



HAL
open science

Integrating new OGC Standards - SensorThings API and WaterML2.0 - Water Quality Interoperability experiment

Sylvain Grellet, Hylke van Der Schaaf

► **To cite this version:**

Sylvain Grellet, Hylke van Der Schaaf. Integrating new OGC Standards - SensorThings API and WaterML2.0 - Water Quality Interoperability experiment. Concept Note for Capacity Building on Hydrological Data Exchange, standardization, and Interoperability in Region VI, WMO, Jan 2024, Zagreb, France. hal-04456540v1

HAL Id: hal-04456540

<https://brgm.hal.science/hal-04456540v1>

Submitted on 14 Feb 2024 (v1), last revised 16 Jan 2025 (v2)

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Integrating new OGC Standards

Sylvain Grellet – BRGM

Hylke van der Schaaf - Fraunhofer IOSB

30/01/2024

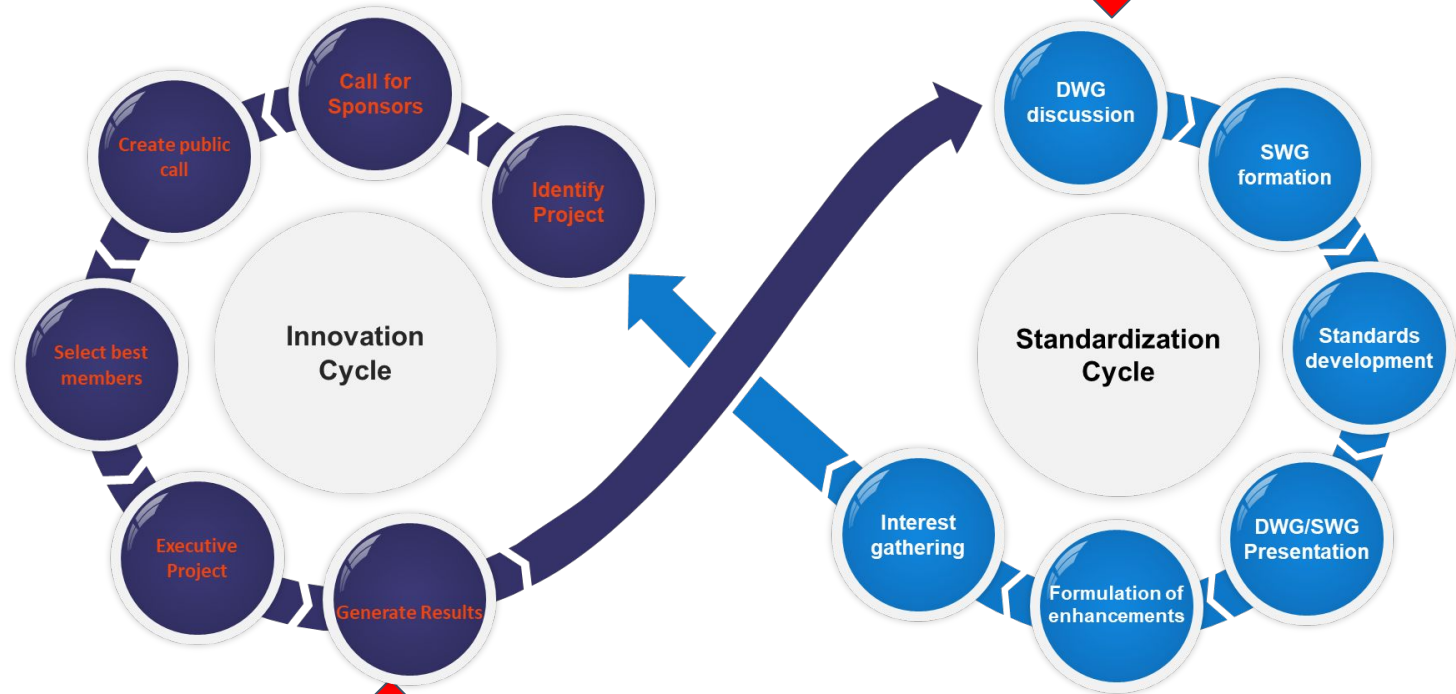
WMO Capacity Building Workshop on Hydrological Data Exchange, Standardization,
Interoperability

Re, WaterML2.0 <-> SensorThings API presentation 2024-01-26th

- Suggestion from the Water Quality IE experience
 - We plan to contribute back to the standard baseline
 - Water ML2.0 Part 1 'Timeseries'
 - Needs to be updated to take into account the revision of O&M (ISO 19156:2011) => Observations, Measurements and Samples a.k.a 'OMS' (ISO 19156:2023)
 - And also TimeSeries ML (issued from Part 1) : also currently integrating OMS
 - And define a best practice to expose it using SensorThings API
 - Water ML 2.0 Part 5 'Water Quality'
 - Building on the output of the Water Quality IE
 - High chance the IE will recommend in its engineering report to
 - Generate a Best Practice document
 - And also revise Part 1 (as we touched quantity during the IE)

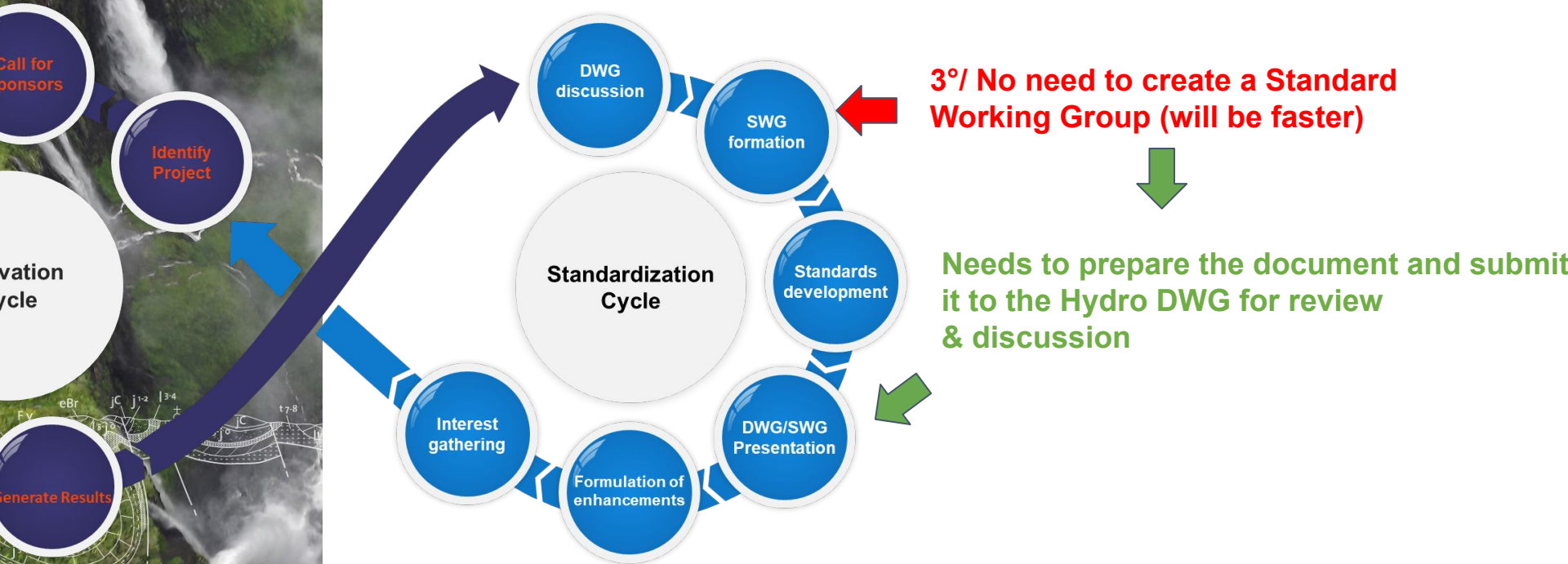
Integrating new OGC Standards: what does that imply ?

- OGC Innovation Continuum



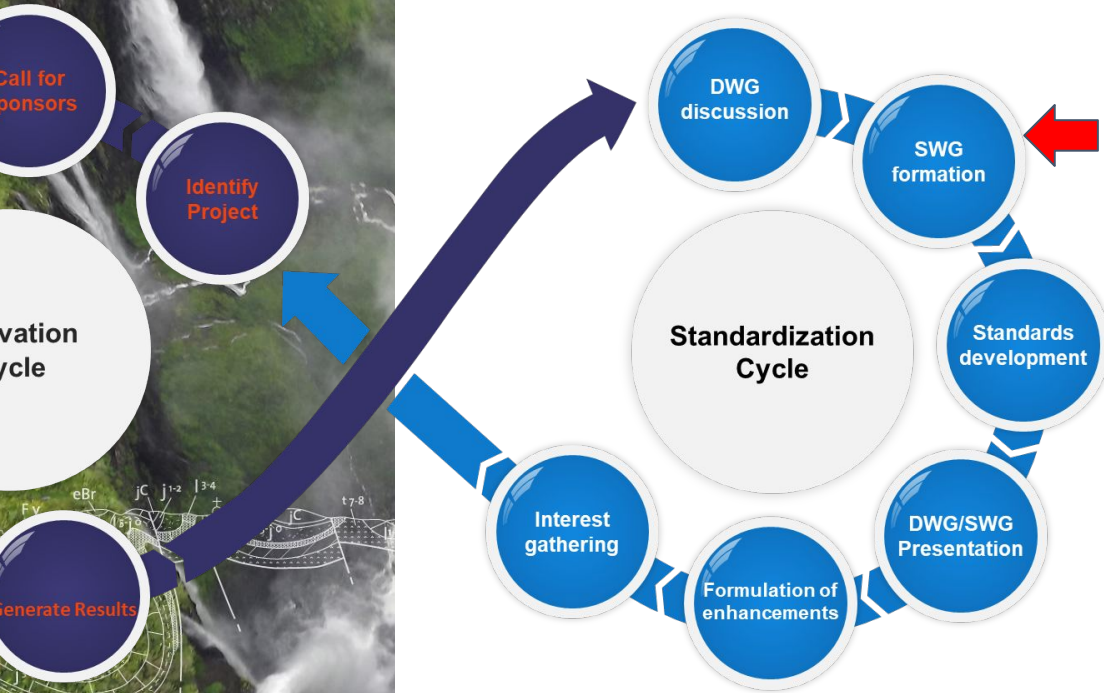
Integrating new OGC Standards: what does that imply ?

- OGC Innovation Continuum
 - Water ML2.0 Part 5 : Water Quality Best Practice review



Integrating new OGC Standards: what does that imply ?

- OGC Innovation Continuum
 - Water ML2.0 Part 1 : review



3°/ A review of the standard should trigger a discussion/work at the Standard Working Group

Integrating new OGC Standards: what does that imply ?

- No matter the timeline, there is a move towards more and more use of OGC SensorThings API to exchange Observation data and, soon, Sample data
=> let's start learning / integrating it !
- We are already working on having a better implementation coverage
 - Server side : FROST already implementing the proposed Water Quality Model
 - Client side : SensorThings API Part 1 being implemented in QGIS core. Plugin will only be for Graphical User Interface
- But 1st let's get acquainted with SensorThings API Part 1



OGC SensorThings API?

- A standard for exchanging sensor data and metadata
 - Historic data & current data
 - JSON Encoded
 - RESTful
 - Adapting OASIS OData URL patterns and query options
 - Supporting OASIS MQTT messaging
- Easy to use & understandable



SensorThings API 1.1 – API

HTTP:

	GET	POST	PATCH	DELETE
v1.1	Get index			
v1.1/Type	Get all of type	Create		
v1.1/Type(id)	Get one of type		Update	Delete
v1.1/Type(id)/Entity	Get linked entity			
v1.1/Type(id)/EntitySet	Get all linked	Create Linked		

MQTT:

1. Subscribe
 - v1.1/Things
 - v1.1/Datastreams(x)
 - v1.1/Datastreams(x)/Observations
 - etc.
2. Get Notified

- Fully Explorable with just a browser
- Composable Responses
- Powerful filtering

https://datacoveeu.github.io/API4INSPIRE/sensorthingsapi/1_Home.html

Do It Yourself

- Docker Quick-Start:
<https://fraunhoferiosb.github.io/FROST-Server/deployment/docker.html>
- Full SensorThings API Tutorial
https://fraunhoferiosb.github.io/FROST-Server/sensorthingsapi/1_Home.html
- Demo service:
<https://ogc-demo.k8s.ilt-dmz.iosb.fraunhofer.de/v1.1>
(As long as nobody deletes everything)
(Or the server catches fire)



SensorThings – Live Demo

<https://airquality-frost.k8s.ilt-dmz.iosb.fraunhofer.de/v1.1>

~760 000 000 Observations

~21 000 Datastreams

~5 000 Stations

Tutorial:

https://datacoveeu.github.io/API4INSPIRE/sensorthingsapi/1_Home.html

Fancy Queries

All data for a map:

```
v1.1/Things?
```

```
$select=id,name,description,properties&
```

```
$top=10&
```

```
$filter=properties/countryCode eq 'HR'&
```

```
$expand=
```

```
Locations($select=location),
```

```
Datastreams (
```

```
    $select=id,name,unitOfMeasurement;
```

```
    $expand=
```

```
    ObservedProperty($select=name),
```

```
    Observations (
```

```
        $select=result,phenomenonTime;
```

```
        $orderby=phenomenonTime desc;
```

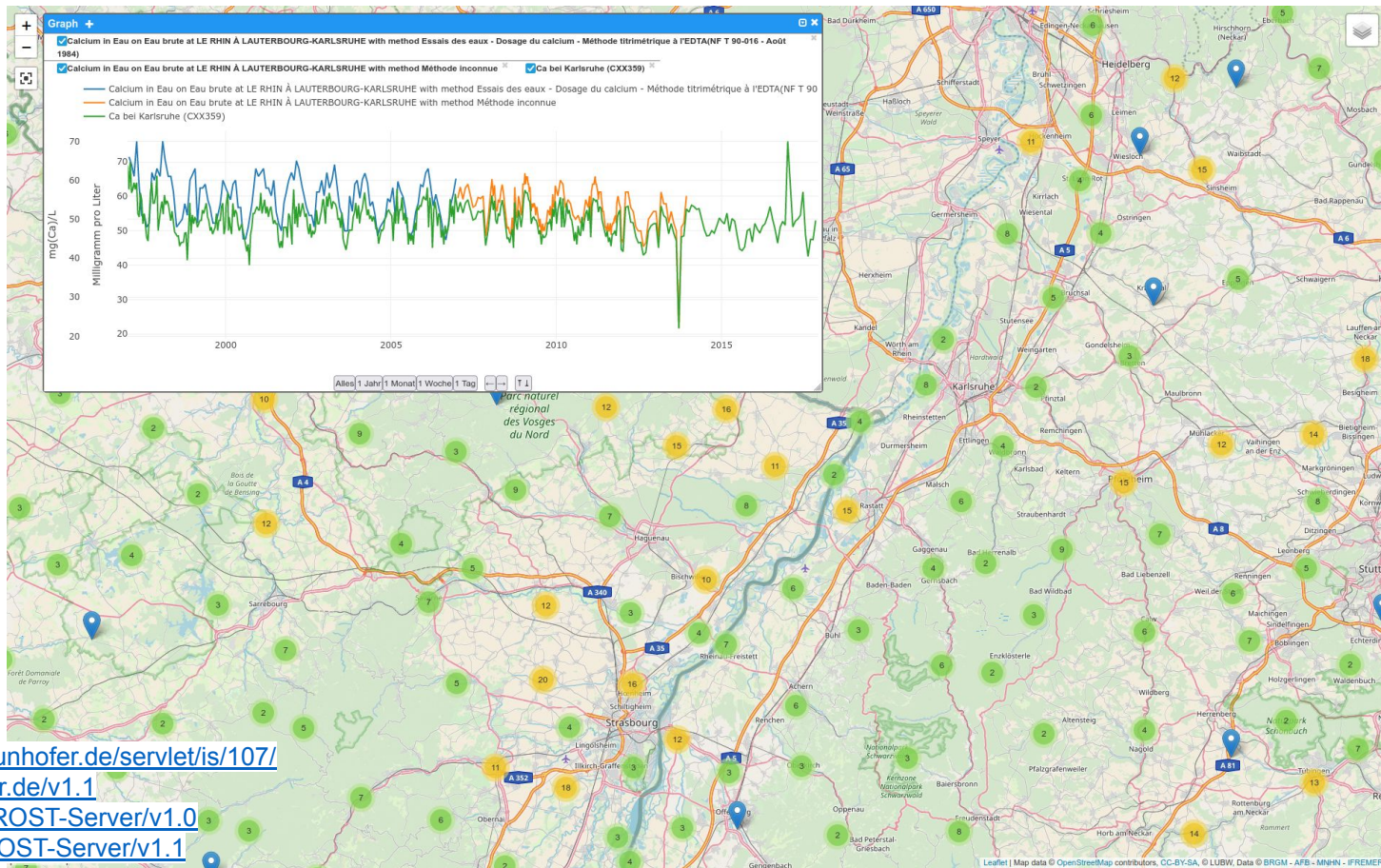
```
        $top=1)
```

```
)
```

[Link](#)

FrancoGermanic Flow – API4INSPIRE

- French & German Data
- 1 Map



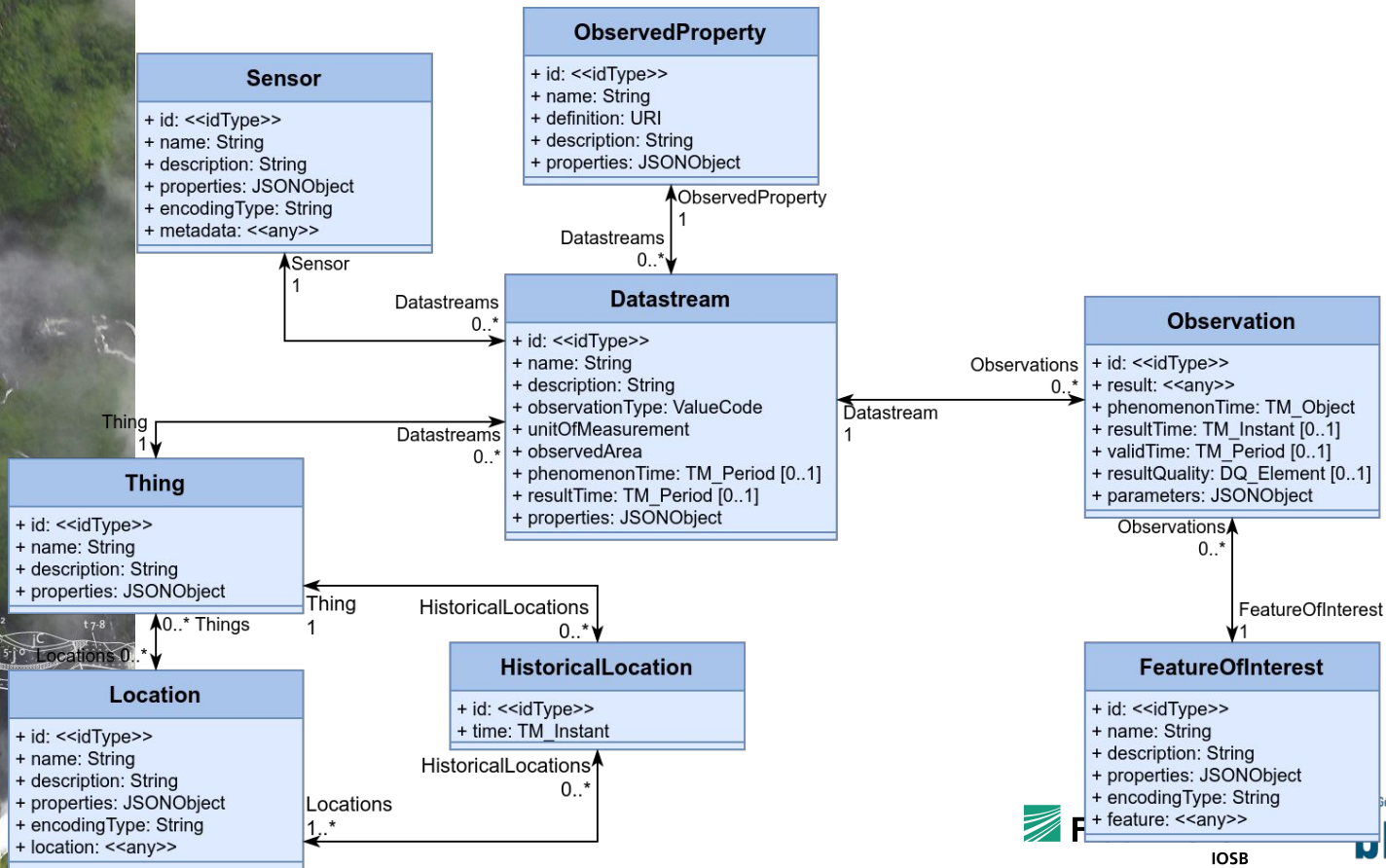
<https://api4inspire.k8s.ilt-dmz.iosb.fraunhofer.de/servlet/is/107/>

<https://lubw.k8s.ilt-dmz.iosb.fraunhofer.de/v1.1>

<https://sensorthings-wq.brgm-rec.fr/FROST-Server/v1.0>

<https://sta4hydrometry.brgm-rec.fr/FROST-Server/v1.1>

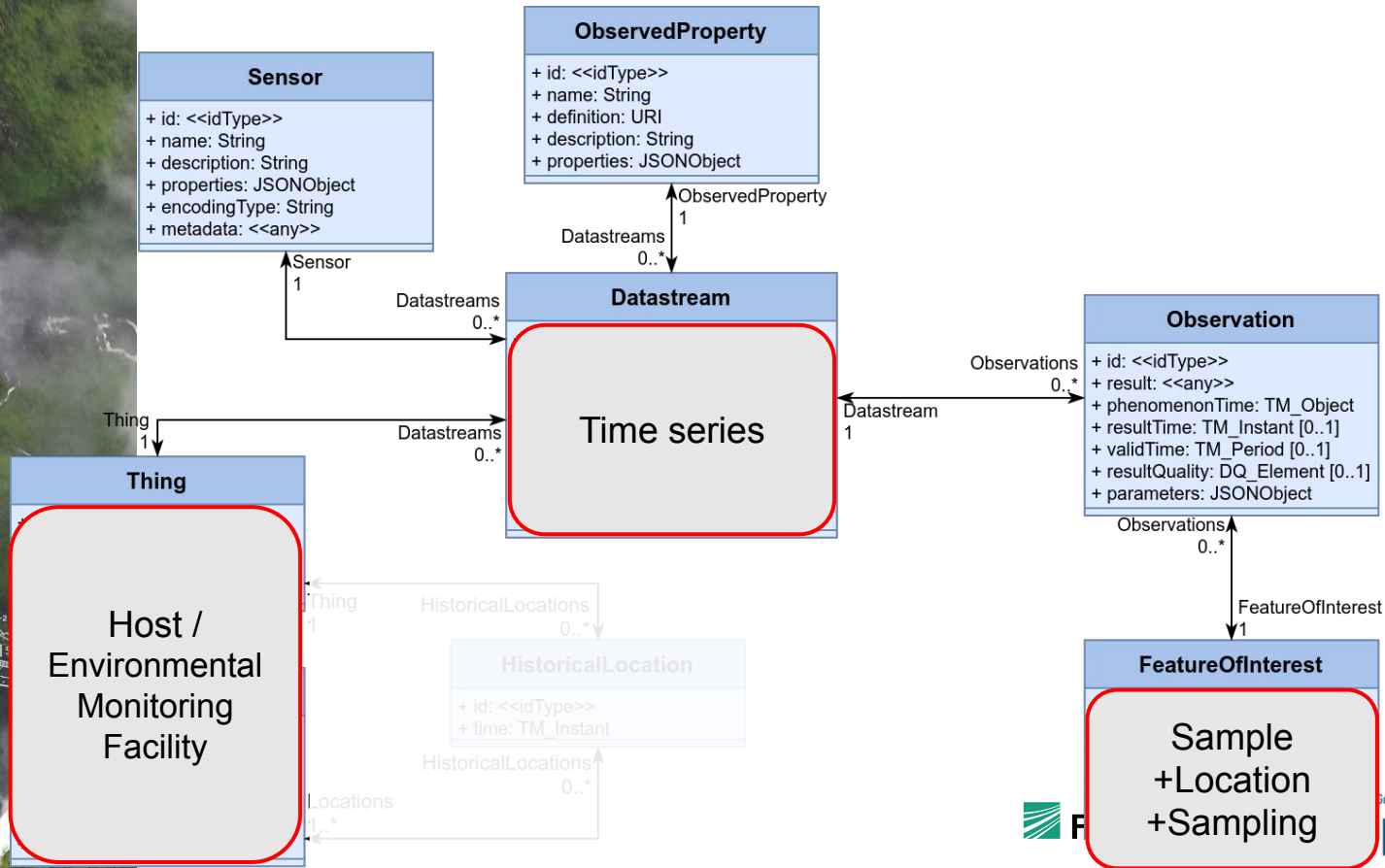
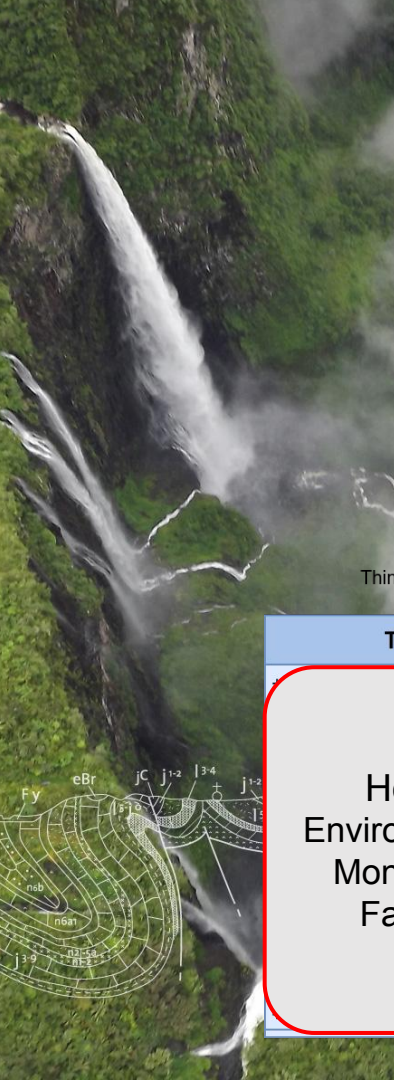
SensorThings API 1.1



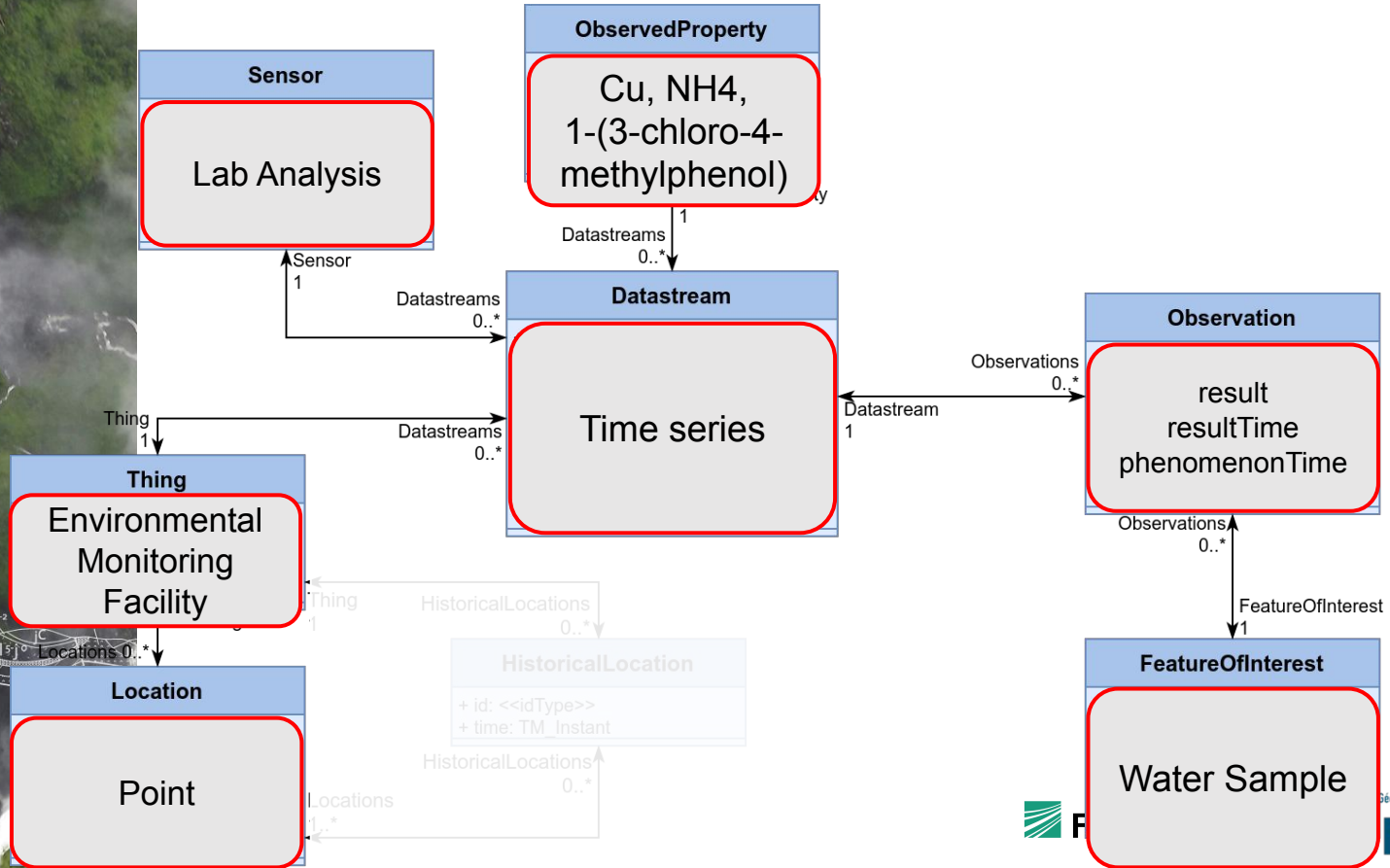
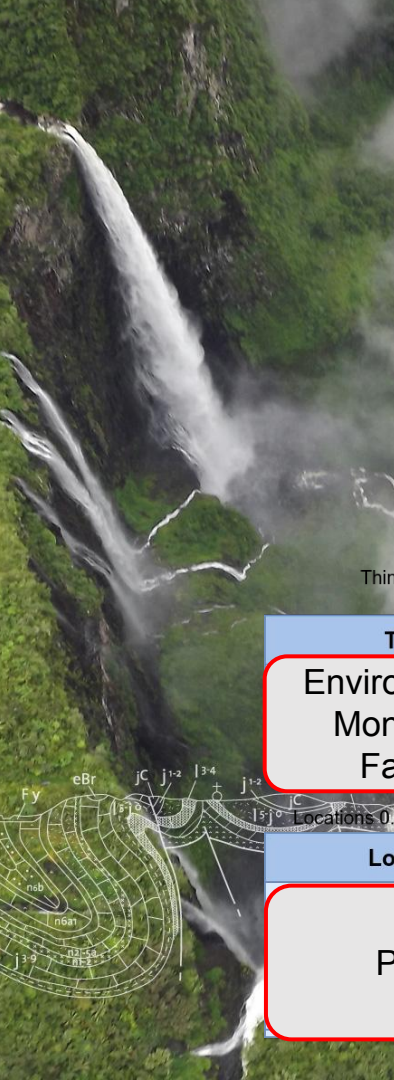
F

IOSB

SensorThings API 1.1 – Water Quality



SensorThings API 1.1 – Water Quality



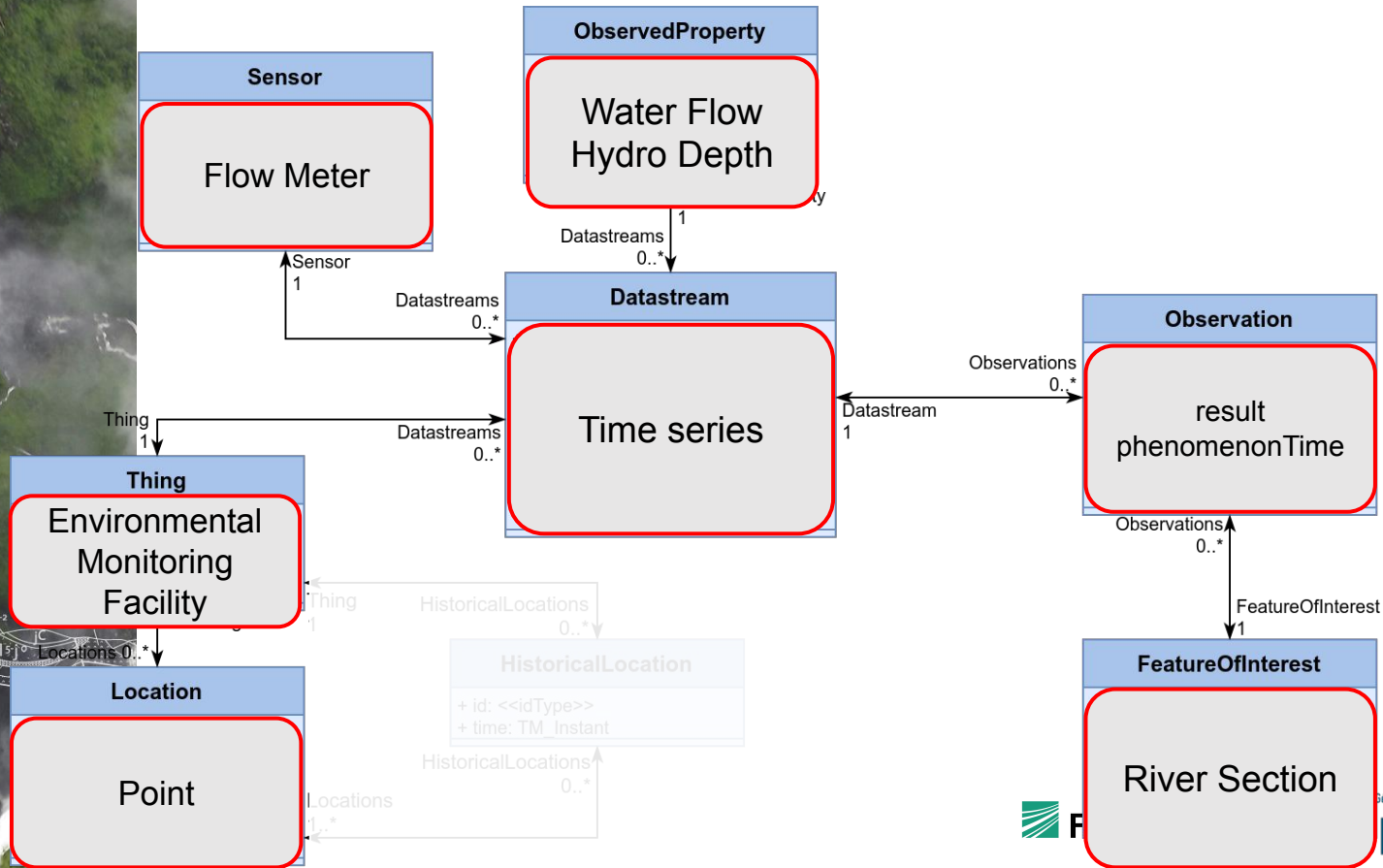
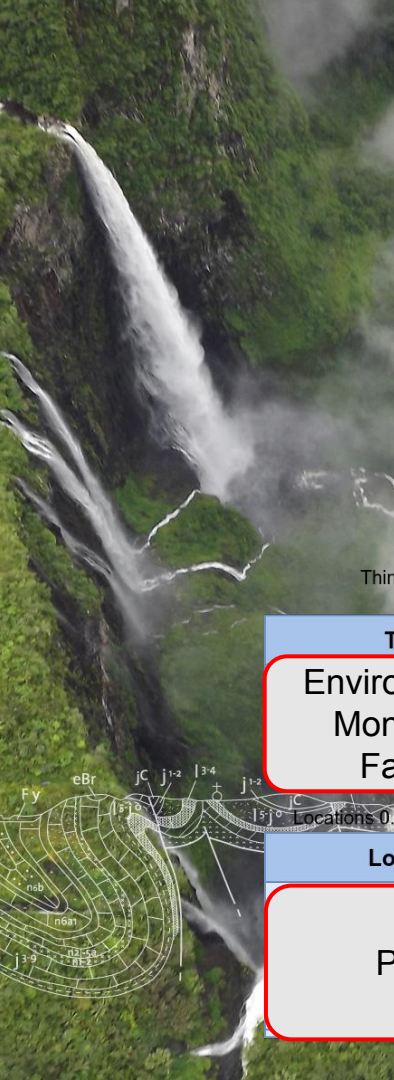
F

Sciences pour une Terre durable

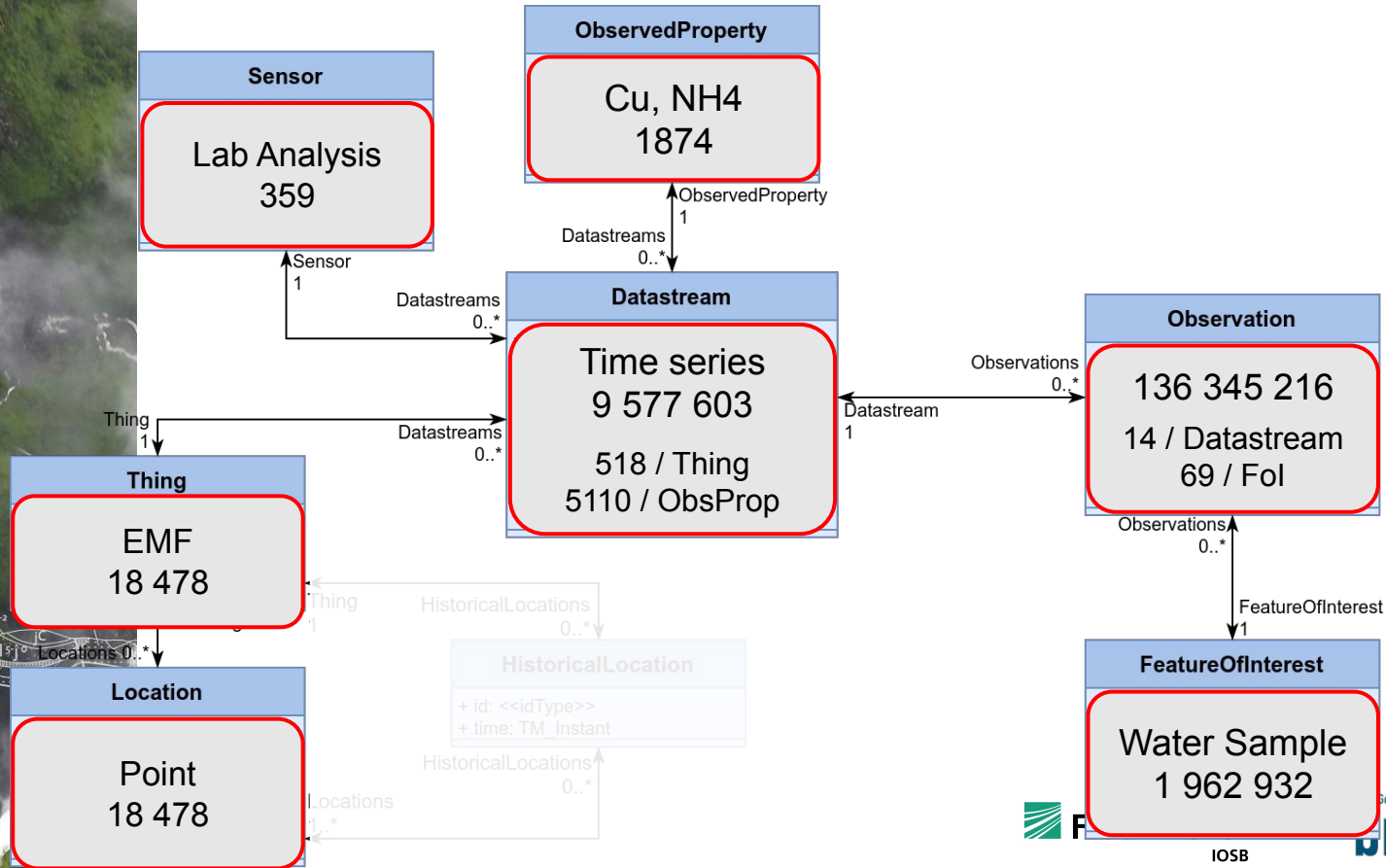
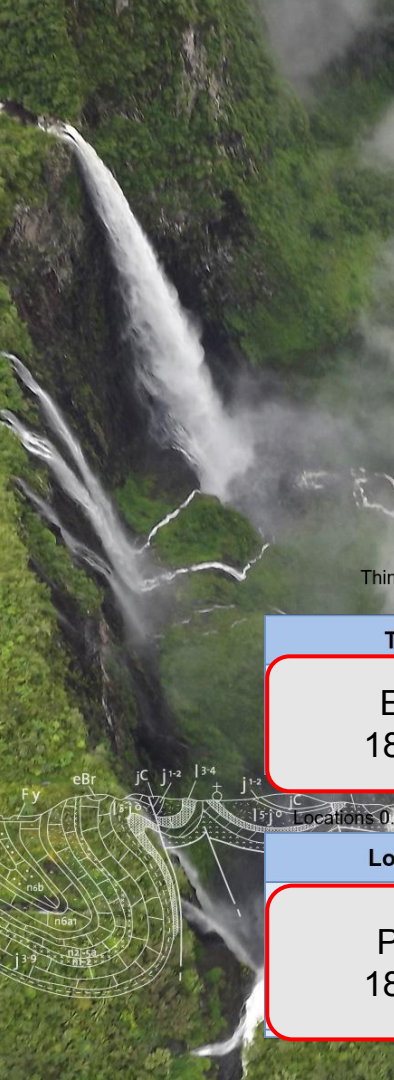


rgm

SensorThings API 1.1 – Water Quantity



SensorThings API 1.1 – Water Quality – BRGM





Thank you

s.grellet@brgm.fr

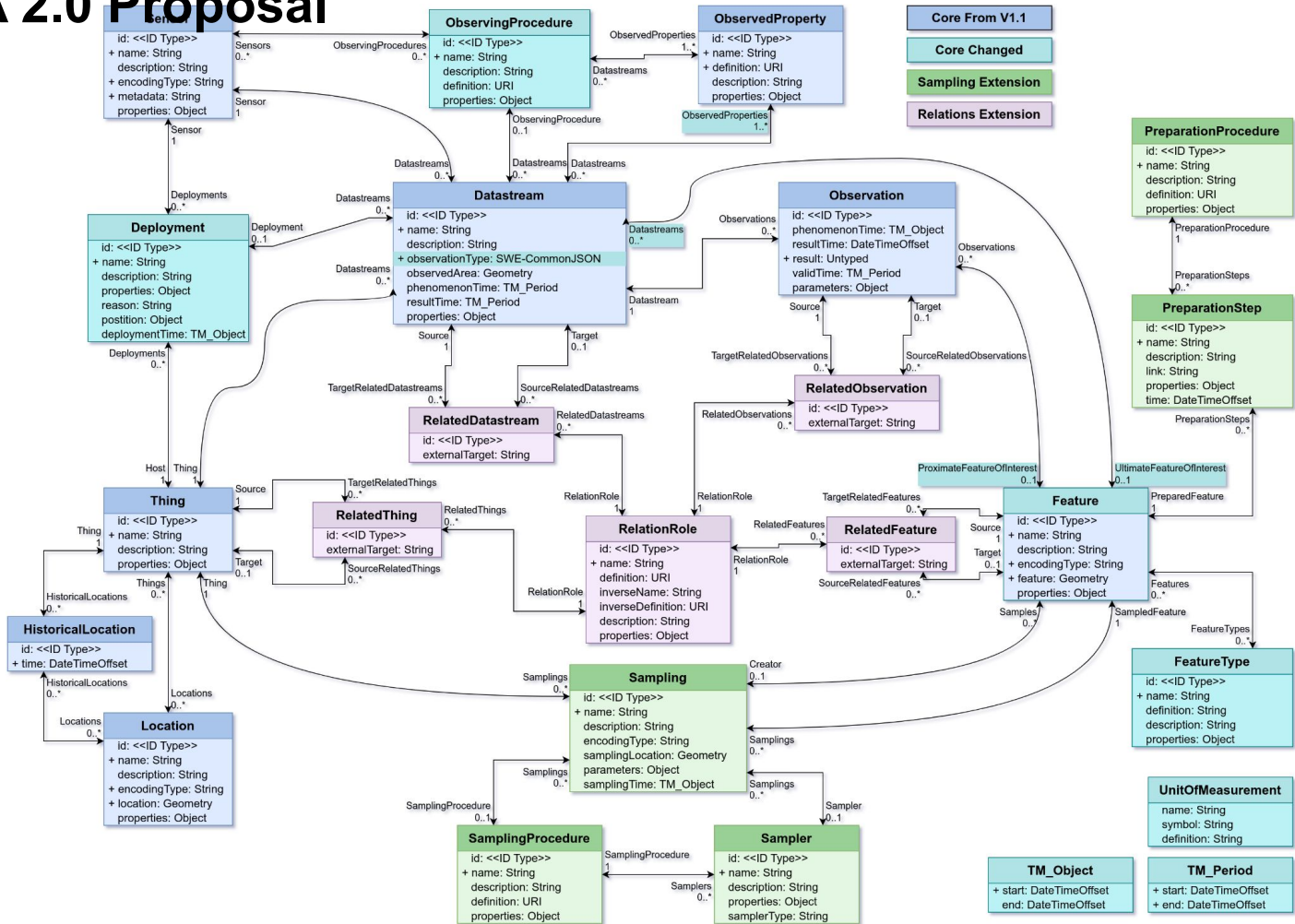
hylke.vanderschaaf@iosb.fraunhofer.de

STA 2.0 Proposal

Full data model

- FeatureOfInterest ⇒ Feature
- No longer v1.1 compatible

How do we mention 2.0 ?
That WQ IE feeds it or ?
Don't want people to conclude : lets wait for V2



STA 2.0 Proposal – Minimal Model

Minimal data model

- Not much more complicated than

How do we mention 2.0 ?
That WQ IE feeds it or ?
Don't want people to conclude : lets wait for V2

