

**Iceland**   
**Liechtenstein**  
**Norway** grants

Closing Event of the PT02 Programme  
Integrated Marine and Coastal Waters Management  
“Achieved Outcomes”

December 6th - Lisbon

# SeaBioData - Portuguese Seamounts Biodiversity Data Management



Artur Rocha  
Alexandre Costa  
Carlos Almeida  
Daniel Benevides  
Inês Garganta  
João Castro  
José Alexandre Teixeira  
Ricardo Amorim  
Susana Barbosa  
Cristina Ribeiro  
Gabriel David





# Project Summary



- **Title:** SeaBioData - Portuguese Seamounts Biodiversity Data Management
- **Reference:** PT02\_Aviso5\_0002
- **Partners:** INESC TEC and IPMA
  - consultant: IMR
- **Duration:** 21 months, 2015-07-16 / 2017-04-30
- **Funding agency:** EEA Grants
  - *OBJECTIVE EEA PT02 PA* Good Environmental State of European marine and coastal waters
  - Call 5 - National Ocean Data integration
- **Budget:** 229 K€





# The database paradigm...

- Each “observation” corresponds to a row in the database
- Enables:
  - SQL queries, relating different observations from different features
  - Sophisticated metadata
  - Elaborated value-added services
- Georeferenced data:
  - INSPIRE compliant (interoperable)
  - OGC Sensor Observation Service (ISSO 19153) compliant

SEA BIO DATA Administration Campaign Observations Samples Summary Fishing effort VME Administrator (BIOMETORE7)

Observations

Select Procedure  
BO60

Files  
No files to show.

Observations

Station	Sample	Timestamp	Latitude	Longitude	Flowmeter Right Start	Flowmeter Left Start	Flowmeter Right End	Flowmeter Left End	Trawling Time Sink [min]	Trawling Time Active [min]	Max Trawling Depth [m]	Notes
1		2017-04-18 16:50:28.471	38.17465	-9.619442	39495	38607	109208	73347	16.18	15.45	200	
3		2016-08-24 15:15:09.733	37.55607	-9.878272	208446	143908	270813	192330	11.36	12.09	200	
4		2016-08-25 22:15:51.254	37.38856	-10.08571	271362	193030	341310	255536	15.59	17.32	200	
5		2016-08-25 05:12:47.476	37.27631	-10.23823	345940	257466	430897	339171	14.28	16.56	200	

SEA BIO DATA Administration Campaign Observations Samples Summary Fishing effort VME Administrator (BIOMETORE7)

Location:  
Gorringe

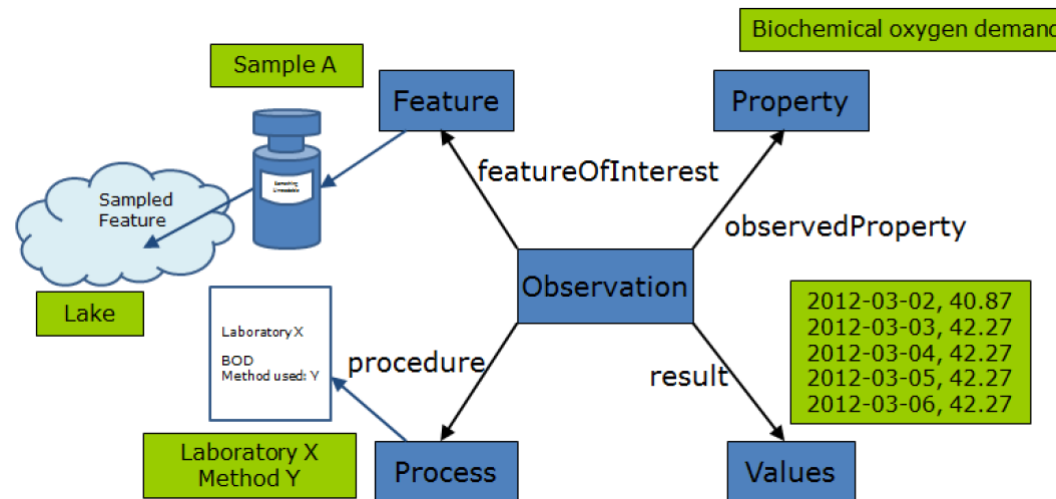
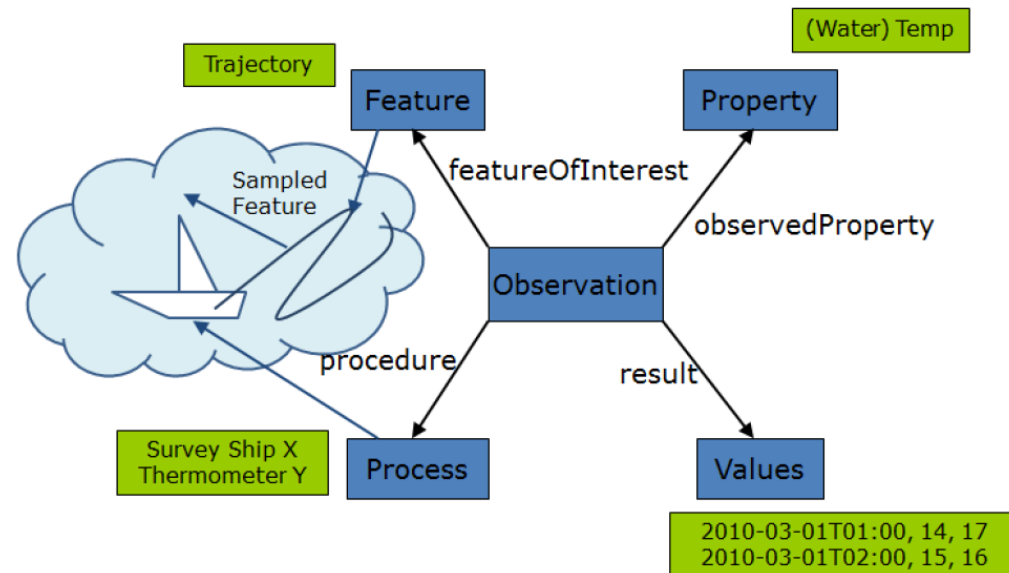
1. Gorringe

#	Name
1	5
2	6
3	7
4	8
5	9
6	10
7	11
8	12
9	13
10	14
11	15
12	16

The map displays a network of observation points (numbered 5-16) connected by lines, representing a trawling path in the Gorrige area.

# Observation centric

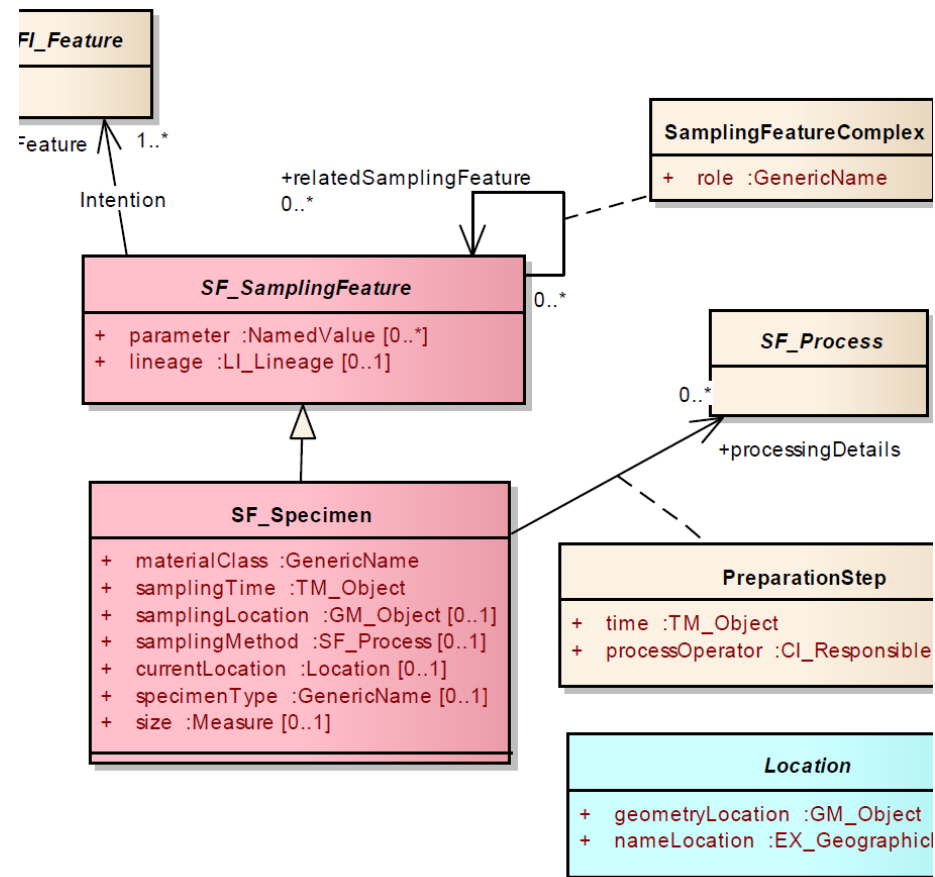
- Feature of Interest (geographic feature)
  - Sampled Features
- Process (semi-structured)
  - Variety of procedures
- Observation (time, location, ...)
- Observed Property
  - Simple types
  - Measurement with Units
  - Taxonomy, ...
- Values





# Supports complex processes

- Possibility of relating several process steps in subsequent laboratory observations
- Concept of Sample
  - Water sample
  - Sediments
  - Specimen, ...
- Sample life cycle
  - Preparation steps
  - Where is it deposited at
  - Collection ID



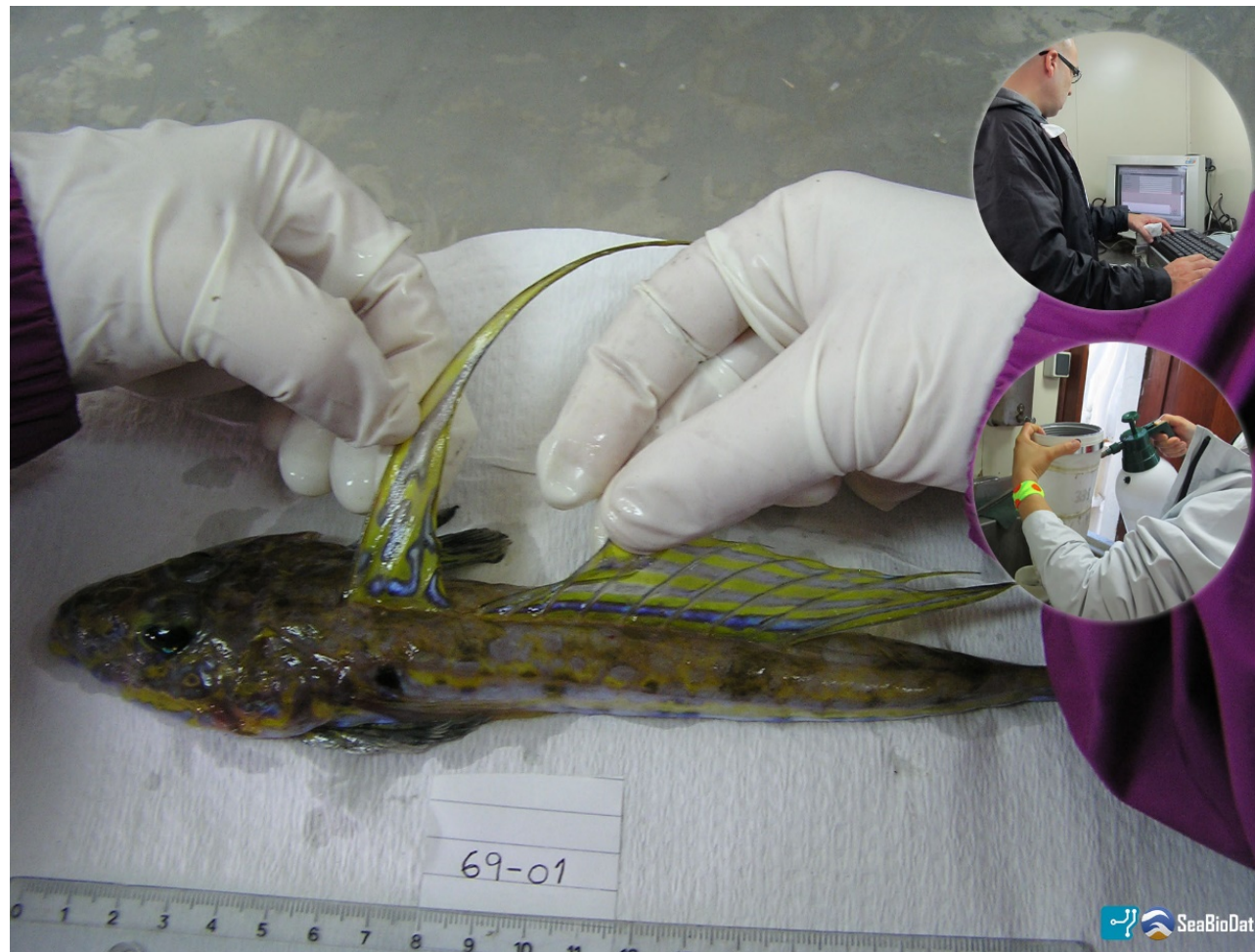
# Documenting relevant context information

- Projects
- Surveys
- Equipment
- Teams
- Stations/Locations
- ...



# Repository of data and attached documents

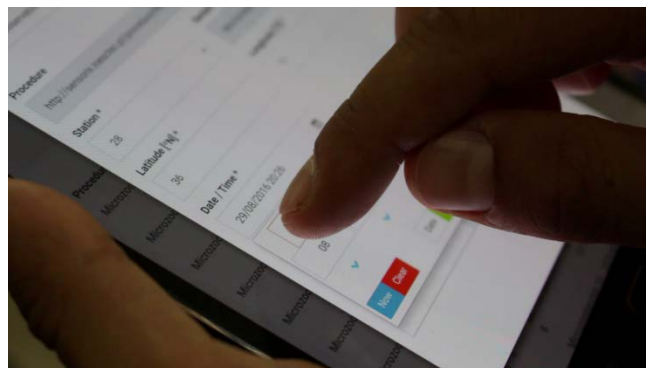
- Photos, videos, sounds, ...
- Survey reports
- Instrument outputs (e.g. CTD)
- Relation to external repositories (e.g. samples deposited at MUHNAC)
- Derived outputs
- ...
- Files are associated to the respective concepts in the data model





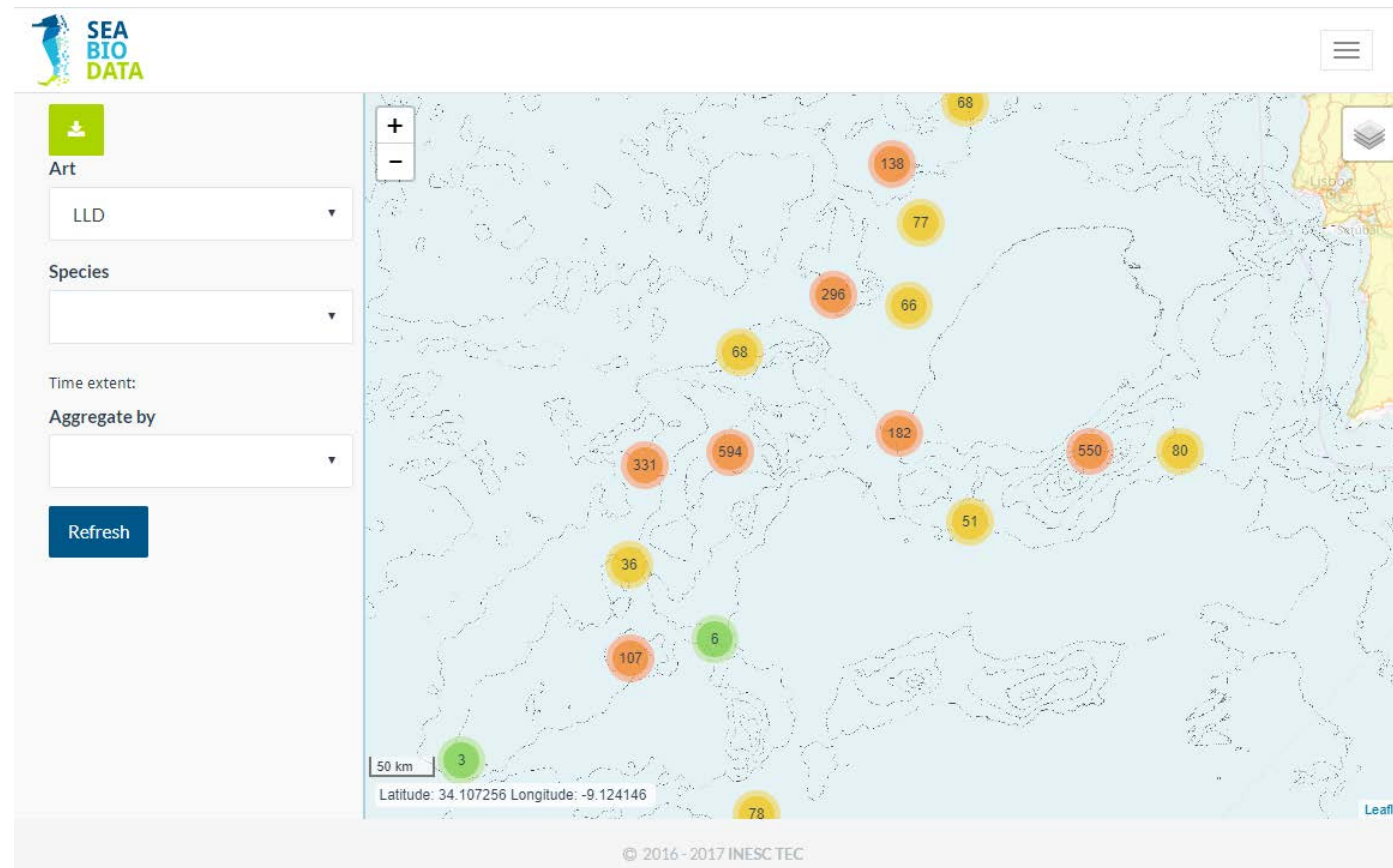
# Promoting innovative ways of collecting data

- Using tablets as Log Book
- Flexible forms generated according to the Observation processes
- Filling aids



# Added value services

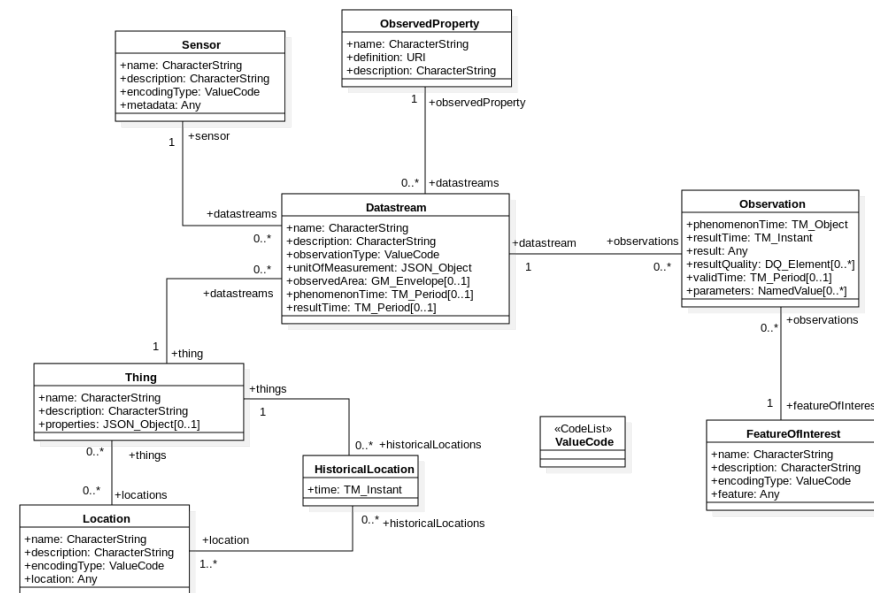
- Human pressures (fishing effort, in picture)
  - Vessel Monitoring System
  - Fishing Logs (“diários de pesca”)
- Vulnerable Marine Ecosystems





# Current trends – IoT: real time data

- Common data model for “data streams”
- The OGC SensorThings API (sensing profile) is derived from the SOS conceptual model
- Restful API
- JSON encoded



**NanoStima DASHBOARD**

- Number of Sensors: 1
- Devices: 3
- Registered Locations: 4
- Datstreams Studied: 8

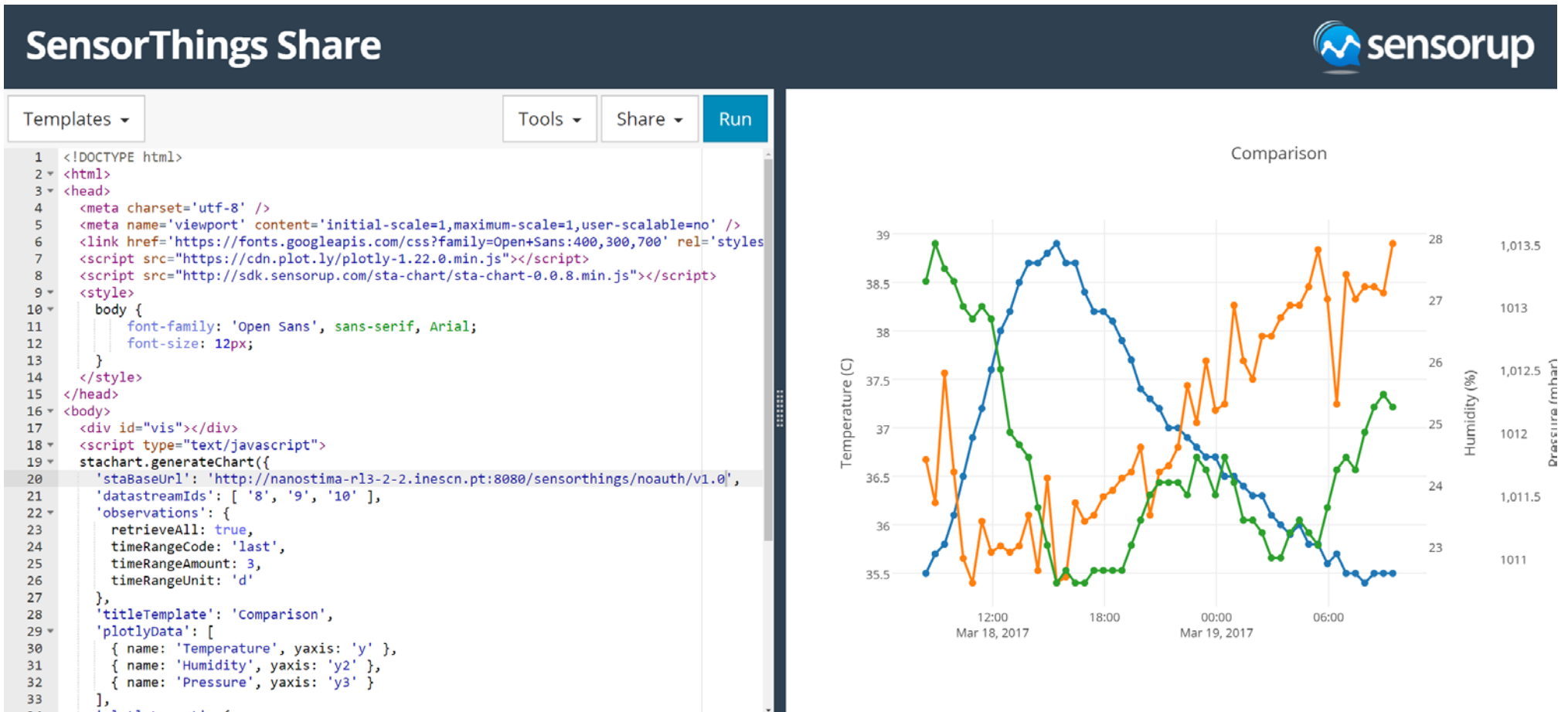
REGISTERED LOCATIONS

Map showing registered locations in a geographical area.



# Consumable by generic clients

Example in picture: data streams at INESC TEC consumed by online client from SensorUp (Canada)



# Conclusions & future work

- The *database paradigm* for storing research data is complementary to other paradigms:
  - exporting a **selection of observations**
  - to **file-based datasets**
  - for
    - Dataset exchange
    - Publishing
- Issues:
  - Citing *open* (evolving) data sets
  - More added-value services (e.g. visualization, exploration)

# SeaBioData Live Demo