

# OGC Water / Hydro related activities

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# A common situation

Hydro Jack

Need flow data!

Hmm maybe Don can help...

**\*RING RING\***

Hi Don, I need some upper Derwent flow readings for my geochemical modelling. Any ideas?

**\*RING RING\***

Ok. Got the data. Where is the site located?  
located?

Don

ugh...

To: Jack  
01/02/09, 3.2, 3, 1  
01/02/09, 3.1, 3, 1

10 minutes...

Oh, it's at laughing jack bridge.

Coordinates?

Ummm. (papers shuffle)  
147.123 -41.588

What reference system??

I think it's GDA94

Ok. What sensor is used?

It's calculated from the stream gauge reading using a rating curve..

Oh...how accurate is that?

Umm.....

**\*CLICK\***

DON?

From Peter Taylor (CSIRO)

# OGC Hydrology Domain Working Group

- **Joint Working Group of the World Meteorological Organisation (WMO) and the OGC**
  
- **Members :**
  - ◆ WMO,
  - ◆ Australia : CSIRO, MetOffice,
  - ◆ USA/Can : CUASHI, SDSC, USGS, NRCan,
  - ◆ Europe : DLZ-IT, Disy, Office International de l'Eau (International Office for Water),
  - ◆ Software companies : 52°N, Kisters
  - ◆ ..

# OGC Hydrology Domain Working Group

## Main Activities :

- ◆ Analysis and harmonization of existing commonly used protocols and standards in the domain,
- ◆ Interoperability Experiments (IEs) focused on selected sub-domains of water data (e.g. surface water, groundwater, water quality, water use, hydrologic forecasts, real time data),
- ◆ Participation in Pilots (Geo AIPs, OGC Pilots, etc), focused on broader scenarios within the entire domain and across domains
- ◆ Submission of discussion papers and best practice papers to OGC TC,
- ◆ Collaboration with other DWGs, in particular ESS (on modeling), MetOcean (on handling gridded data), SWE (on real time data management).

# OGC Hydrology Domain Working Group

## ▫ Ongoing projects :

- ◆ WaterML2.0 Part I & II: Model, Surface Water IE, Hydrologic Forecasting IE,
- ◆ Ground Water IE.

## ▫ Possible/Planned further projects :

- ◆ WaterML2.0 part III : Water Quality IE + Water Quality IE
- ◆ Hydrologic features and vocabularies,
- ◆ Potential joint IE with MetOcean on flood forecasting,
- ◆ GroundWaterML2.0 (data model) & GroundwaterIE-2,

# OGC Hydrology Domain Working Group

## Water Observational Data

### Water quantity



### Soil water



### Rainfall



### Water quality



### Groundwater



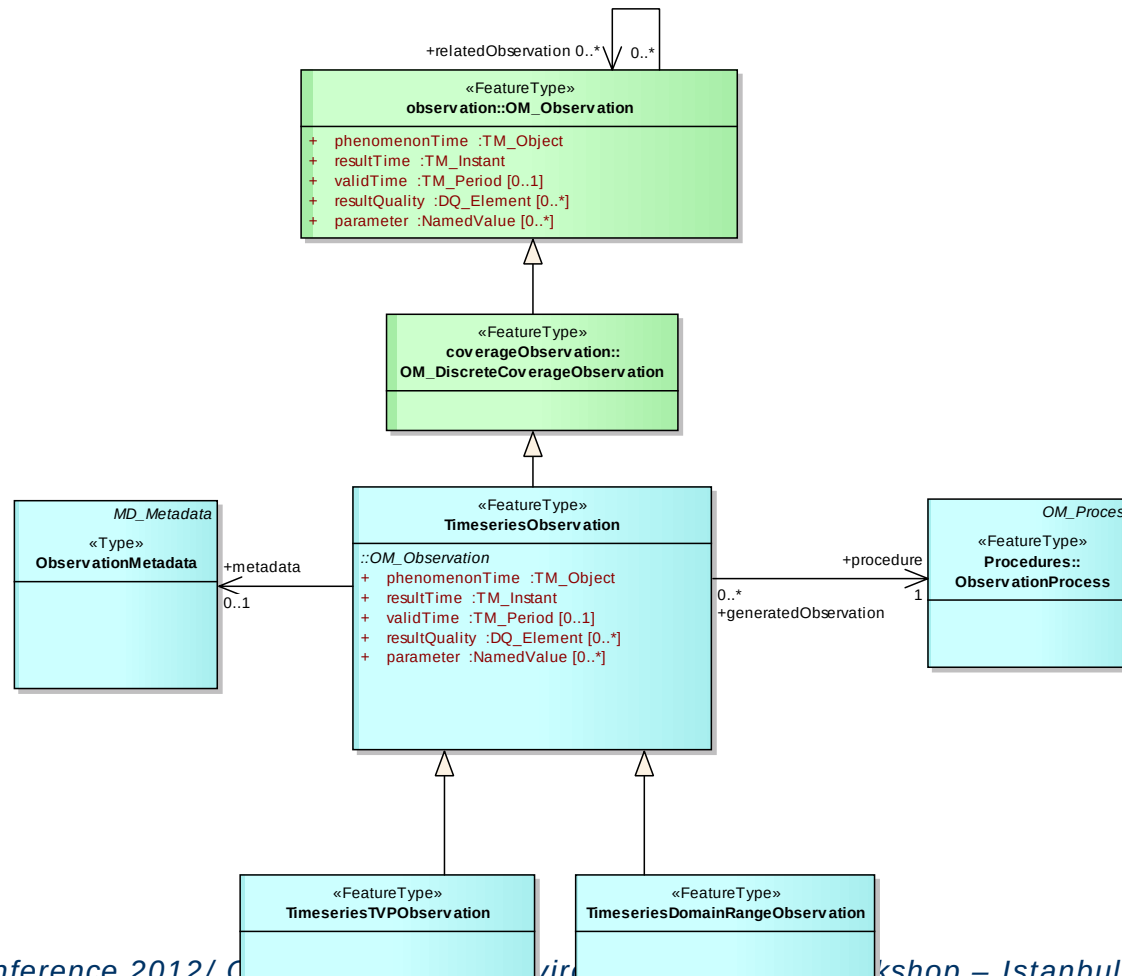
### Meteorology



# OGC Hydrology Domain Working Group

## WaterML2.0 :

- ◆ Datamodel to exchange water monitoring observations,
- ◆ Part I : Time-Series : new OGC standard (June 2012).

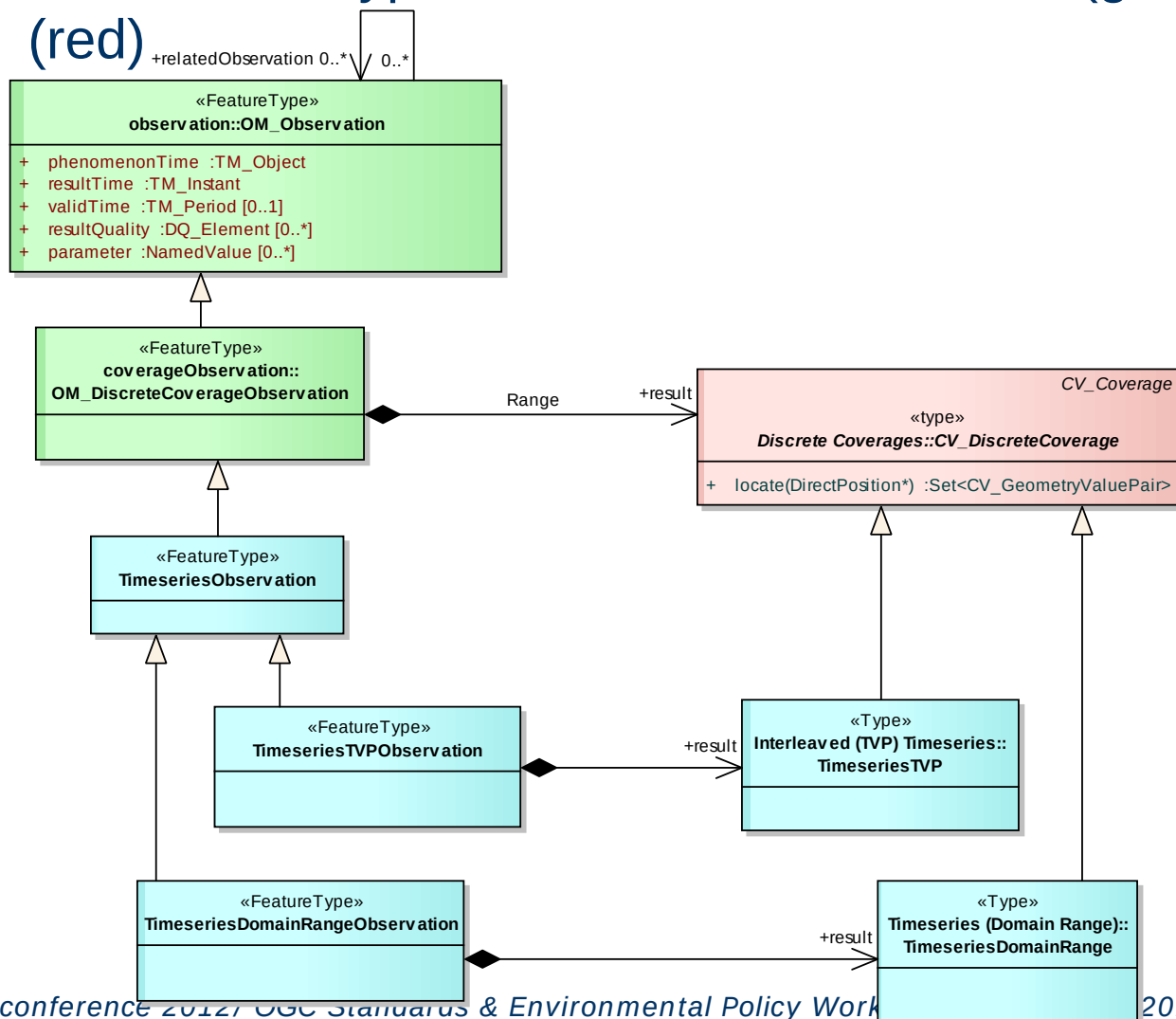




# OGC Hydrology Domain Working Group

## WaterML2.0 :

- Observation types as related to ISO19156 (green) and ISO19123 (red)



# Surface Water Interoperability Experiment

## Objectives :

- ◆ Test WaterML2.0 + OGC architecture/services to exchange/search for water quantity monitoring observations on cross border situations.

## Use Cases :

- ◆ Rhine Watershed : cross-boarder,
- ◆ Global Runoff (river contribution to oceans): Mississippi river, ....
- ◆ Flood Forecast (became an IE by itself) : huge data volumes/performances, simulated values,

# Surface Water Interoperability Experiment

- Standardised exchanges using the OGC architecture/services (Sensor Observation Service, ...)

⇒ standardised information flows

```
<?xml version="1.0" encoding="UTF-8"?>
<DescribeSensor version="1.0.0"
service="SOS"
xmlns="http://www.opengis.net/sos/1.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.opengis.
net/sos/1.0
http://schemas.opengis.net/sos/1.0.0/sosDe
scribeSensor.xsd"
outputFormat="text/xml;subtype="sensorM
L/1.0.1"">

<procedure>O61400100101_WATERHEIGH
T</procedure>
</DescribeSensor>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<GetObservation xmlns="http://www.opengis.net/sos/1.0"
xmlns:ows="http://www.opengis.net/ows/1.1"
xmlns:gml="http://www.opengis.net/gml"
xmlns:ogc="http://www.opengis.net/ogc"
xmlns:om="http://www.opengis.net/om/1.0"
xmlns:wml2="http://www.opengis.net/waterml/2.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.opengis.net/sos/1.0
http://schemas.opengis.net/sos/1.0.0/sosGetObservation.xsd"
service="SOS" version="1.0.0"
srsName="urn:ogc:def:crs:EPSG::4326">

<offering>U2122010</offering>
<procedure>U21220100101_WATERHEIGHT</procedure>

<observedProperty>WATERHEIGHT</observedProperty>

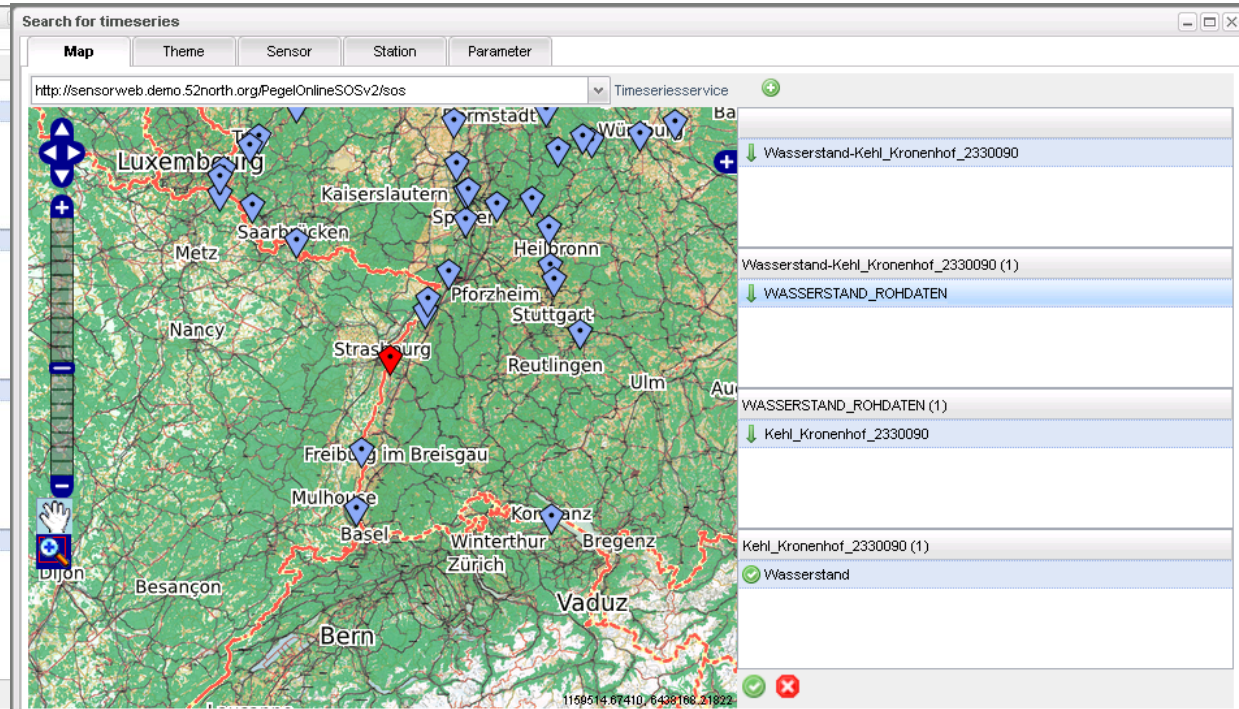
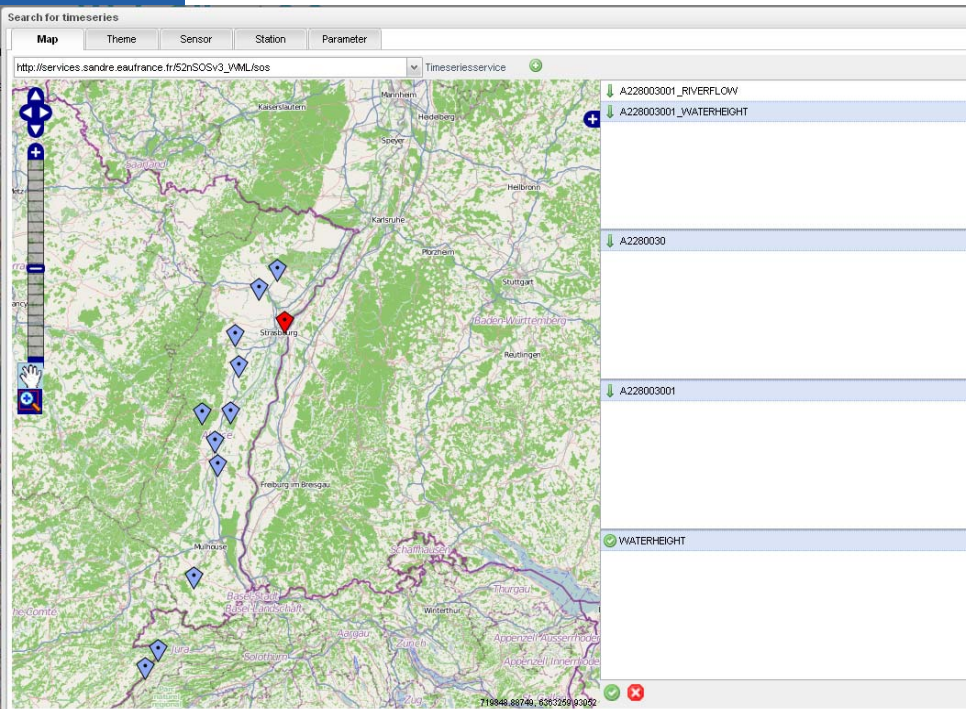
<responseFormat>text/xml;subtype="om/1.0.0"</responseFormat>
<resultModel>wml2:TimeseriesObservation</resultModel>
<responseMode>inline</responseMode>

</GetObservation>
```

# Surface Water Interoperability Experiment

## Standardised information flows :

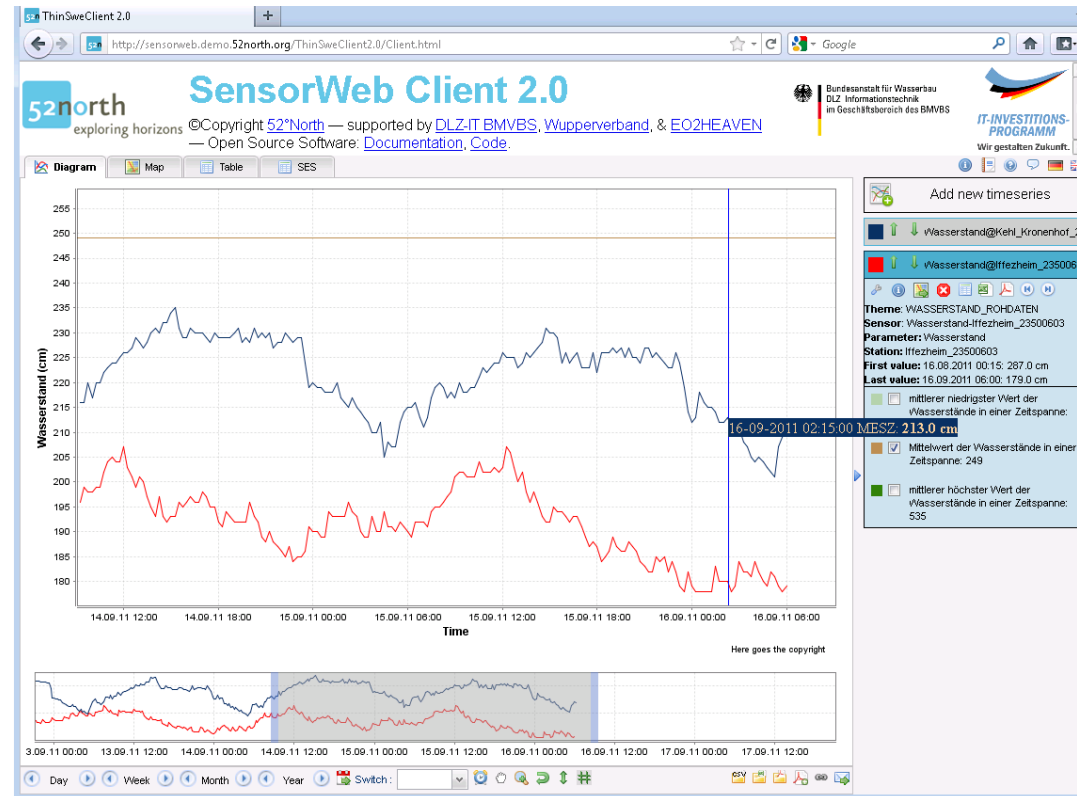
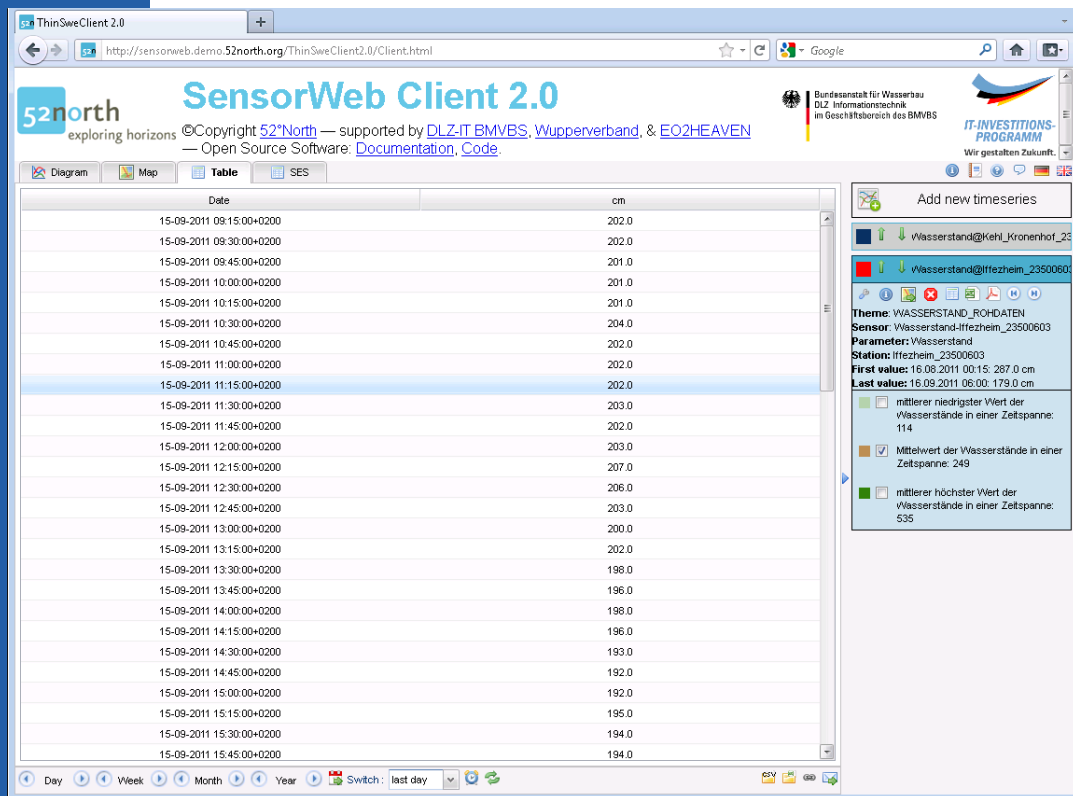
- ⇒ ability to exchange on cross-boarder situation,
- ⇒ ex : Rhine Watershed Use Case : French, German stations, their observed parameters, process, observations & measurements.



# Surface Water Interoperability Experiment

## Standardised information flows :

- ⇒ ability to build generic interfaces (client),
- ⇒ ex : Rhine Watershed Use Case : Various ways to manipulate the information exchanged.





# French Water Information System experience

- **An integrated shared information system running for 20 years:**
  - ◆ Shared architecture,
  - ◆ Shared datamodels, services,
  - ◆ Controlled vocabulary wherever possible.
  
- **Many partners & data producers:**
  - ◆ French Ministry of Environment, Ministry of Health, ...at national and local levels, 13 River Basin Districts, BRGM, IFREMER, Office International de l'Eau (houses the Sandre), ONEMA, IRSTEA, ...
  - ◆ One standardisation structure : Sandre (National Service for Water Data and Common Repositories Management)

# French Water Information System experience

## ▫ Rationale :

- ◆ Service oriented architecture : Distributed/Seamless/Multi-access architecture,
- ◆ Collect once, reuse many times,
- ◆ One focal point for referential datasets (Parameters, stations, ... rivers codes) : Sandre website,
- ◆ Other Data, Observation stay at the producer level (ex : Water Agency,...),
- ◆ Reused on national portals : via webservice.

# French Water Information System experience

- **Ensure data models/dictionnaires compatibility**
  - ◆ To enhance interoperability with WISE, INSPIRE,...,
  - ◆ Data models (40) from Entity Relation -> UML : done,
  - ◆ Data models from UML -> ISO 191xx compliant : on going,
  - ◆ Translation into English : Partly planned in the coming years.
- **ISO 191xx compatibility:**
  - ◆ Ease webservices deployment,
  - ◆ Real GML compatible to application schema available,
  - ◆ Observations & Measurements inserted into Water Quantity Monitoring data model.



# French Water Information System experience

## ▫ An even more interoperable architecture :

- ◆ Many Sandre's specific webservices previously developed to exchange observational datasets, controlled vocabularies.
- ◆ Rationale : reuse as many open standards as possible
  - ⇒ Reduce the burden of the implementation phase. More technical solutions available for the French WIS members,
  - ⇒ Each relevant new OGC specified services is evaluated to assess its value added to the system,
  - ⇒ Surface Water IE is a good opportunity.

# French Water Information System experience

## Other on going projects:

- ◆ Feature versioning,
- ◆ Dereferencing external controlled vocabulary for XML validation,
- ◆ Push/pull mechanism to update national referential datasets within Sandre Master Data Management System.

## Why being involved in the Hydro DWG ? :

- ◆ To share experience on common issues with other Water Information Systems,
- ◆ To progress together toward common solutions.

# Underpinning Environmental Policy

- Try to act as a mediator  
for the european water community



- Otherwise communities could move in opposite directions
- Mediators should be neutral, at the core of data management, aware of the main constraints of the respective actors.

# Underpinning Environmental Policy

## Core Groups involved

- ◆ WISE-TG : help technical decisions based on National experience,
- ◆ Inspire data specifications :
  - ◆ Environmental Monitoring Facilities, O&M Guidelines + other data specification reviews based on the experience acquired within national information system & OGC's workgroups,
  - ◆ Area Management & Reporting Units : Darja Lihteneger (EEA).

- ◆ **Help european infrastructure (at least SEIS water pillar : WISE) move to a full service oriented architecture**
  - ⇒ Reduce reporting burden at Member States level.

# Conclusion

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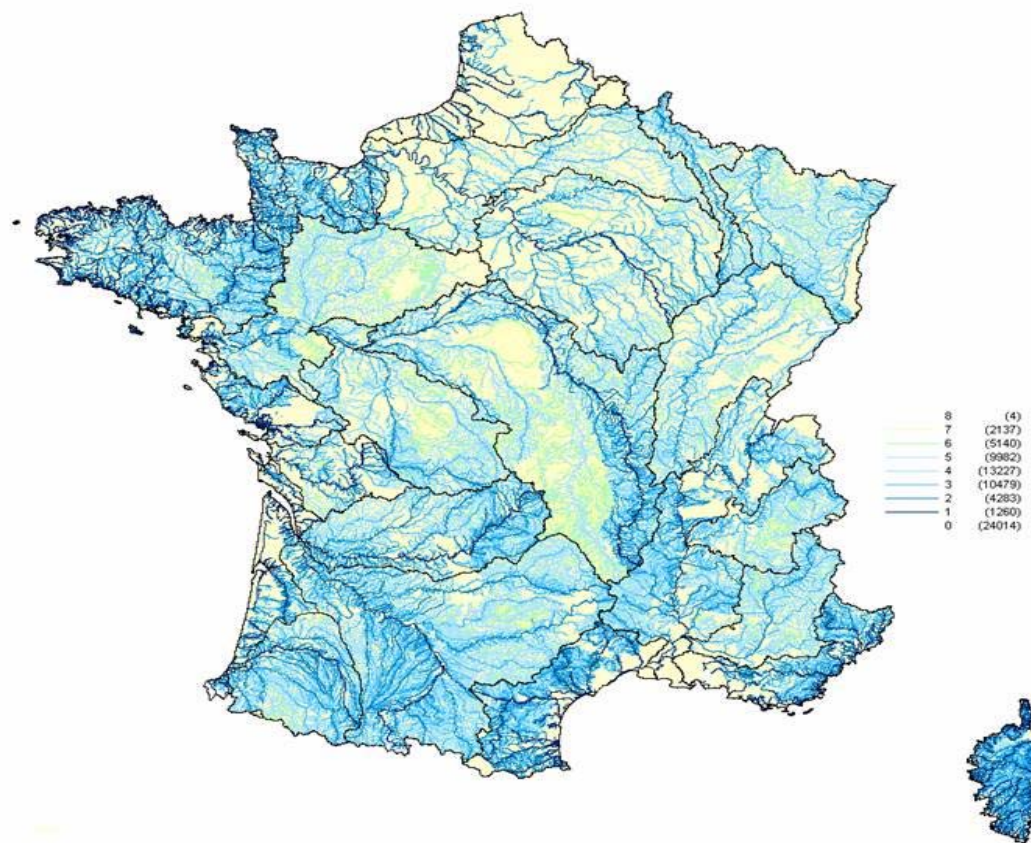
## ▫ Open standards

- ◆ Help data models being interoperable : common data structures,
- ◆ Facilitate data exchange via shared webservices : common transfert vehicles,

⇒ Ease Environmental Policy implementation

# Thank you

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- Darja Lihteneger : [Darja.Lihteneger@eea.europa.eu](mailto:Darja.Lihteneger@eea.europa.eu)



# OGC Hydrology DWG

## ▫ Sensor Web Enablement (SWE)

- ✦ Datamodel for observations & measurements, sensors
- ✦ + webservices to exchange those.

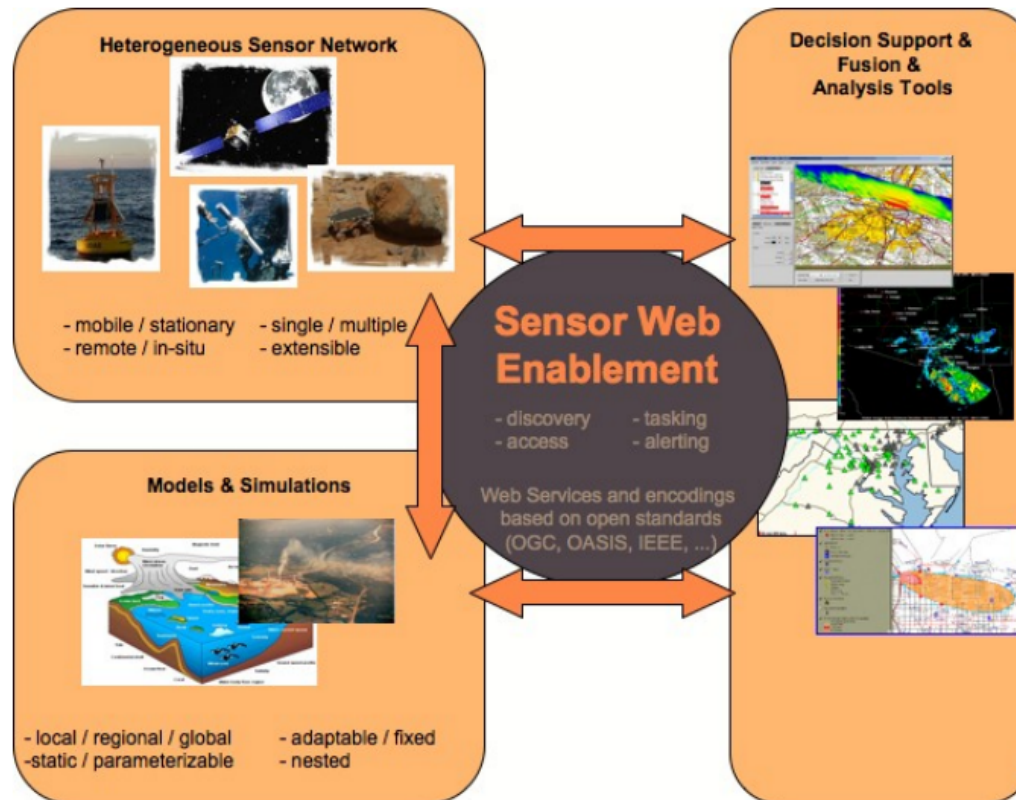


Figure 6-1: SWE Framework