://resource.europe-geology.eu/vocabs/BoreholeInclinationType/vertical
@xlink:href	http://resource.europe-geology.eu/vocabs/BoreholeInclinationType/vertical
@xlink:title	vertical
gsmlp:boreholeMaterialCustodian	unknown
gsmlp:boreholeLength_m	23.0
@uom	http://qudt.org/vocab/unit/M

QGIS GML Application Schema Toolbox

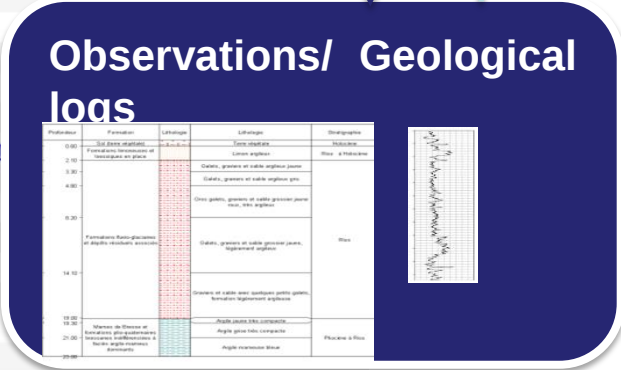
Borehole

<http://ressource.brgm-rec.fr/data/BoreholeView/BSS001REWW>

Element	Value
gsmlp:drillEndDate	1974-11-30Z
▾ gsmlp:startPoint	
@xlink:href	http://resource.europe-geology.eu/vocabs/BoreholeStartPoint/naturalLandSurface
@xlink:title	natural land surface
▾ gsmlp:inclinationType	
@xlink:href	http://resource.europe-geology.eu/vocabs/BoreholeInclinationType/vertical
@xlink:title	vertical
gsmlp:boreholeMaterialCustodian	unknown
▾ gsmlp:boreholeLength_m	
@uom	http://qudt.org/vocab/unit/M
value	23.0
▾ gsmlp:elevation_m	
@uom	http://qudt.org/vocab/unit/M
value	223.87
gsmlp:elevation_srs	http://www.opengis.net/def/crs/EPSSG/0/5720
gsmlp:source	http://ficheinfoterre.brgm.fr/InfoterreFiche/ficheBss.action?id=06512X0037/STREMY
gsmlp:metadata_uri	http://www.geocatalogue.fr/Detail.do?fileIdentifier=BR_BSS_BAA
gsmlp:genericSymbolizer	Not provided
▾ gsmlp:shape	
▾ gml:Point	
@srsDimension	2
@srsName	urn:ogc:def:crs:EPSG::4326
@gml:id	gsmlp.shape.BSS001REWW
gml:pos	46.1909541655103 5.18713262971692
gsmlp:cored	false
gsmlp:accessToPhysicalDrillCore	false
▾ gsmlp:boreholeUse	
@xlink:href	http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/groundwaterLevelMonitoring
@xlink:title	surveillance du niveau de la nappe phrÃ©atique
▾ gsmlp:detailedDescription	
@xlink:href	http://www.opengis.net/def/nil/OGC/0/template
@xlink:title	template
▾ gsmlp:geophysicalLogs	
@xlink:href	http://www.opengis.net/def/nil/OGC/0/unknown
@xlink:title	unknown
▾ gsmlp:geologicalDescription	
@xlink:href	http://ressource.brgm-rec.fr/obs/RawGeologicLogs/BSS001REWW
@xlink:title	Borehole BSS001REWW geologic log available.
▾ gsmlp:groundWaterLevel	
@xlink:href	http://ressource.brgm-rec.fr/data/Piezometre/06512X0037/STREMY.2
@xlink:title	Description of Piezometer attached to BSS001REWW. Provides link to SensorObservationService offering

QGIS GML Application Schema Toolbox

gsmpl:shape		
gml:Point		
@srsDimension		2
@srsName		urn:ogc:def:crs:EPSG::4326
@gml:id		gsmpl.shape.BSS001REWW
gml:pos		46.1909541655103 5.18713262971692
gsmpl:cored		false
gsmpl:accessToPhysicalDrillCore		false
gsmpl:boreholeUse		
@xlink:href		http://inspire.ec.europa.eu/codelist/BoreholePurposeValue/groundwaterLevelMonitoring
@xlink:title		surveillance du niveau de la nappe phrÃ©atique
gsmpl:detailedDescription		
@xlink:href		http://www.opengis.net/def/nil/OGC/0/template
@xlink:title		template
gsmpl:geophysicalLogs		
@xlink:href		http://www.opengis.net/def/nil/OGC/0/unknown
@xlink:title		unknown
gsmpl:geologicLogs		
@xlink:href		http://ressource.brgm-rec.fr/obs/RawGeologicLogs/BSS001REWW
@xlink:title		hole BSS001REWW geologic log available.
gsmpl:groundwaterChemistry		
@xlink:href		http://www.opengis.net/def/nil/OGC/0/unknown
@xlink:title		unknown
gsmpl:rockGeochemistry		
@xlink:href		http://www.opengis.net/def/nil/OGC/0/unknown
@xlink:title		unknown
gsmpl:poreGasChemistry		
@xlink:href		http://www.opengis.net/def/nil/OGC/0/inapplicable
@xlink:title		inapplicable
gsmpl:geoTechnicalInfo		
@xlink:href		http://www.opengis.net/def/nil/OGC/0/unknown
@xlink:title		unknown



B

QGIS GML Application Schema Toolbox

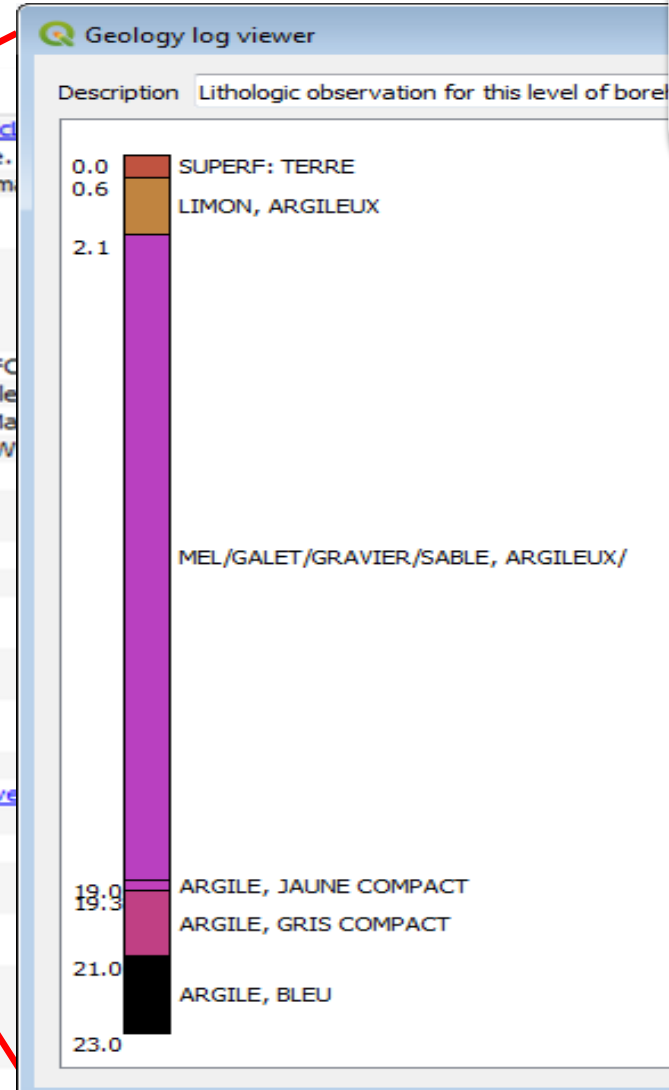
Observations/ Geological logs

sos:GetObservationResponse

- @xlink:href <http://ressource.brgm-rec.fr/obs/RawGeologic>
- @xlink:title Borehole BSS001REWW geologic log available.
- @xsi:schemaLocation <http://www.opengis.net/sos/2.0> <http://schemas.opengis.net/sos/2.0/observationData.xsd>

sos:observationData

- om:OM_Observation**
 - @gml:id o_B8A578CD13F439A702FBAD713F09AA17FC
 - gml:description** Lithologic observation for this level of borehole
 - gml:identifier** <http://ressource.brgm-rec.fr/obs/RawEarthMa>
 - gml:name** RawEarthMaterialLogObservation BSS001REWW
 - om:type**
 - om:phenomenonTime**
 - om:resultTime**
 - om:procedure**
 - om:parameter**
 - om:parameter**
 - om:parameter**
 - om:observedProperty**
 - @xlink:href <http://www.opengis.net/def/gwml/2.0/observe>
 - @xlink:title Earth Material
 - om:featureOfInterest**
 - om:result**
- sos:observationData**
 - om:OM_Observation**
- gswml:groundWaterLevel**
 - @xlink:href <http://ressource.brgm-rec.fr/data/Piezometre/06512X0037/STREMY.2>
 - @xlink:title Description of Piezometer attached to BSS001REWW. Provides link to SensorObservationService offering



BRGM perspectives

- > Continue implementing more and more feature types with the current solutions we identified
 - CSW with GeoNetwork
 - WMS with MapServer
 - WFS AppSchema with GeoServer
 - SOS with 52°North solution

- > Yet, continue exploring new horizons and contribute in (financing) technologies improvements
 - GMLAS toolbox still being developed
 - GeoServer connection to solR index to handle huge volumes of data
 - Pub/Sub to notify users of updates in the system
 - SensorThings approach to facilitate sensor data integration

Conclusion

> Building an information system is not a one-time process

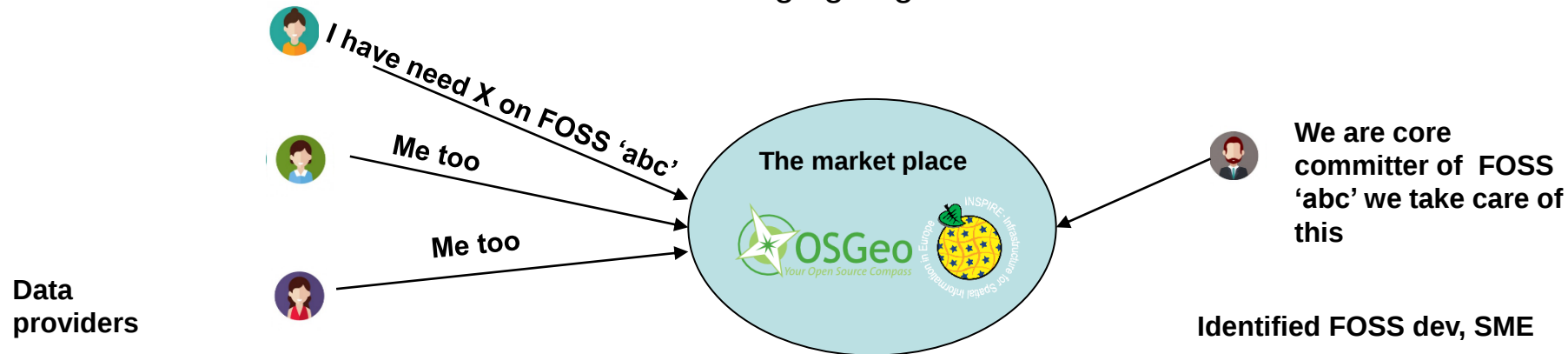
- Labs help testing things and get feedback from users
- Users participates in building the system, then it helps getting their support

> Technologies need improvements

- Yet a lot of things have been already done
- Technology providers are willing to help, but we have to feed their efforts (providing use cases, feedback and finance developments)

> We have common needs. Why don't we build a common solution?

- In order to share the efforts. Make things going faster.



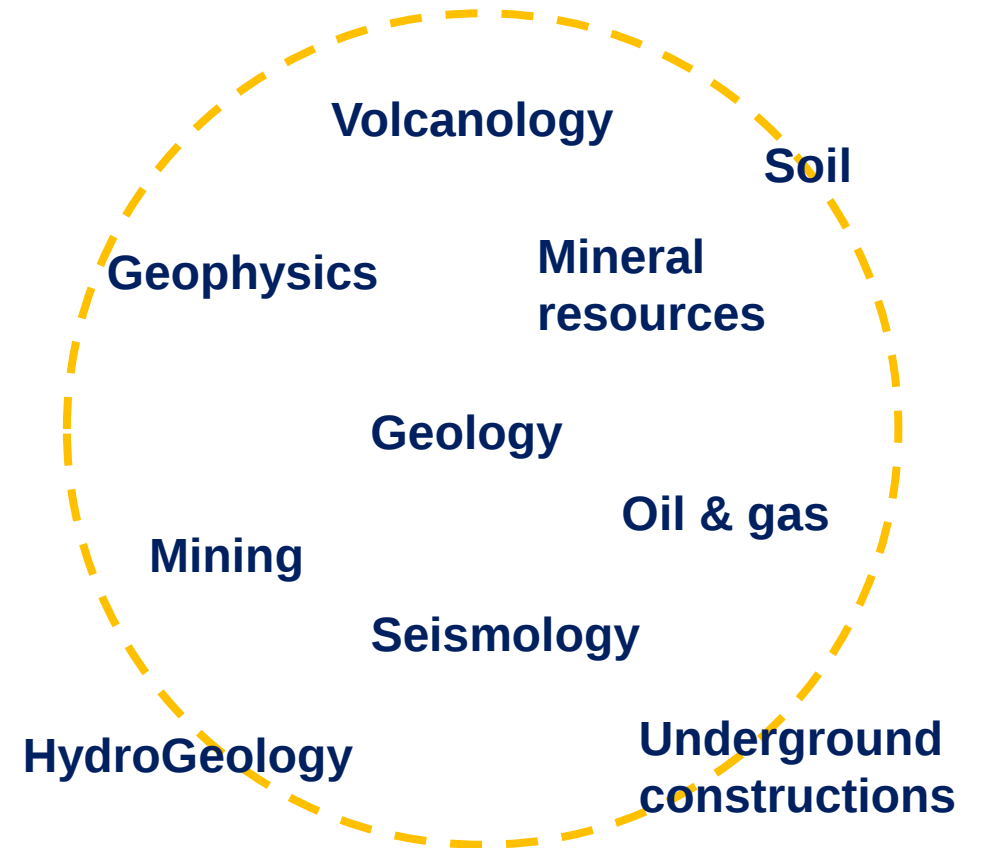
GeoScience DWG

- > A Domain Working Group especially dedicated to push GeoScience data interoperability



- > First meeting next week in Southampton OGC TC
 - Thursday 14, 8AM-12AM (UK local time)
 - Discussion and action for:
 - Borehole description
 - 3d geological modelling
 - Urban geology and geotechnics

- > Join us!





Thanks for your attention

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