# OGC SensorThings API
# Data Model

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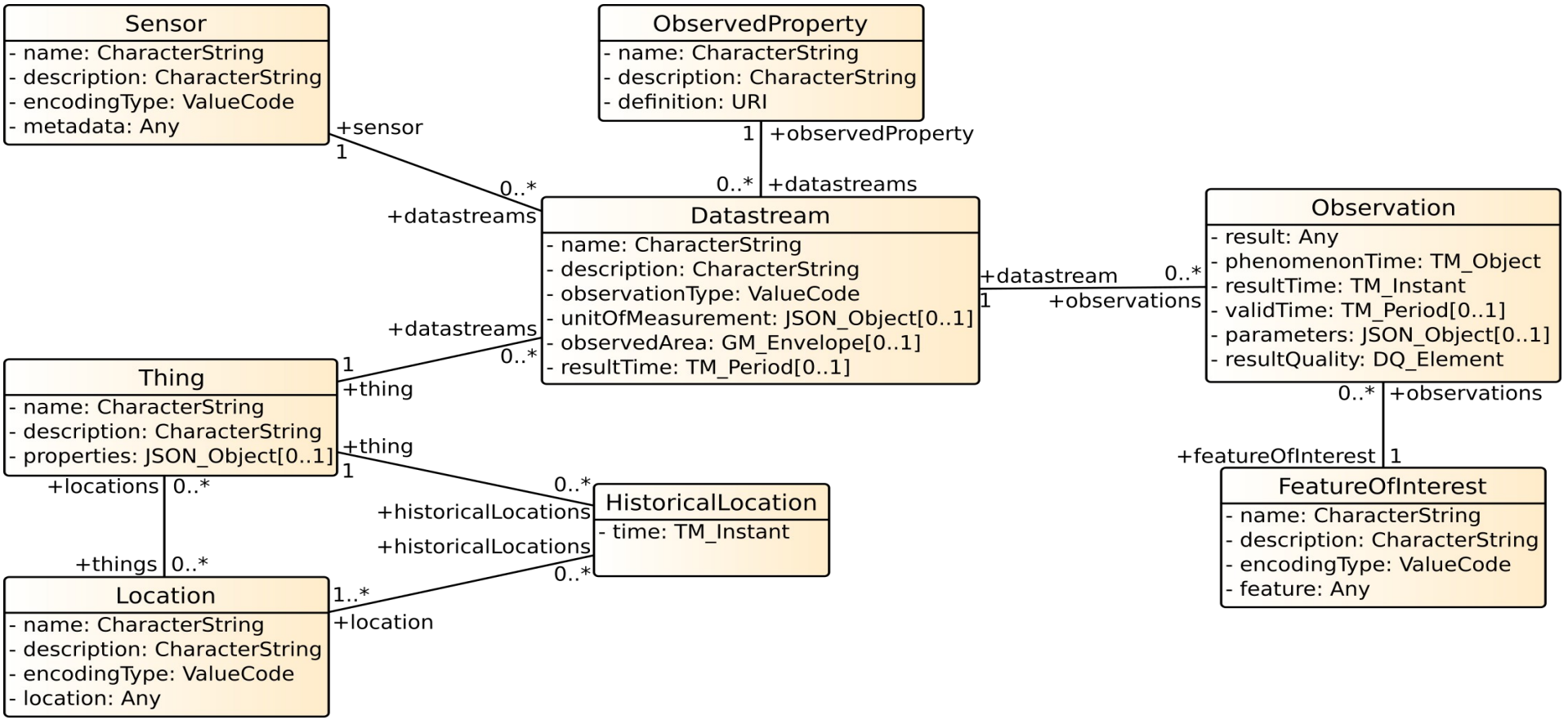
IOSB

# Data model



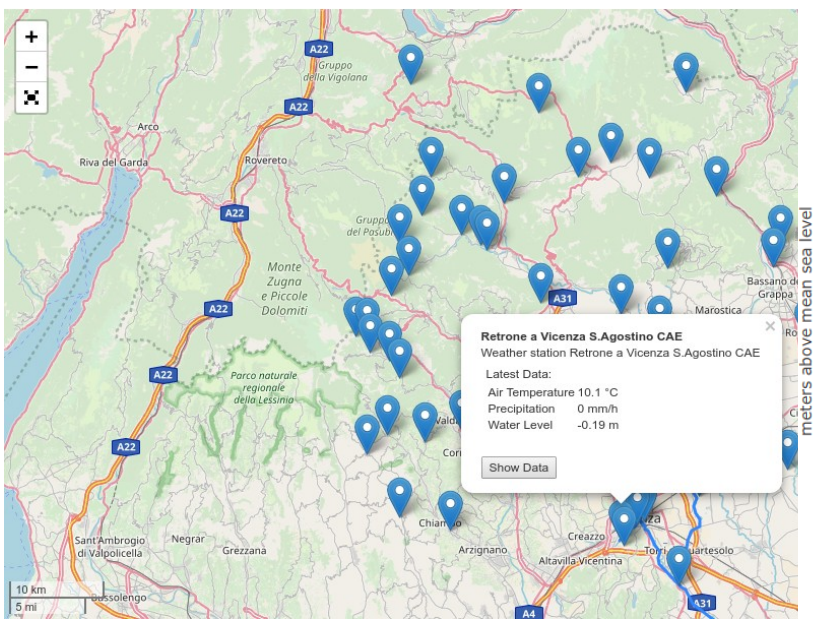

- EU-Project in Horizon 2020 framework
- **Integrated solution** to support **forecasting**, early warnings, transmission and routing of the emergency data, aggregated analysis of **multimodal data** and management of the coordination between the first responders and the authorities

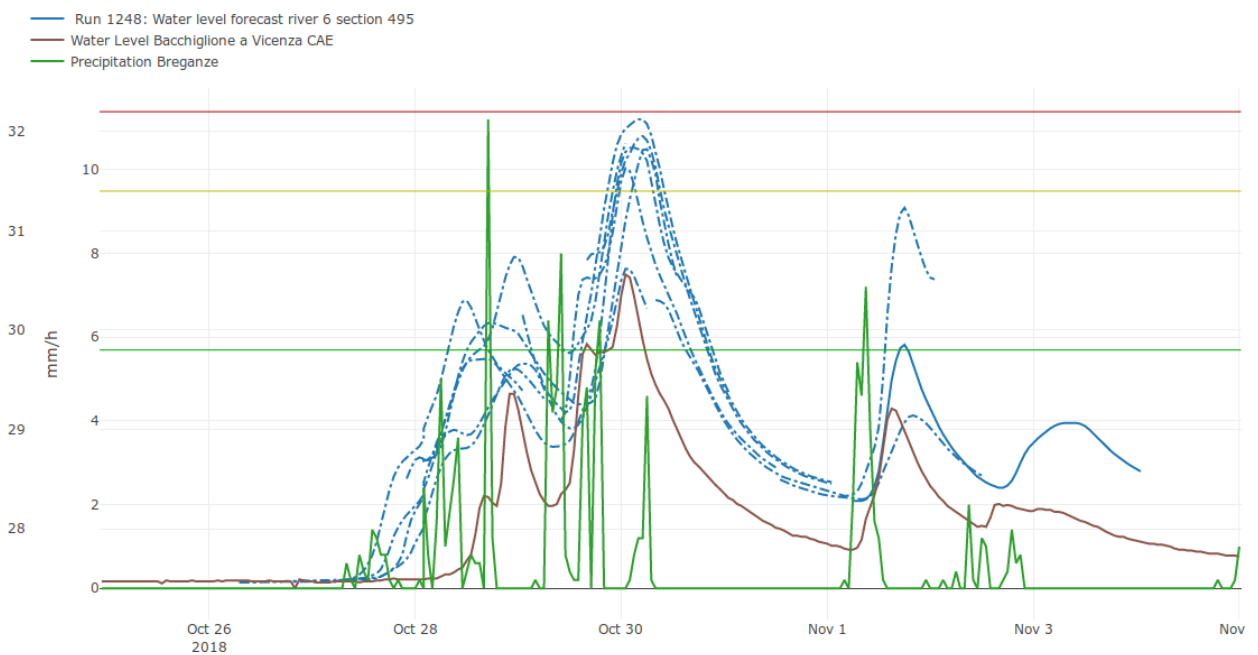
- http://beaware-project.eu/

# BeAWARE – Flood Scenario Data

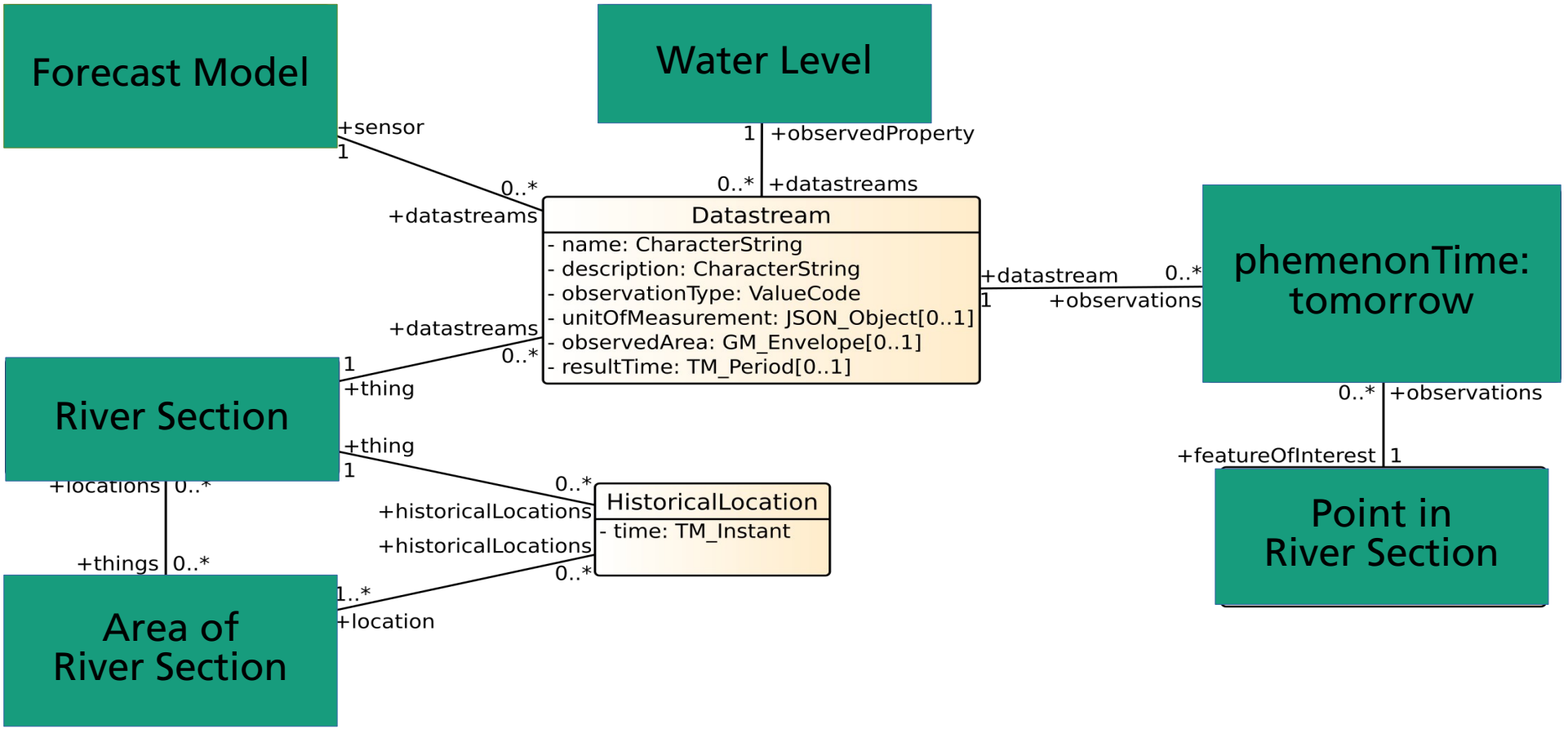
- Past, Current & Predicted
  - Weather (Temperature, Humidity, Rainfall, etc)
  - Water levels in rivers

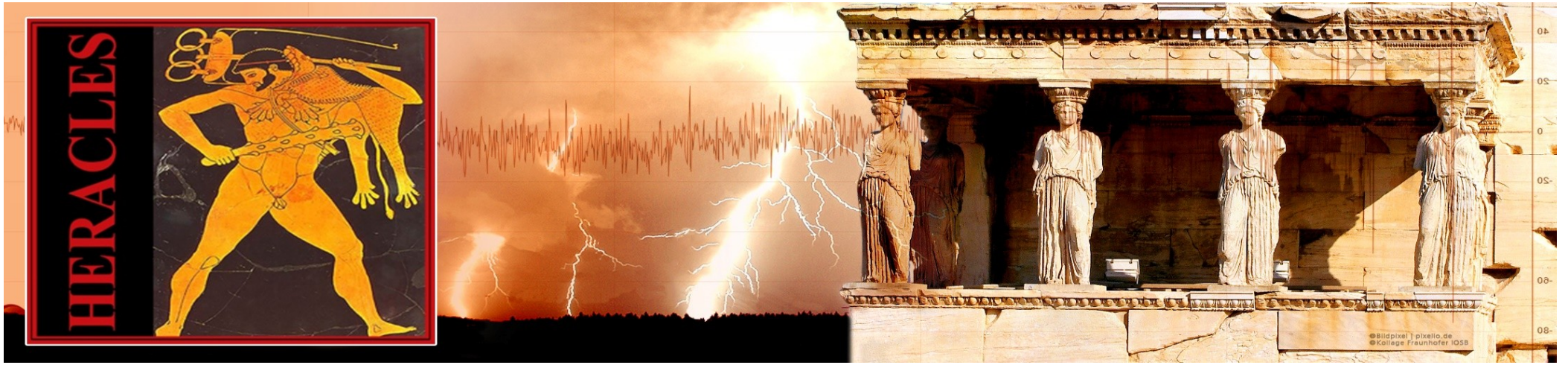
Overview Map (Italy)



# Data model – BeAWARE






- EU-Project in Horizon 2020 framework
- Design responsive systems/solutions for protecting Cultural Heritage against climate change effects
- Semantic Modeling of cultural heritage, risks climate effects, materials, sensors, simulation models, …

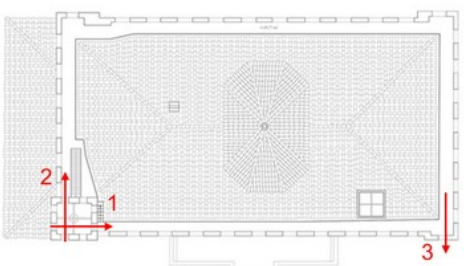
- http://www.heracles-project.eu/

# HERACLES – Data

HERACLES > HERACLES Knowledge Base > Instances > SensorIndividuals > Accelerometer

## Accelerometer

Accelerometer measure acceleration caused by shocks or structural influences. The sensors can identify individual frequencies and their impact on the observed object. The picture below shows the accelerometers on the roof of the Gubbio Palace.




Accelerometers #1 and #2

Accelerometer #3

In the pictures below sample charts of possibly obtained data is shown. The left picture shows the accelerometer amplitudes (positive values). The right picture shows a frequency analysis and depicts the occurence of specific frequencies and their distribution. In the right column sample data in text files is provided as content.

**Concept**

Sensor

**Sensor endpoint**

Endpoint for Accelerometer

**Sensor monitors**

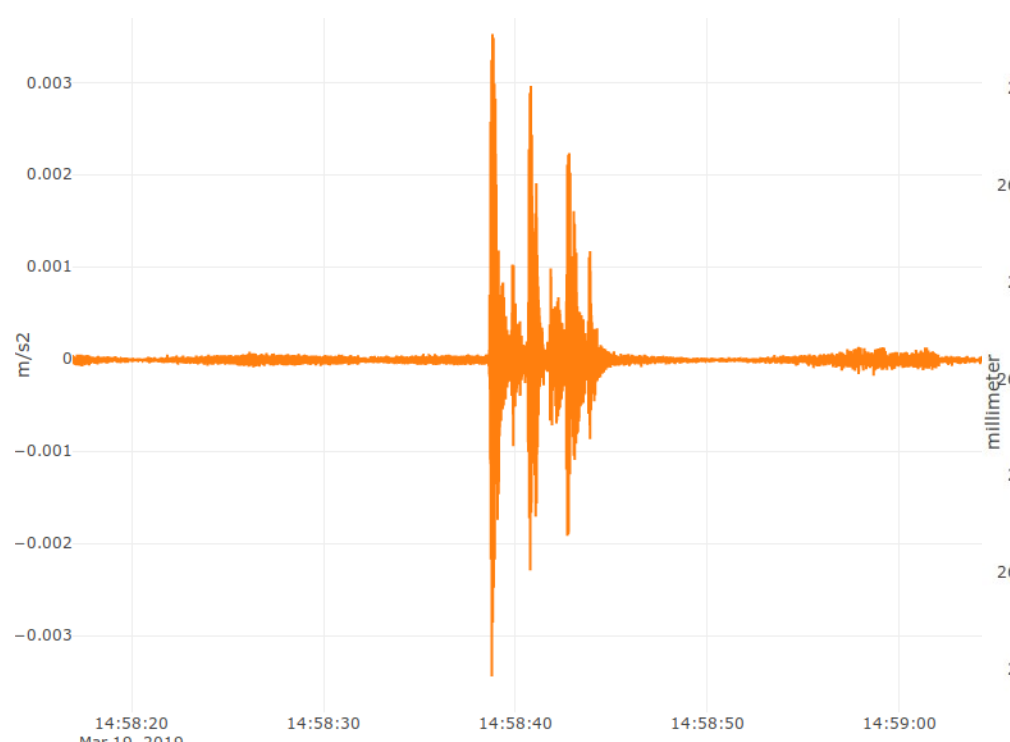
Palace of Gubbio

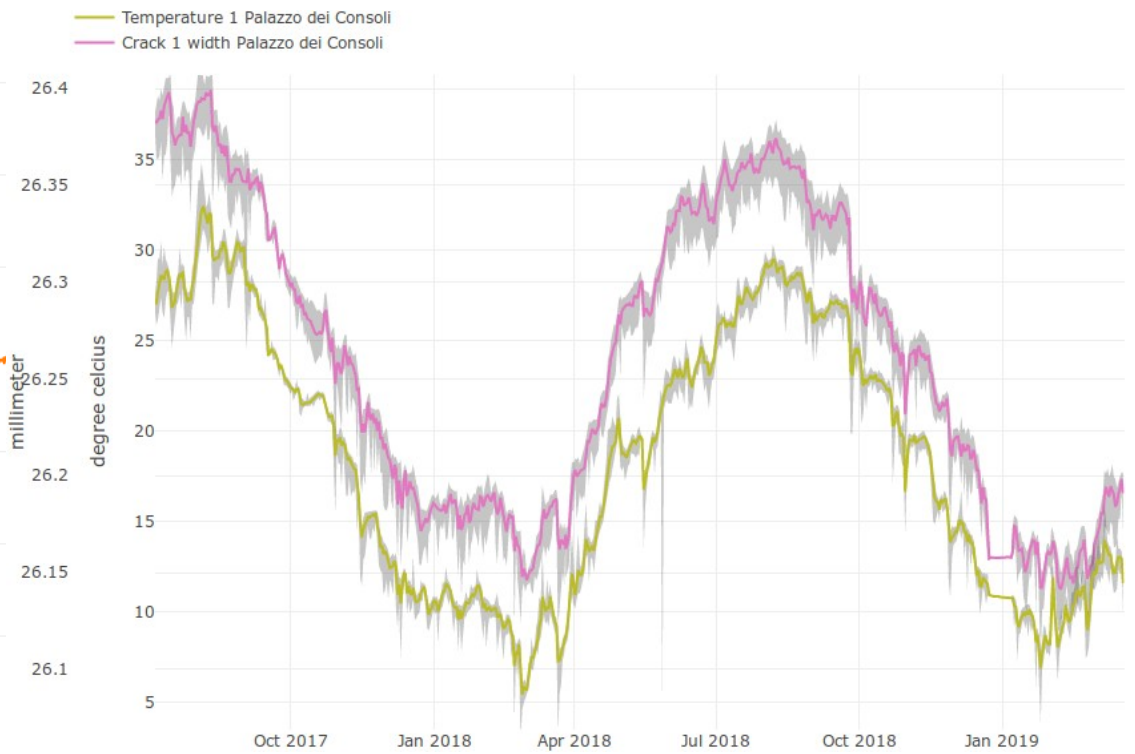
**Sensor produces dataset**

Acceleration Data Set

# HERACLES – Data

High data rate, up to 100Hz







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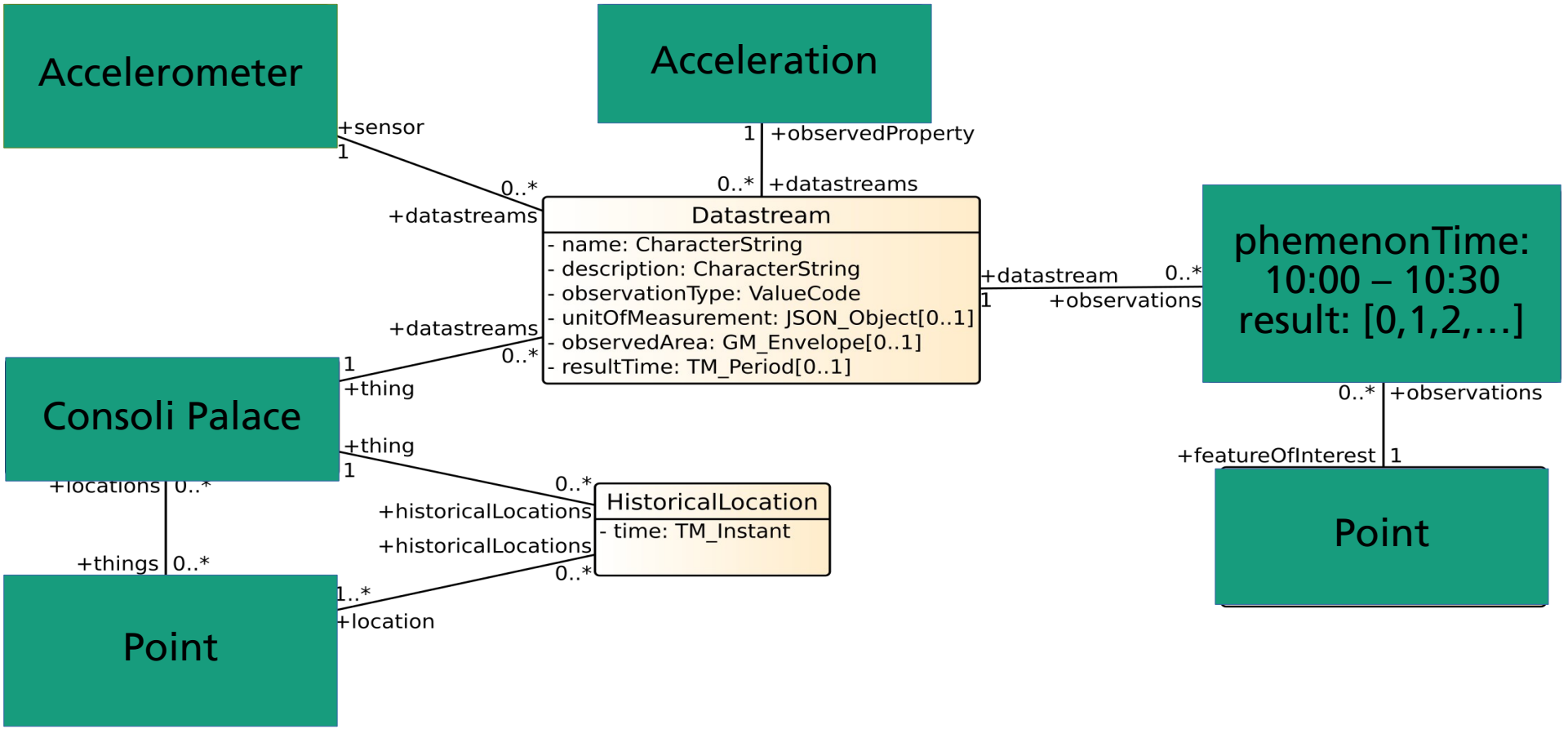
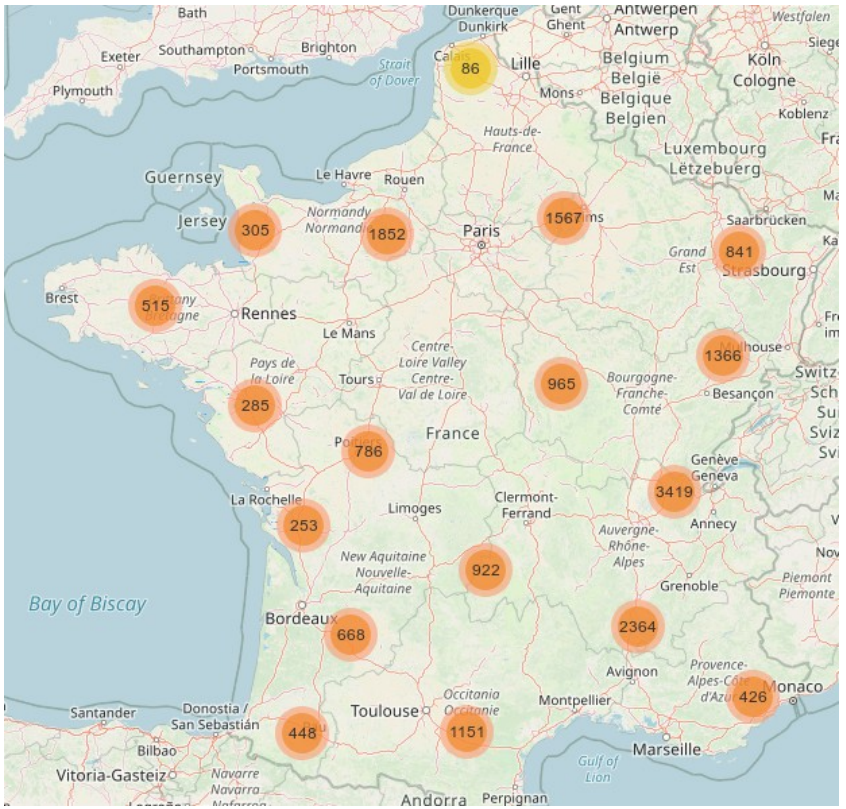
# Data model – HERACLES

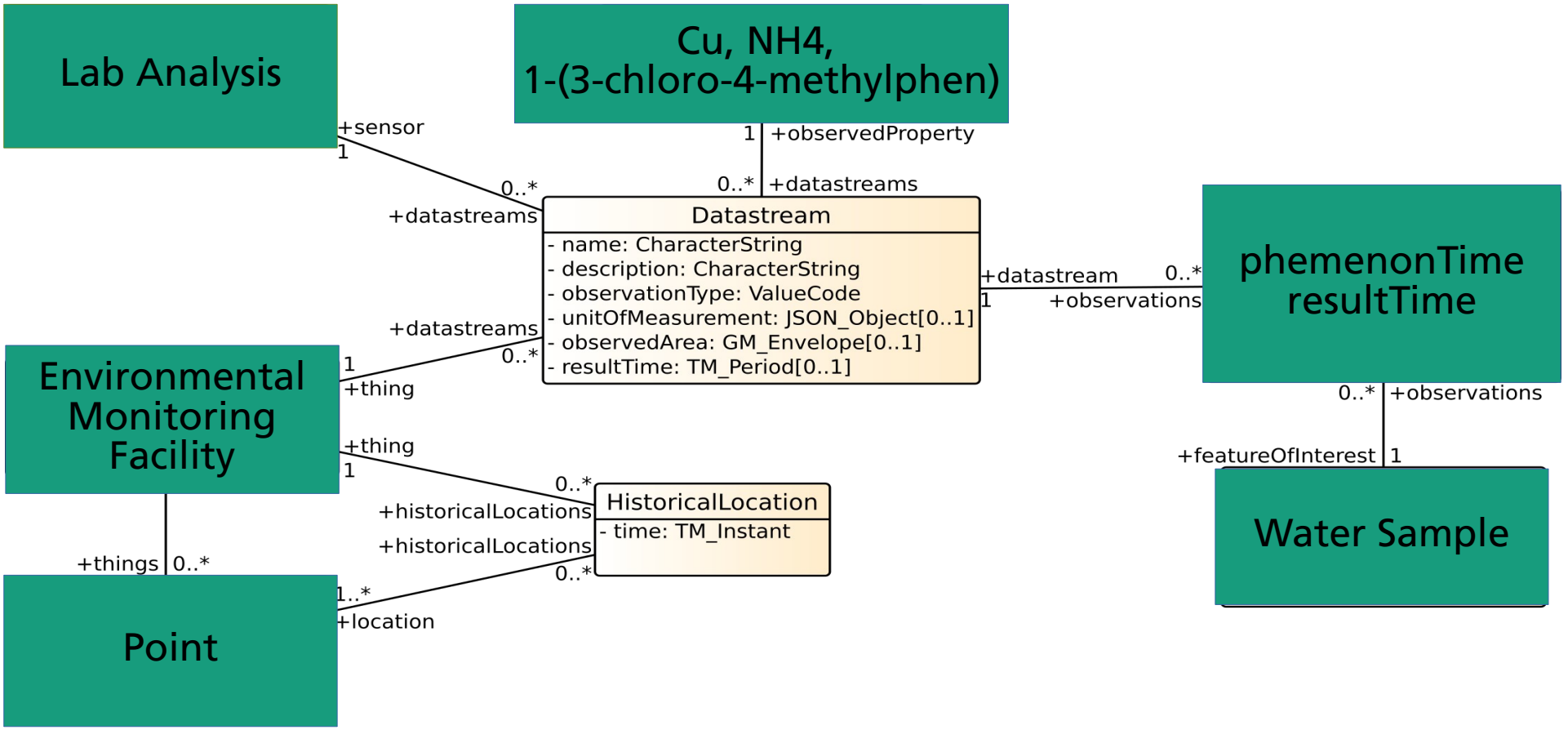


# Examples: BRGM – French surface water database

- French surface water quality database
  - 18478 Stations
    1874 Observed Properties
    136000000 Observations
  - INSPIRE Aligned
  - Water samples
    - analysed in laboratory
    - many results per sample



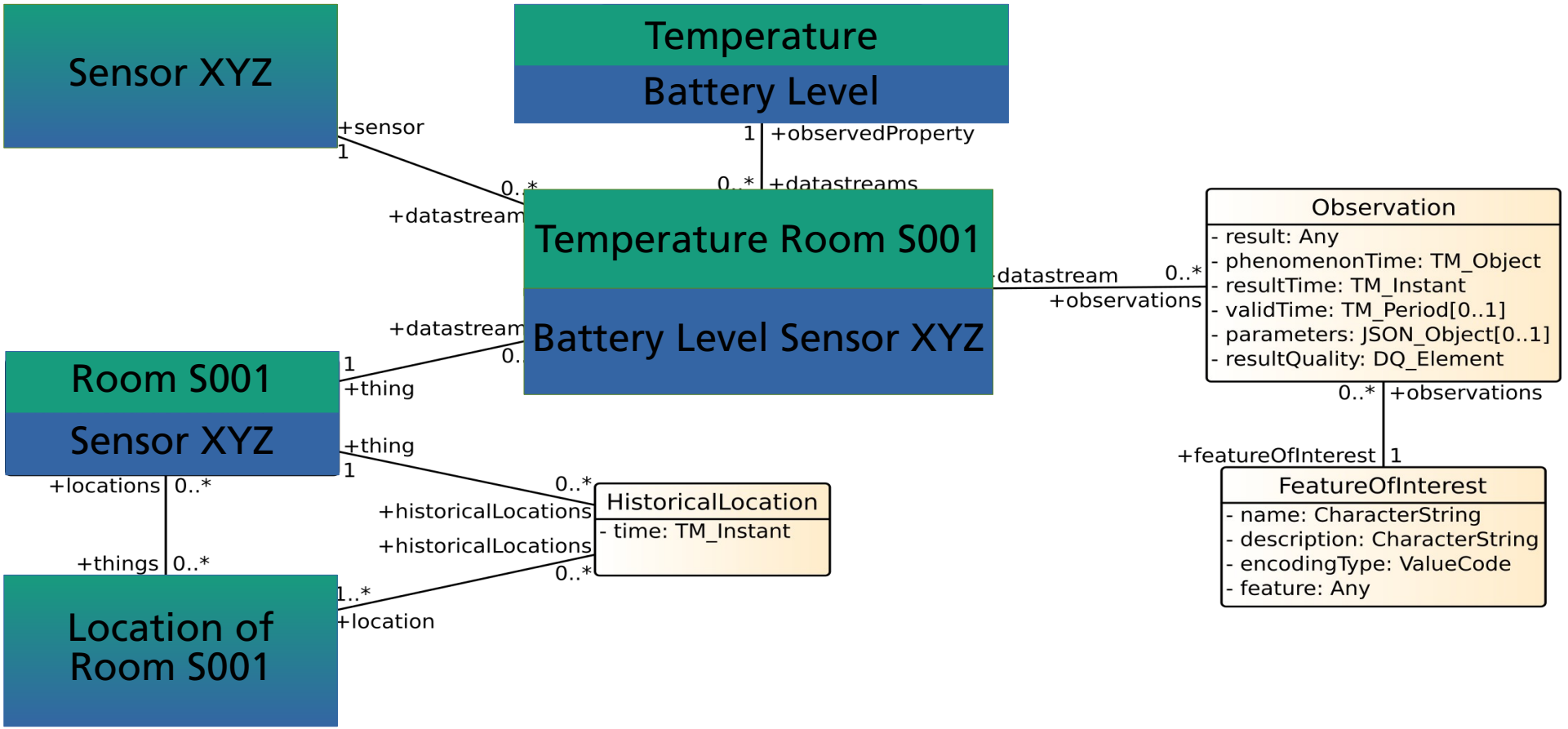
# Data model – BRGM Water Quality



# IOSB Building Management

- LoRa Sensors measure
  - Room-Related properties (Temperature, Humidity)
  - Sensor-Related properties (Battery level, RSSI)
- Sensors are occasionally moved
  - Room-Related Observations flow in different Datastreams
  - Sensor-Related Observations keep the same Datastream
- Multiple sensors can be in the same room
  - At the same time
  - At different times
- Sensors are identified by their LoRa-ID

# IOSB Building Management



# IOSB Building Management

Sensor:


```
{
   "name": "lora-raumsensor-elsys-367BA",
   "description": "lora-raumsensor-elsys-367BA",
   "properties": {
      "sensorType": "ELSYS ERS",
      "type": "sensor",
      "sensorId": "a81758fffe0367ba"
   },
   "@iot.id": 10
}
```


Thing (Sensor):


```
{
   "name": "lora-raumsensor-elsys-367BA",
   "description": "Sensor lora-raumsensor-elsys-367BA",
   "properties": {
      "sensorType": "ELSYS ERS",
      "type": "sensor",
      "sensorId": "a81758fffe0367ba"
   },
   "@iot.id": 2,
}
```


Thing (Room):


```
{
   "name": "S201",
   "description": "Room S201",
   "properties": {
      "roomNr": "S201",
      "type": "room",
      "floor": 2
   },
   "@iot.id": 57,
}
```

# IOSB Building Management

- Get the Datastream for Sensor XYZ and Property ABC

```
v1.0/Datastreams?$filter=
  Sensor/properties/sensorId eq '{{deveui}}'
  and ObservedProperty/name eq '{{observedProperty}}'
  and Thing/Locations/Things/properties/sensorId eq '{{deveui}}'
  and Thing/Locations/Things/properties/type eq 'sensor'
```