OGC Water / Hydro related activities

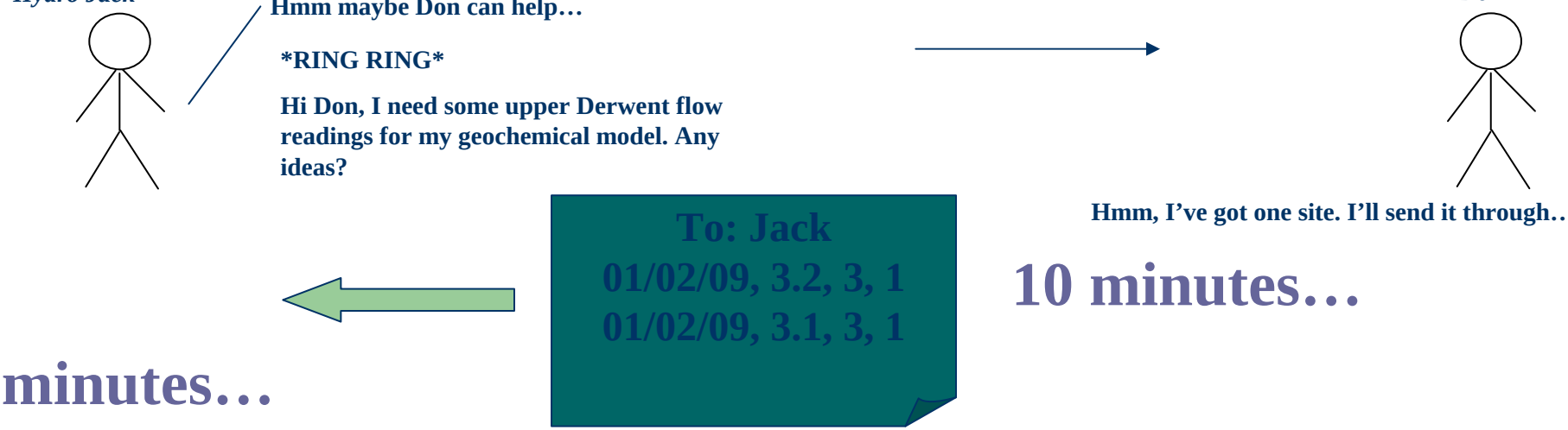
Inspire conference 2012 / OGC Standards & Environmental Policy Workshop – Istanbul – 2012.06.24

Sylvain Grellet
Office International de l'Eau - Sandre

Table of content

- The OGC Hydrology Domain Working Group
- Hydro DWG Surface Water Interoperability experiment
- French Water Information System experience
- Interface with European Directives

A common situation



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

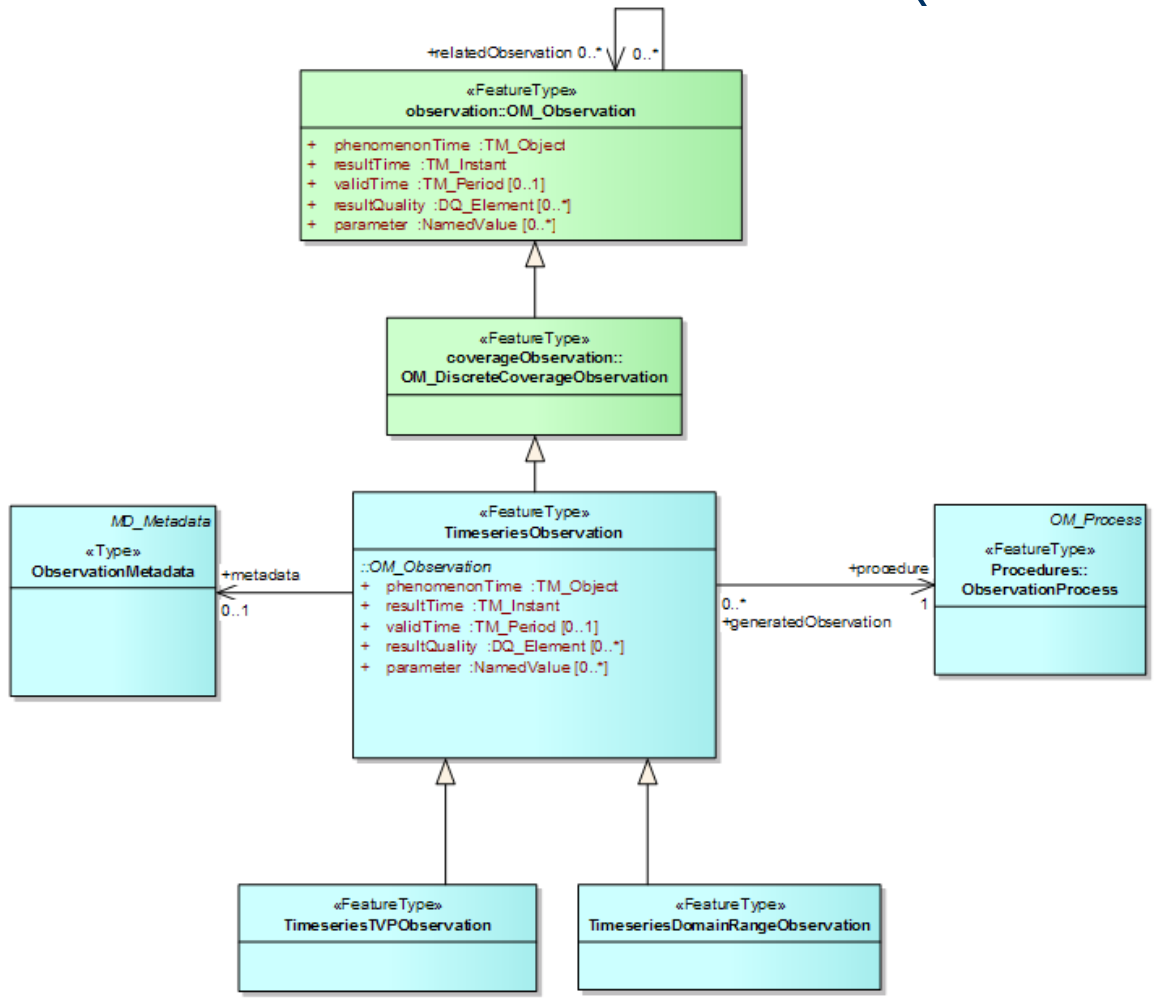
Water quality

Groundwater

Meteorology

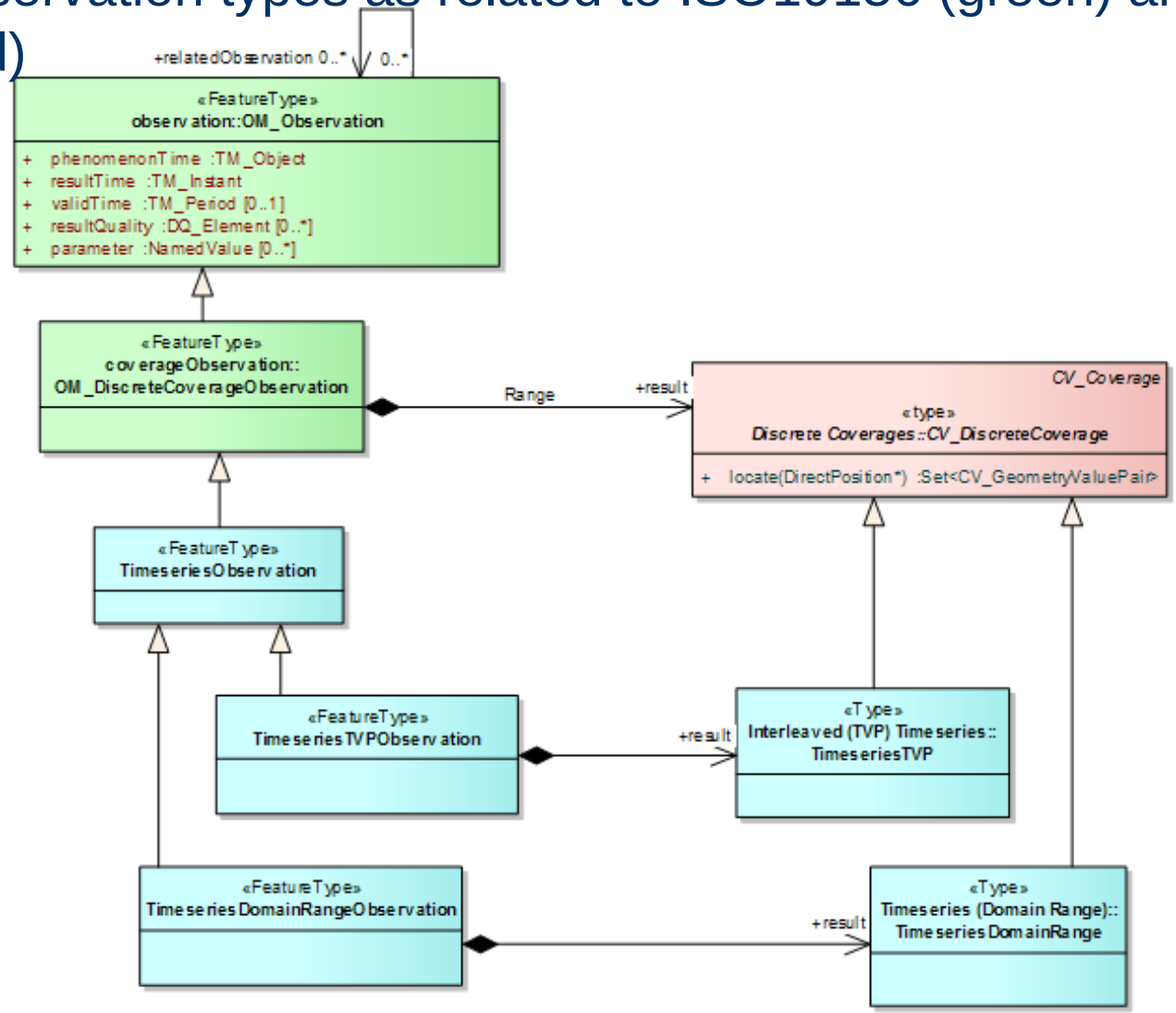
OGC Hydrology Domain Working Group

- **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)



s.grellet@oieau.fr

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): Missippi river, ….
  - Flood Forecast (became an IE by itself) : huge data volumes/performances, simulated values.

Surface Water Interoperability Experiment

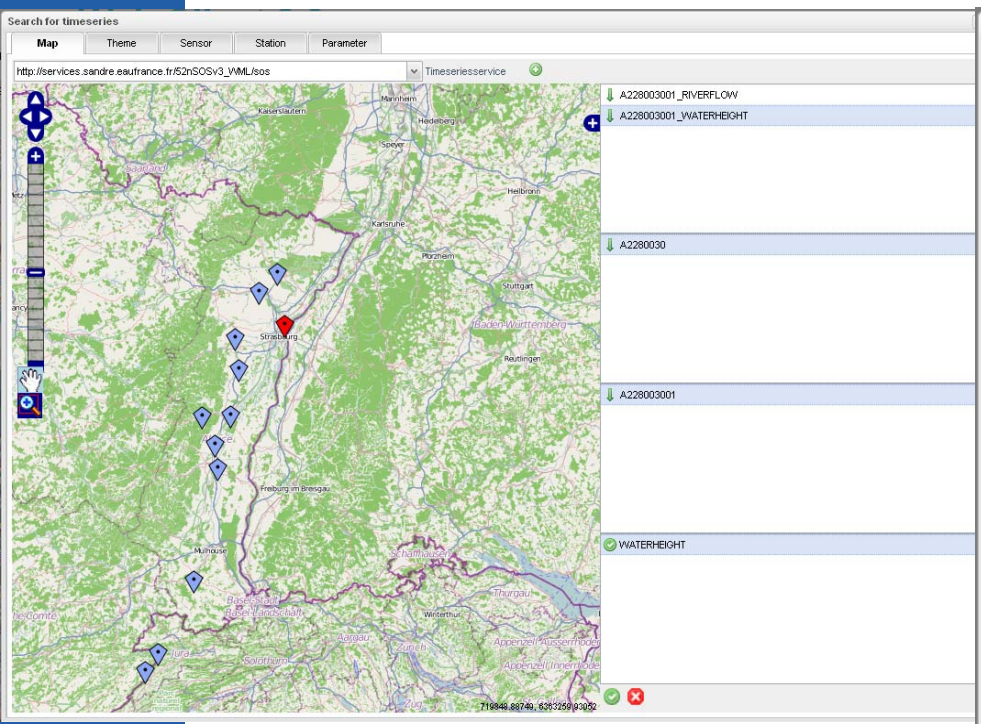
- **Standardised exchanges using the OGC architecture/services (Sensor Observation Service, …)**
  - ⇒ standardised information flows

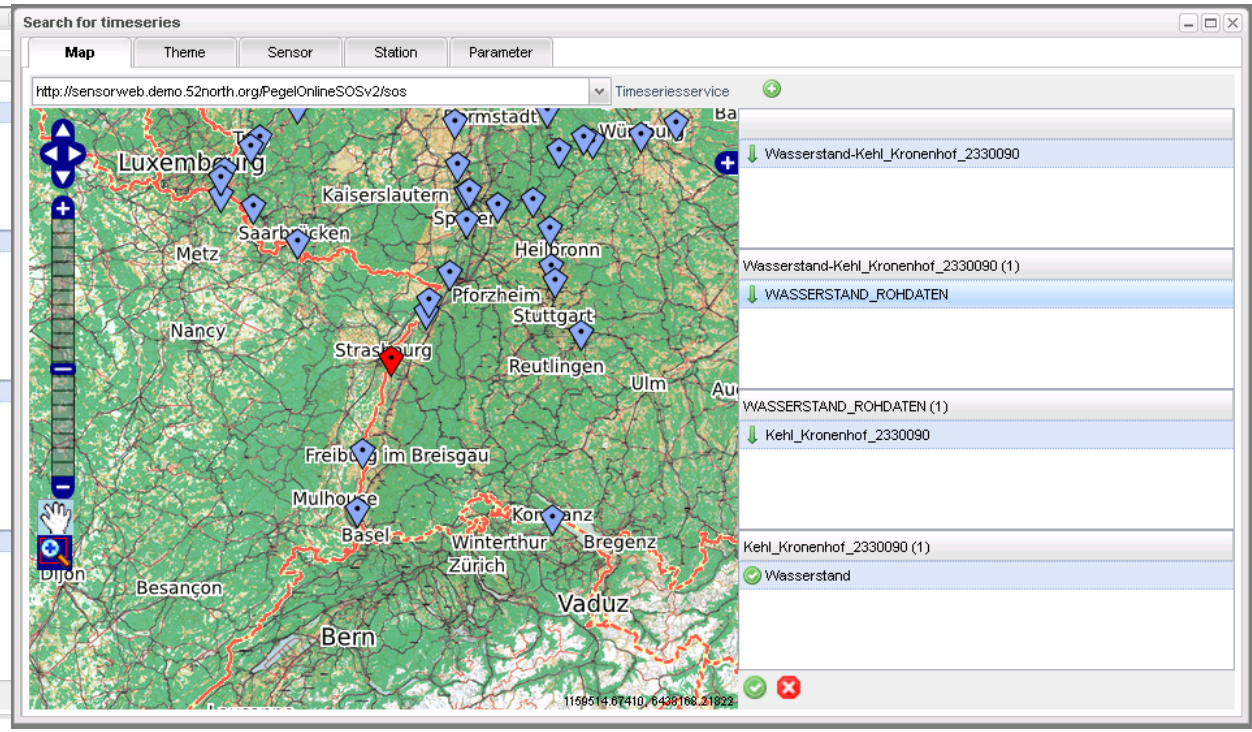
```
<?xml version="1.0" encoding="UTF-8"?>
<DescribeSensor version="1.0.0"
service="SOS“
xmlns="http://www.opengis.net/sos/1.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.opengis.net/sos/1.0
http://schemas.opengis.net/sos/1.0.0/sosDescribeSensor.xsd"
outputFormat="text/xml;subtype="sensorML/1.0.1"">

<procedure>O61400100101_WATERHEIGHT</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

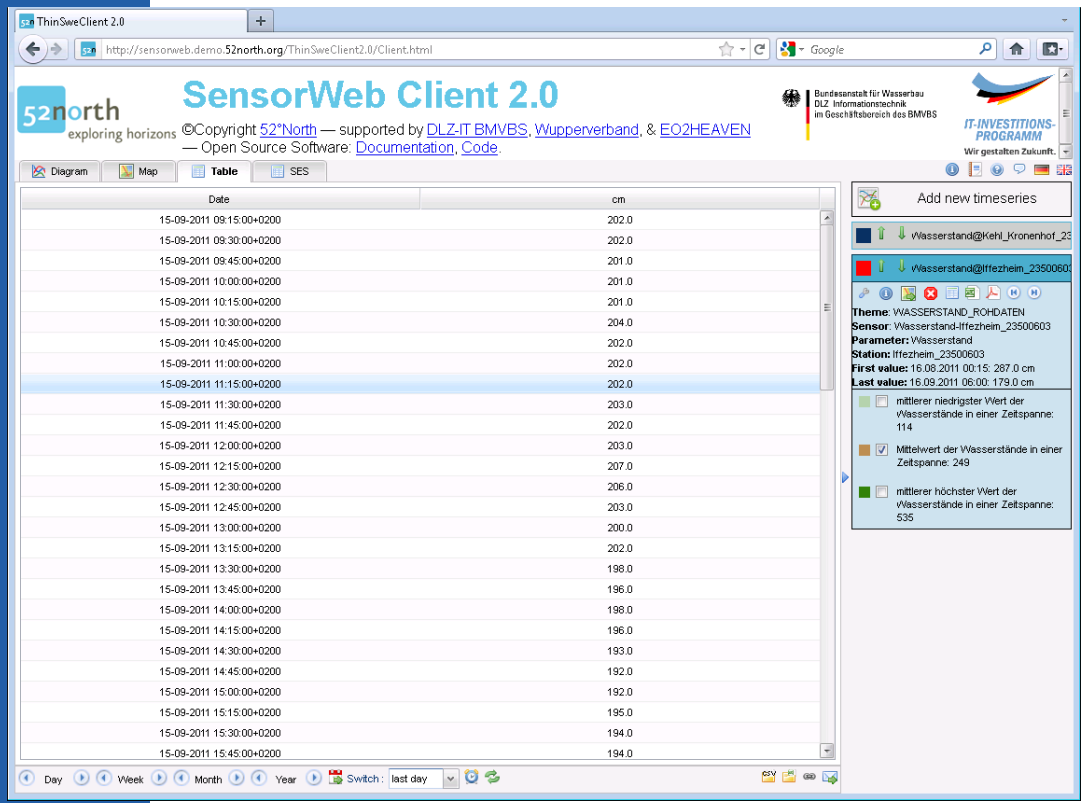
- **Standardised information flows :**
  - ⇒ ability to exchange on cross-boarder situation,
  - ⇒ ex : Rhine Watershed Use Case : French, German stations, their observed parameters, process, observations & measurements.





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 webservices.

French Water Information System experience

- **Ensure data models/dictionnaries 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 contraints 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.

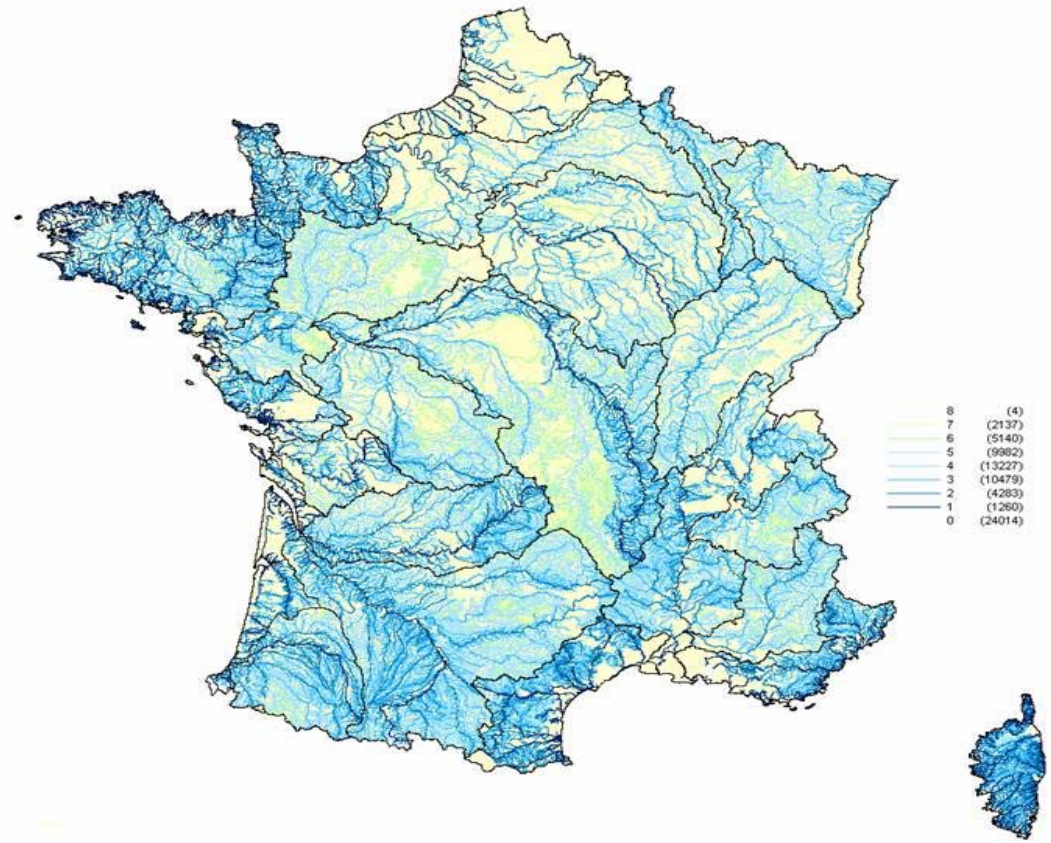
Conclusion

- **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

- Sylvain Grellet : s.grellet@oieau.fr
- Darja Lihteneger : Darja.Lihteneger@eea.europa.eu



OGC Hydrology Domain Working Group

Sensor Web Enablement (SWE)

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

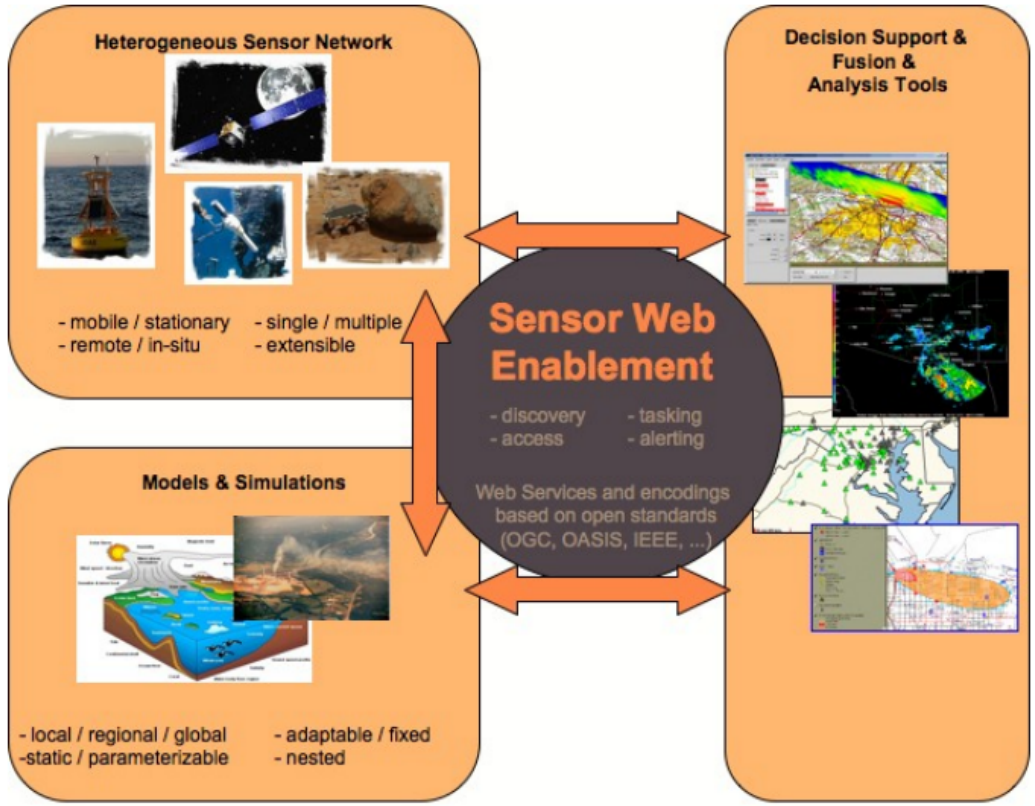


Figure 6-1: SWE Framework