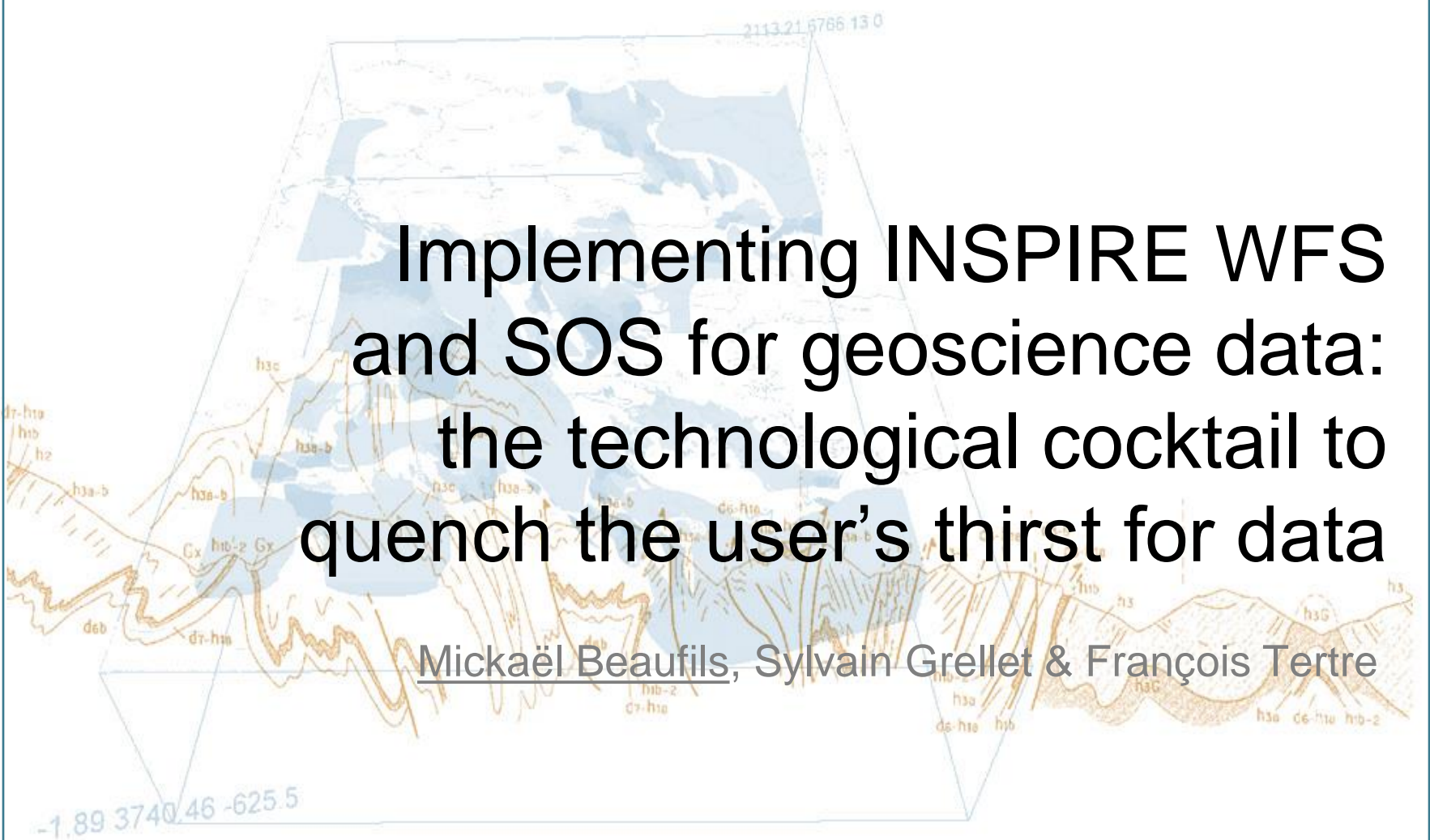


A detailed geological map of the area around Monte Reghina and Pozzo di Felco. The map shows various geological units in different colors: red for the main mountain area, blue for the northern part, and green for the southern part. Topographic features include the town of Pozzo di Felco, the church of San Felice, and the Monte Reghina. The map also shows the course of the river Po and the road network. The map is oriented with North at the top.



Implementing INSPIRE WFS
and SOS for geoscience data:
the technological cocktail to
quench the user's thirst for data

Mickaël Beaufils, Sylvain Grellet & François Tertre



Monday, September 26, 2016

BRGM on the rocks © cocktail



4. User interface

3. Identifier & resolver

2. SOS

1. WFS App Schema

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WFS Application Schema

WFS App Schema > Stairway to ... interoperability



User side

Advanced usage
(e.g. filtering)

Basic usage
(e.g. GetFeatureById)

Administrator side

**Tool configuration
for App Schema**

**Performance
and scalability**

Tool installation




**Update
and maintainability**

Database modelling

WFS App Schema > Tools used in BRGM



WFS App Schema > Current uses cases

			Implementations		
Data type	Model	BRGM associated project			
Geologic units, faults and boreholes	INSPIRE Geology + GeoSciML v4	EPOS / EGD I			X
Water level piezometers	INSPIRE Environmental Monitoring Facility & Network	Pôle INSIDE			X
Shoreline	INSPIRE Sea Region	EnergicOD			X
Aquifer units	GroundWaterML v2	Pôle INSIDE	X		POC
Mineral resources	EarthResourceML	Minerals4EU		X	POC

WFS App Schema > Subjective feedback

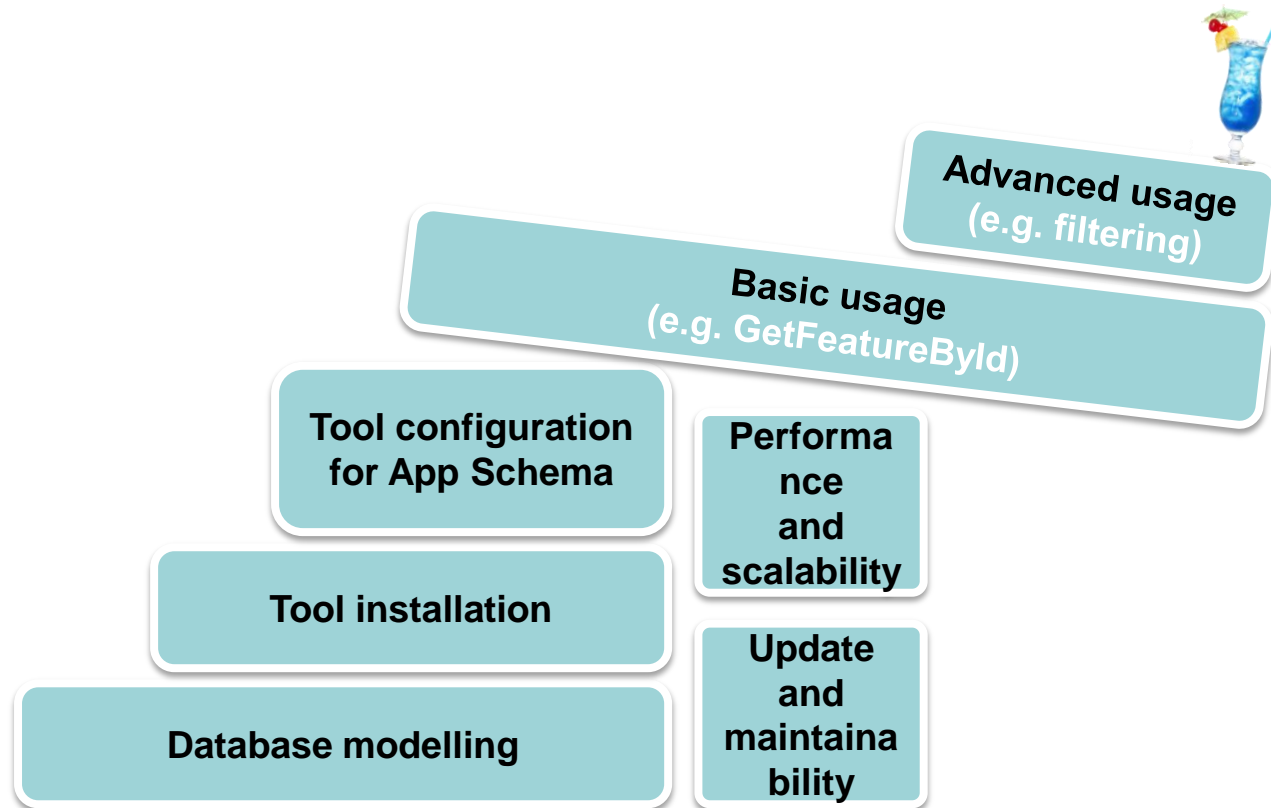
> No totally satisfying implementation

- Constellation
 - Difficult to configure and to update
- Deegree
 - Database structure must be close to diffusion schema
 - Filtering issues emphasized in 2015 (see Deegree Github)
- GeoServer
 - Still some bugs (e.g. ERML: IsMultipleIsTrue > data duplication)
 - Configuration of App Schema is tricky
 - Performances issues on complex features (all data are loaded by JAVA)

> Positive aspect

- GetFeatureById works
- Should we define stored queries and forbid other filter combinations?

WFS App Schema > Main conclusion & perspectives



Can we team up to finance necessary evolution?

SOS

SOS > Feedback from SOS implementation

> **Topics of discussion during the implementation**

- Which SOS solution to deploy?
- How to map to preexisting (non O&M compliant) databases?
- How to design the rawobservation database?
- How to link features to observations (at service level)?

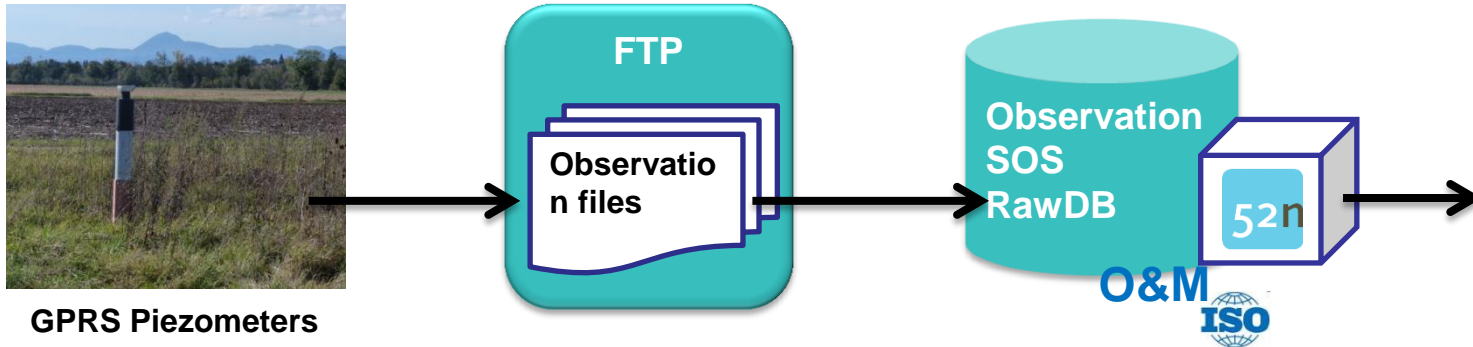
> **Choices:**

- 52 North solution
- Raw observation schema database very close to O&M schema
 - Use of materialized views to bridge to raw database
- One webapp is set up per use case

SOS > Current use cases

Data type	Profile	BRGM associated project	Status
Groundwater levels (raw observations)	INSPIRE PointTimeSeriesObs°	Pôle INSIDE	X
Groundwater levels (validated data)	INSPIRE PointTimeSeriesObs°	Pôle INSIDE	WIP
Groundwater quality (validated data)	Under discussion	Pôle INSIDE	Specified
Borehole logs	GWML2 (GeologyLogCoverage)	EPOS	Specified
Geothermy properties	INSPIRE PointTimeSeriesObs°	BRGM ADEME platform	WIP
Coastline erosion observation (CitizenScience)	Under discussion	EnergicOD	Under discussion

SOS > Focus on Groundwater RawData Levels



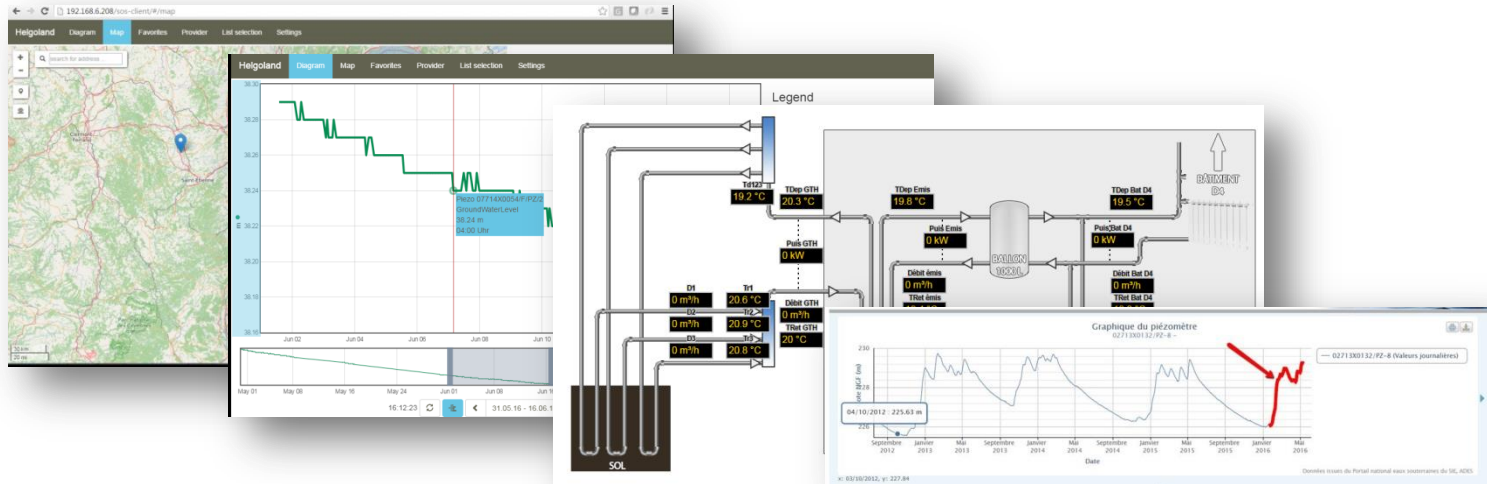
> Some examples:

- Latest GroundWaterLevel observation from one piezometer:
 - WaterML 2.0 format: <http://ressource.brgm-rec.fr/obs/RawOfferingPiezo/00463X0036/H1.2&responseFormat=http://www.opengis.net/waterml/2.0&temporalFilter=om%3AphenomenonTime%2Clatest>
 - JSON format: <http://ressource.brgm-rec.fr/obs/RawOfferingPiezo/00463X0036/H1.2&responseFormat=application/json&temporalFilter=om%3AphenomenonTime%2Clatest>

SOS > Positive feedback

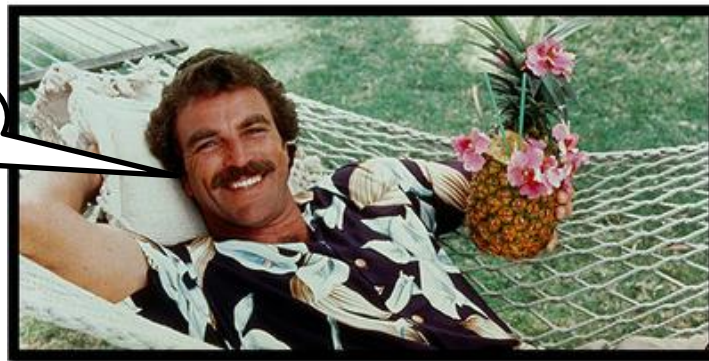
> It's worth the effort!

- Lot of reuse (websites, QGIS client plugin)



- Our domain colleagues are happy!

Now I have a
taste of INSPIRE!



Identifiers and resolvers

URIs to link data

> Objectives

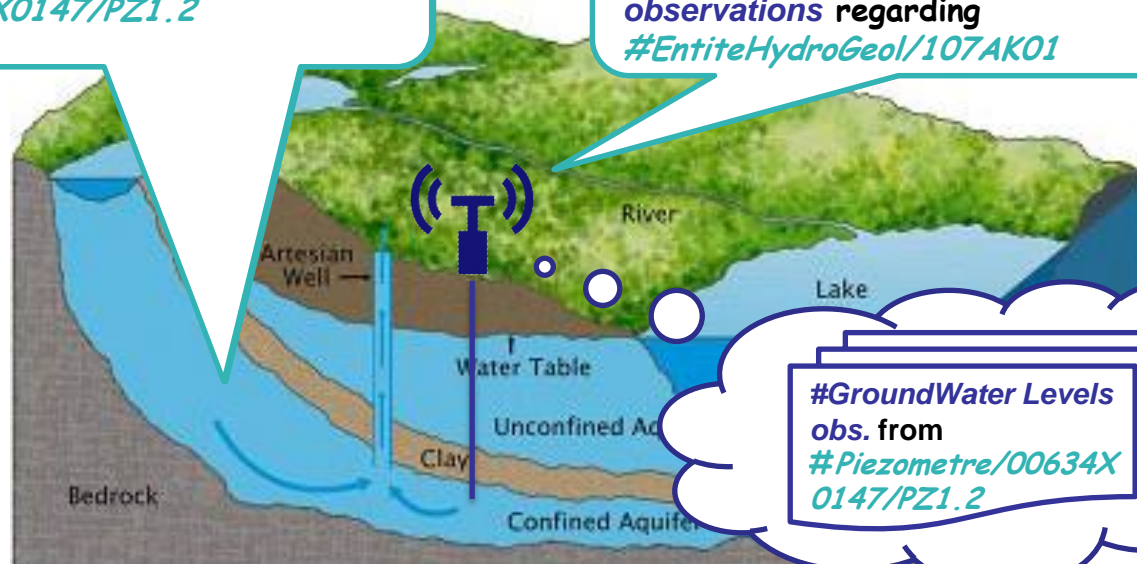
- To provide stable and resolvable links to resources
- To allow reference / data citation
- Independant from underlying technologies used to provide data

I am [#EntiteHydroGeol/107AK01](#)

I am monitored by
[#Piezometre/00634X0147/PZ1.2](#)

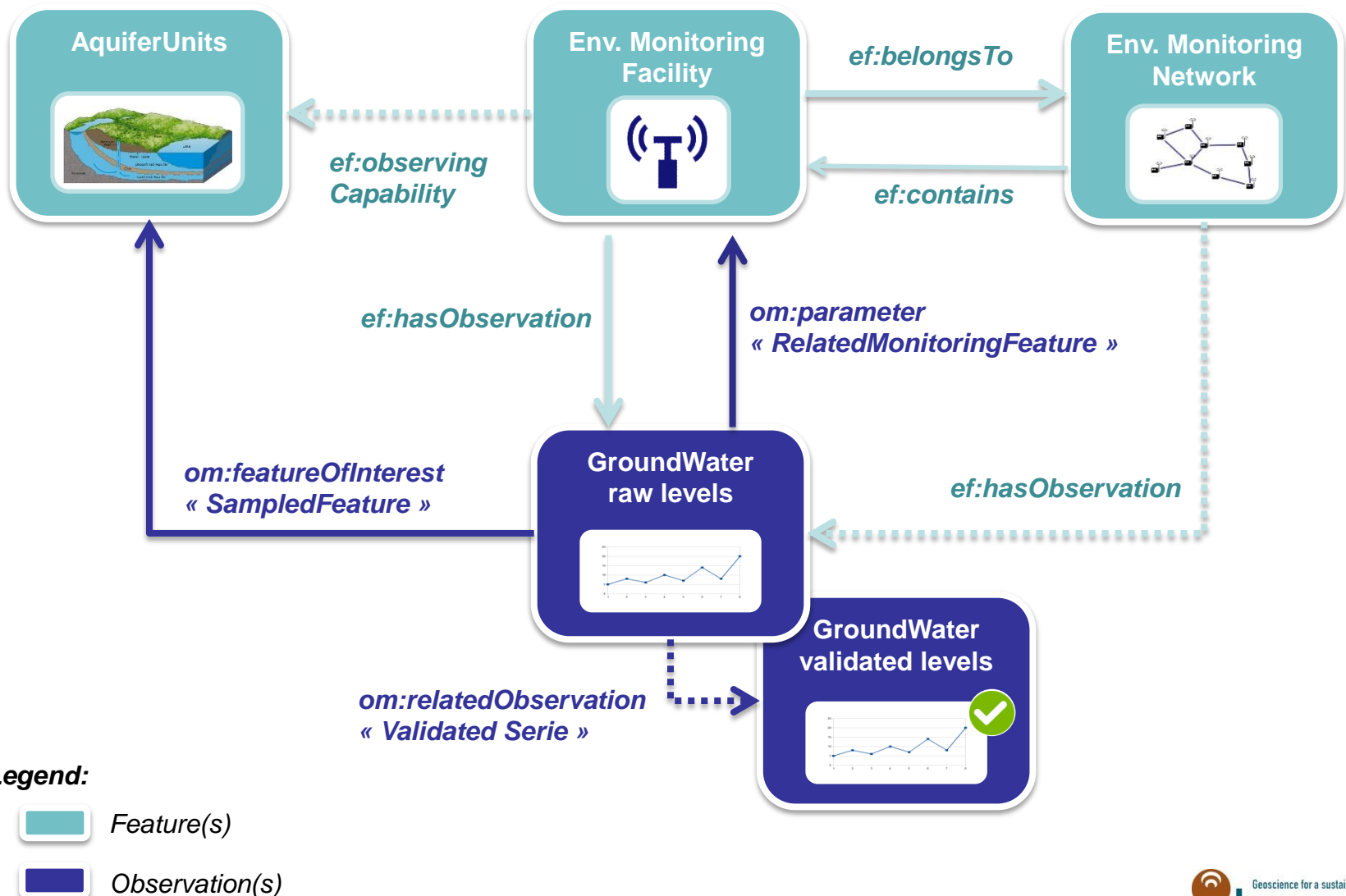
I am [#Piezometre/00634X0147/PZ1.2](#)

I have a lot of [#GroundWater Levels](#)
[observations](#) regarding
[#EntiteHydroGeol/107AK01](#)

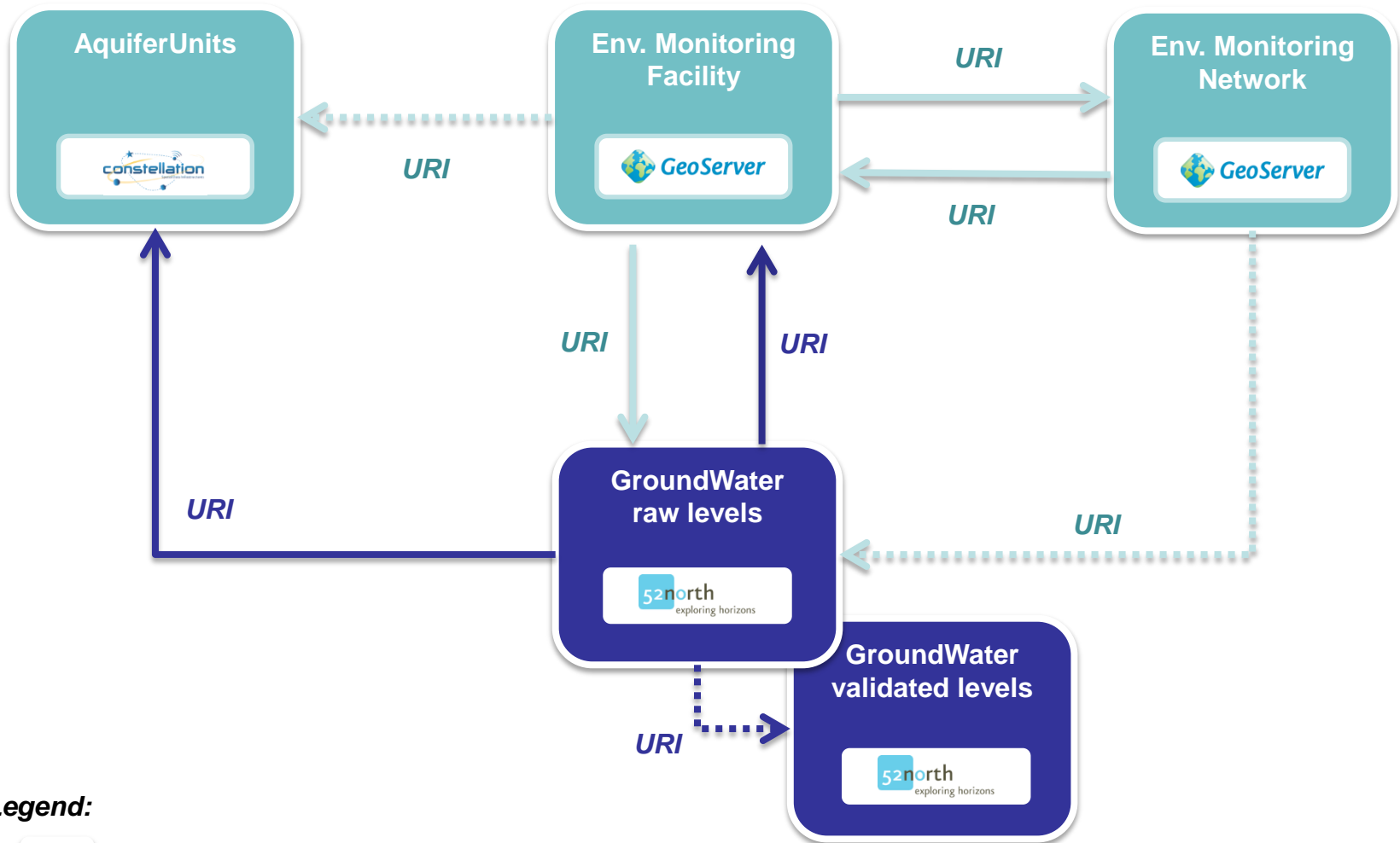


[#GroundWater Levels](#)
obs. from
[#Piezometre/00634X0147/PZ1.2](#)

URIs > Groundwater Levels use case: model view



URIs > Groundwater Levels use case: service view



URIs > Implementation

> Topics of discussion

- Identifier nomenclature (language, pluralism, separators)
- When should we define specific identifiers ?
 - Different representations of the same resource
 - Data versions
 - Data granularity

> Choice

- <http://ressource.brgm-rec.fr/> to centralize BRGM data resources
 - **./data** for data objects (e.g. geologic units, piezometers, ...)
 - **./obs** for observations (e.g. groundwater levels, ...)
 - **./vocab**s for controled vocabularies (e.g. groundwater sampling for quality analysis, ...)
 - **./services** for web services endpoint
- POC Apache rewriting rules

URIs > Some examples of identifiers and resolvers

<http://ressource.brgm-rec.fr/data/EntiteHydroGeol/107AK01>

Rewrite in proxy mode

http://gwml2poc.brgm-rec.fr/WS/wfs/BRGM:GWML2?service=WFS&version=2.0.0&request=GetFeature&typeName=gwml-main:GW_Aquifer&storedQuery_Id=urn:ogc:def:query:OGC-WFS::GetFeatureById&id=EntiteHydroGeol.107AK01

> Other examples:

- One piezometer: <http://ressource.brgm-rec.fr/data/Piezometre/00634X0147/PZ1.2>
- One GroundWaterLevel offering: <http://ressource.brgm-rec.fr/obs/RawOfferingPiezo/00463X0036/H1.2&responseFormat=http://www.opengis.net/waterml/2.0>

User interfaces

User interface

> Objectives

- Enhance INSPIRE services readability
- Emphasizes data connectivity
- Break the No client <-> No data loop

> QGIS GML Application Schema Toolbox



- Funded by BRGM and developed by Oslandia
- Available for download on QGIS plugin store
- Developed for QGIS v2.14 +

Teaser to Wednesday

> XML Mode (W)

14.3-Essen - EF_50piezo_XML

lter Vue Couche Préférences Extension Vecteur Raster Base

ches

EnvironmentalMonitoringFacility (points)

Feature Identification

id http://ressource.brgm.fr/data/Piezometre/1.01418X0001/F

Element	Value
@gml:id	Piezometre.1.01418X0001-F
gml:description	Water well from national BSS (Banque du Sous-Sol) Data database. Piezometer monitoring ground water level
gml:identifier	http://ressource.brgm.fr/data/Piezometre/1.01418X0001/F
@codeSpace	http://www.ietf.org/rfc/rfc2616
ef:inspireId	
base:Identifier	
base:localId	1.01418X0001/F
base:namespace	http://ressource.brgm.fr/data/Piezometre/
base:versionId	
ef:name	Grès du Trias inférieur (GTI) à WALDHOUSE
ef:additionalDescription	
ef:mediaMonitored	
@xlink:href	http://inspire.ec.europa.eu/codelist/MediaValue/water
@xlink:title	water
ef:legalBackground	
ef:geometry	
gml:Point	
@srsName	urn:ogc:def:crs:EPSG::4326
@gml:id	Piezometre.geom.1.01418X0001-F
@srsDimension	2
gml:pos	49.1457899460854 7.46857315544213
ef:onlineResource	http://fichebssseau.brgm.fr/bss_eau/fiche.jsf?code=01418X0001/F
ef:purpose	
@xlink:href	http://www.sandre.eaufrance.fr/?urn=urn:sandre:donnees:148::CdElement:2::referentiel:3.1.xml
@xlink:title	Mesure quantité (piézométrie)
ef:observingCapability	
ef:broader	
ef:supersedes	
ef:supersededBy	
ef:reportedTo	
@nilReason	unpopulated
@xsi:nil	true
ef:hasObservation	
@xlink:href	http://ressource.brgm.fr/obs/ChroniquePiezometrique/xxx
@xlink:title	ChroniquePiézométrique xxx
ef:involvedIn	
ef:representativePoint	
gml:Point	
@srsName	urn:ogc:def:crs:EPSG::4326
@gml:id	Piezometre.geom.1.01418X0001-F
@srsDimension	2
gml:pos	49.1457899460854 7.46857315544213

Grès du Trias inférieur (GTI) à WALDHOUSE

ef:additionalDescription

ef:mediaMonitored

@xlink:href <http://inspire.ec.europa.eu/codelist/MediaValue/water>

@xlink:title

ef:legalBackground

ef:geometry

gml:Point

@srsName urn:ogc:def:crs:EPSG::4326

@gml:id Piezometre.geom.1.01418X0001-F

@srsDimension 2

Copy value

Copy XPath

Resolve external

Embedded

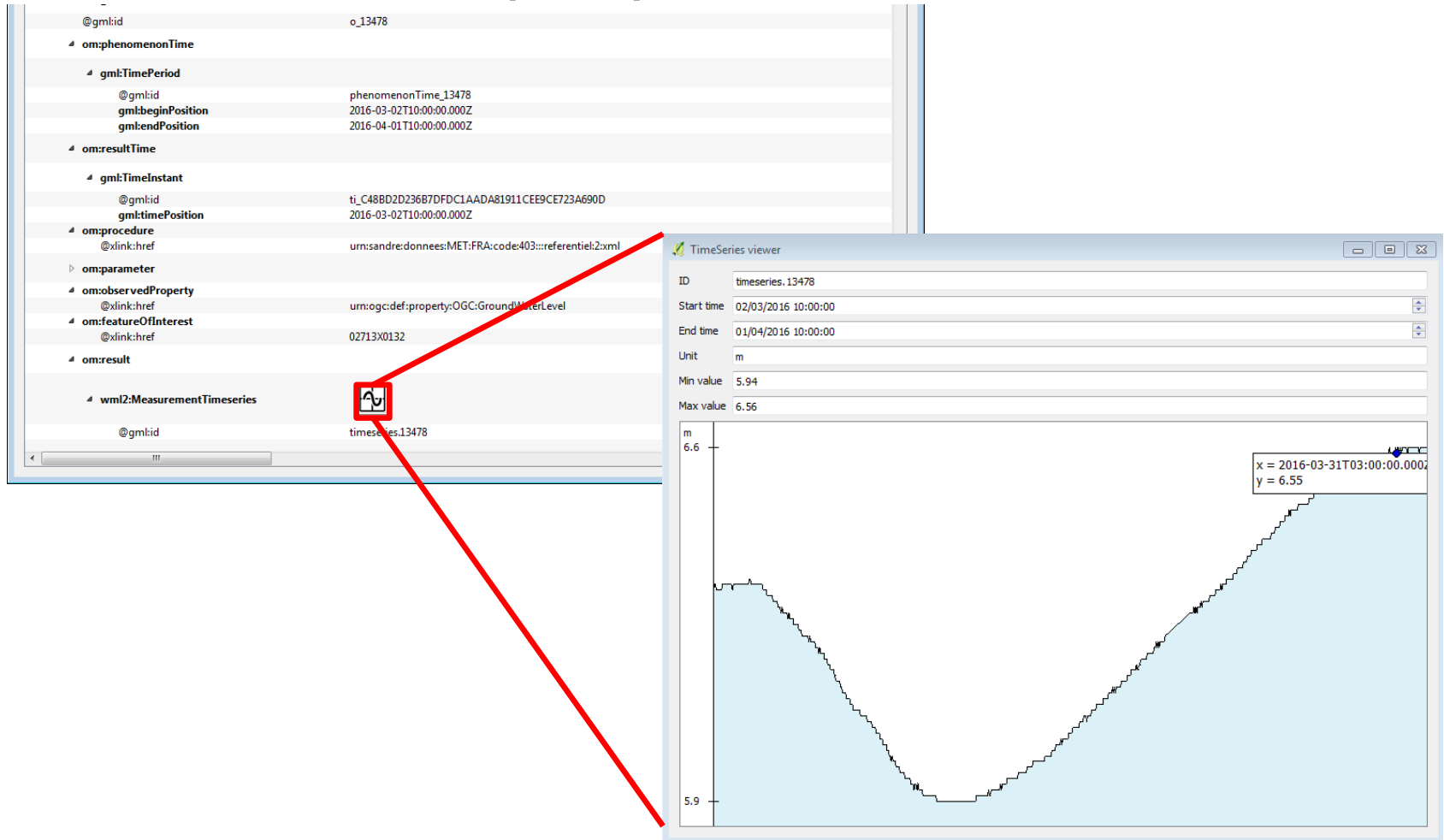
As a new layer

Add to layer

EnvironmentalMonitoringFacility (points)

Teaser to Wednesday 28th presentation

> XML Mode (SOS)



Teaser to Wednesday 28th presentation

> Relational mode

The screenshot shows the QGIS Attribute Editor window in 'Relational mode'. The 'Fields' tab is active, displaying a table of fields for the 'mobile' feature. The 'Relations' tab is also visible, showing a list of relations for the 'EnvironmentalMonitoringFacility' layer. The 'Columns' list on the right shows the fields for the 'mobile' feature, including 'measurementRegime_title', 'measurementRegime_href', 'id', 'identifier_codeSpace', 'description', 'inspireId_Identifier_namespace', 'specialisedEMFType_title', 'mobile', 'specialisedEMFType_href', 'identifier', 'inspireId_Identifier_localId', 'geometry_Point_id', and 'representativePoint_Point_id'. The '1:N Links' section shows the relations for the 'EnvironmentalMonitoringFacility' layer, including 'EnvironmentalMonitoringFacility_operationalActivityPeriod', 'EnvironmentalMonitoringFacility_relatedTo', 'EnvironmentalMonitoringFacility_supersededBy', 'EnvironmentalMonitoringFacility_involvedIn', 'EnvironmentalMonitoringFacility_resultAcquisitionSource', 'EnvironmentalMonitoringFacility_legalBackground', 'EnvironmentalMonitoringFacility_belongsTo', 'EnvironmentalMonitoringFacility_observingCapability', 'EnvironmentalMonitoringFacility_reportedTo', 'EnvironmentalMonitoringFacility_purpose', 'EnvironmentalMonitoringFacility_name', and 'EnvironmentalMonitoringFacility_mediaMonitored'.

Attribute editor layout: Drag and drop designer Python Init function

Fields

	Id	Name	Edit widget	Alias	Type
123	7	mobile	Text Edit		qlonglor
abc	8	specialisedEMFType_href	Text Edit		QString
abc	9	identifier	Text Edit		QString
abc	10	inspireId_Identifier_localId	Text Edit		QString
123	11	geometry_Point_id	Relation Reference		qlonglor
123	12	representativePoint_Point_id	Relation Reference		qlonglor

Relations

Name	Layer	Field
EnvironmentalMonitoringFacility_belongsTo	EnvironmentalM...	Environm
EnvironmentalMonitoringFacility_hasObservation	EnvironmentalM...	Environm
EnvironmentalMonitoringFacility_involvedIn	EnvironmentalM...	Environm
EnvironmentalMonitoringFacility_legalBackground	EnvironmentalM...	Environm
EnvironmentalMonitoringFacility_mediaMonitored	EnvironmentalM...	Environm
EnvironmentalMonitoringFacility_name	EnvironmentalM...	Environm

Columns

- measurementRegime_title
- measurementRegime_href
- id
- identifier_codeSpace
- description
- inspireId_Identifier_namespace
- specialisedEMFType_title
- mobile
- specialisedEMFType_href
- identifier
- inspireId_Identifier_localId
- geometry_Point_id
- representativePoint_Point_id

1:N Links

- EnvironmentalMonitoringFacility_operationalActivityPeriod
- EnvironmentalMonitoringFacility_relatedTo
- EnvironmentalMonitoringFacility_supersededBy
- EnvironmentalMonitoringFacility_involvedIn
- EnvironmentalMonitoringFacility_resultAcquisitionSource
- EnvironmentalMonitoringFacility_legalBackground
- EnvironmentalMonitoringFacility_belongsTo
- EnvironmentalMonitoringFacility_observingCapability
- EnvironmentalMonitoringFacility_reportedTo
- EnvironmentalMonitoringFacility_purpose
- EnvironmentalMonitoringFacility_name
- EnvironmentalMonitoringFacility_mediaMonitored

Suppress attribute form pop-up after feature creation Default

Help Style Apply Cancel OK

Conclusion

In a (coco)nutshell

> **Very encouraging points:**

- WFS & SOS enable to provide data for basic usage
- Identifiers and resolvers enable to link data
- QGIS plugin increase data consumption pleasure
- Domain colleagues can now taste INSPIRE (SOS)!

> **Challenges to overcome:**

- Configuration of WFS App Schema is not really accessible
- SOS implementation need one instance per use case
- Scalability and performances must be enhanced to reach production mode

> **Can we can team up to finance it?**



Cheers!

m.beaufils@brgm.fr

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