

Data Management in Oceanography at SOCIB

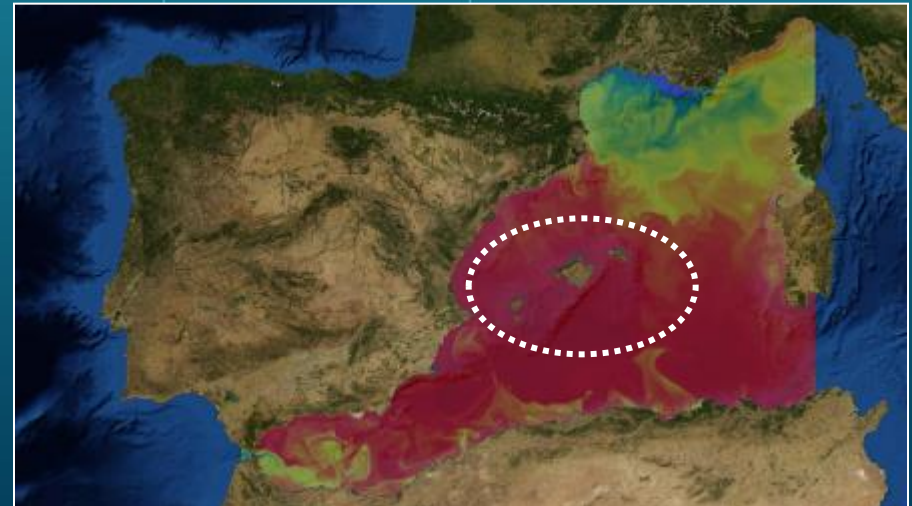
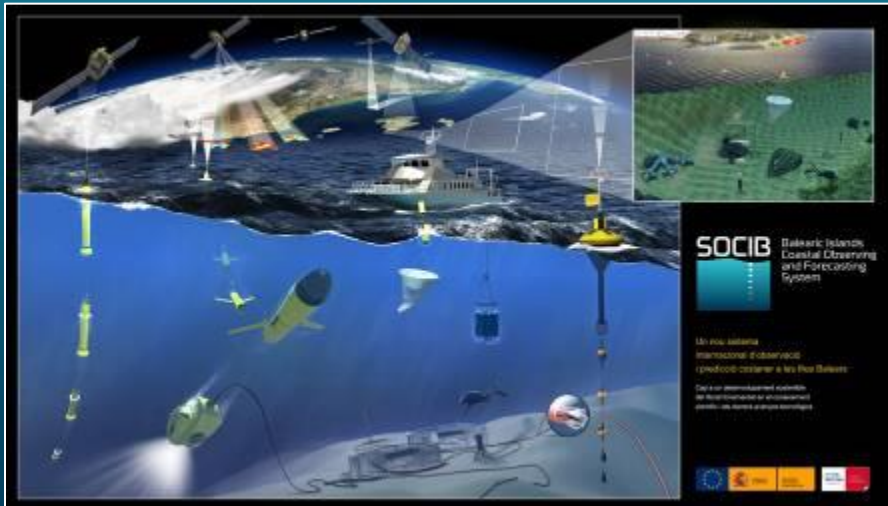
EGU 2014
Vienna, Austria



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- Marine Research **Infrastructure** located in Balearic Islands (NW Mediterranean)
- **Nearshore** to **open sea**
- Components:
 - Distributed multiplatform **observing** system
 - Numerical **forecasting** system
 - **Data Management** and visualization system
- Provide **free, open and quality controlled** data for science, technology development and response to societal needs



OBSERVING FACILITIES



Research vessel



HF Radar



Glider



Drifting buoys

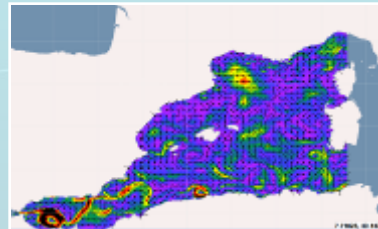


Fixed stations



Beach Monitoring

MODELLING FACILITY



Hydrodynamics (ROMS)



Waves (SWAN)

STRATEGIC ISSUES & APPLICATIONS FOR SOCIETY



Integrated Coastal Management



Marine Spatial Planning

DATA SOURCES

glider ROMS drifter station AUV buoy video camera tide vessel parameter gauge weather current meter ADCP research surface model AIS satellite radar CTD

PARAMETERS

traffic density depth plastics fluorescence oxygen water wind altimetry coastal currents noise maritime waves salinity conductivity temperature chlorophyll coast velocity erosion pollution rainfall pressure

DATA TYPES

time profile vector grid raster polygon mesh image trajectory line point series

DATA FORMATS

csv shapefile GPX netCDF sbd hdf XML tsv KML JSON

DATA CENTER FACILITY

- Manage all multi-platform SOCIB Data
- Allow users to discover, gather, visualize and download
- Immersed in the international framework

OPEN DATA PRINCIPLES

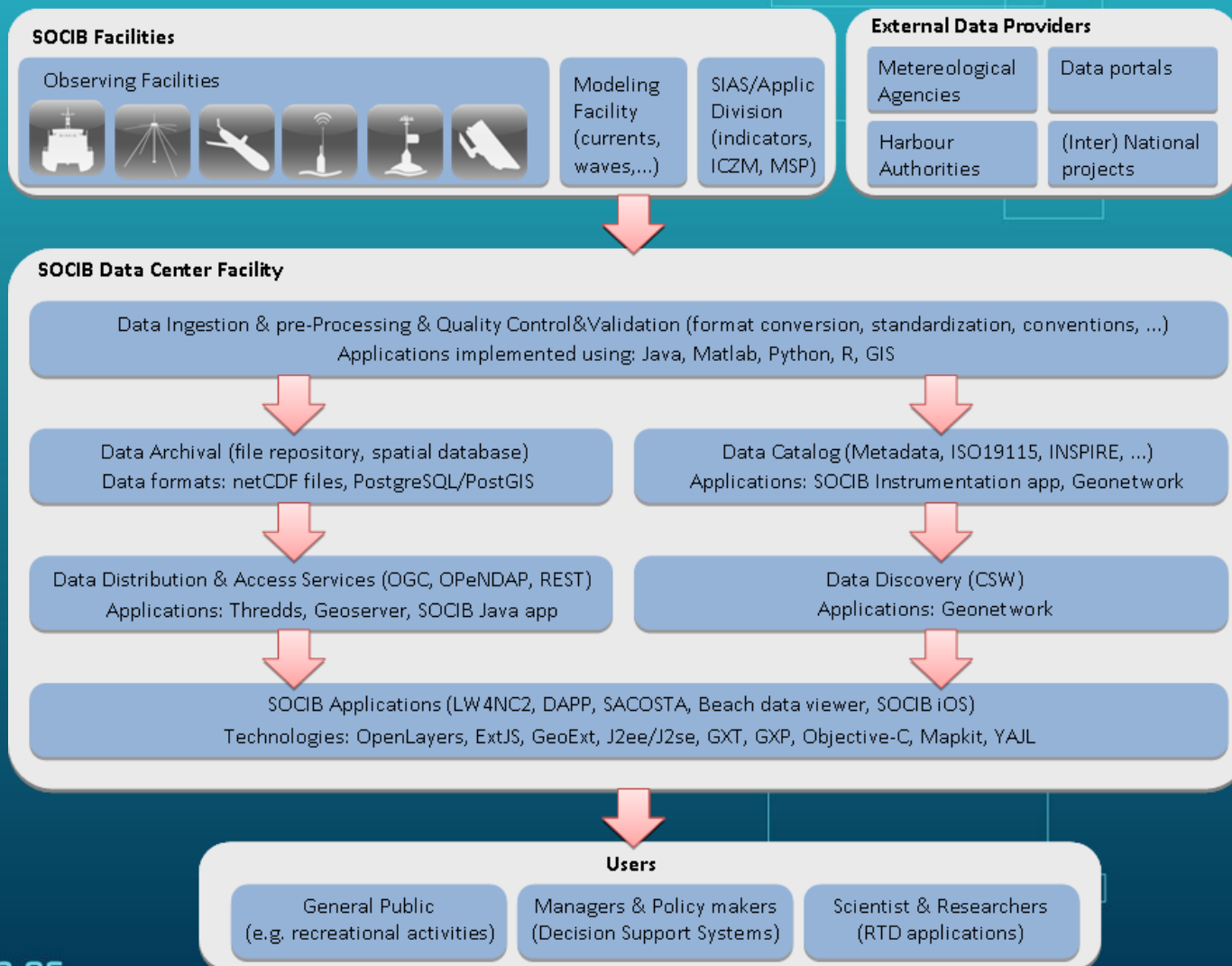
- Discoverable and accessible
- Freely available
- Interoperable, standardized and quality controlled

CHALLENGE

- Implement an integrated data management system



LIFE CYCLE OF DATA



DATA PROCESSING

DATA PROCESSING STAGES

1. Input data **ingestion**
2. Data **calibration**
3. Parameter **derivation**
4. **Merging** (existent & new)
5. **Quality Control**
6. **Product** generation



INSTRUMENTATION MANAGEMENT DB

- Manages the state of all the instrumentation
- PostgreSQL
- Managed by web-based application

SOCIB Web based Real-Time Data Monitor

Custom software implementations
developed with



Java



Matlab



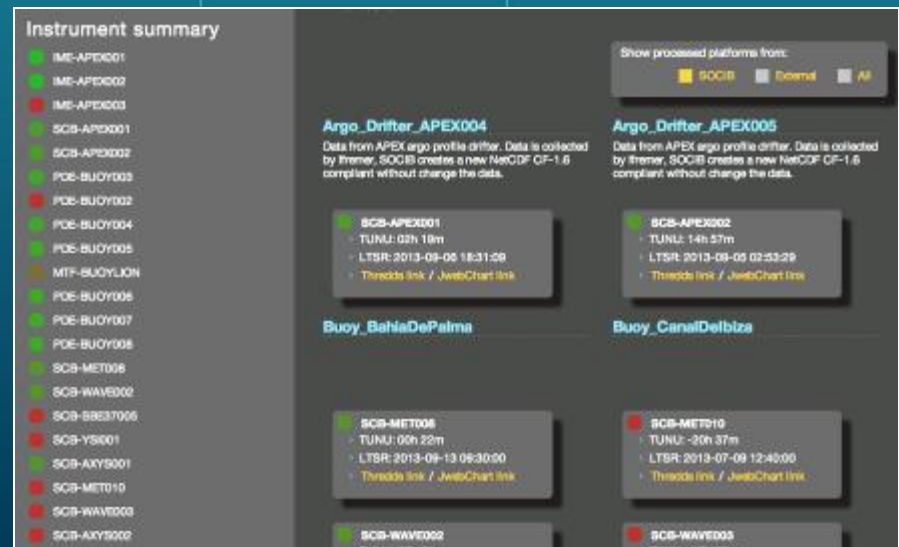
Python



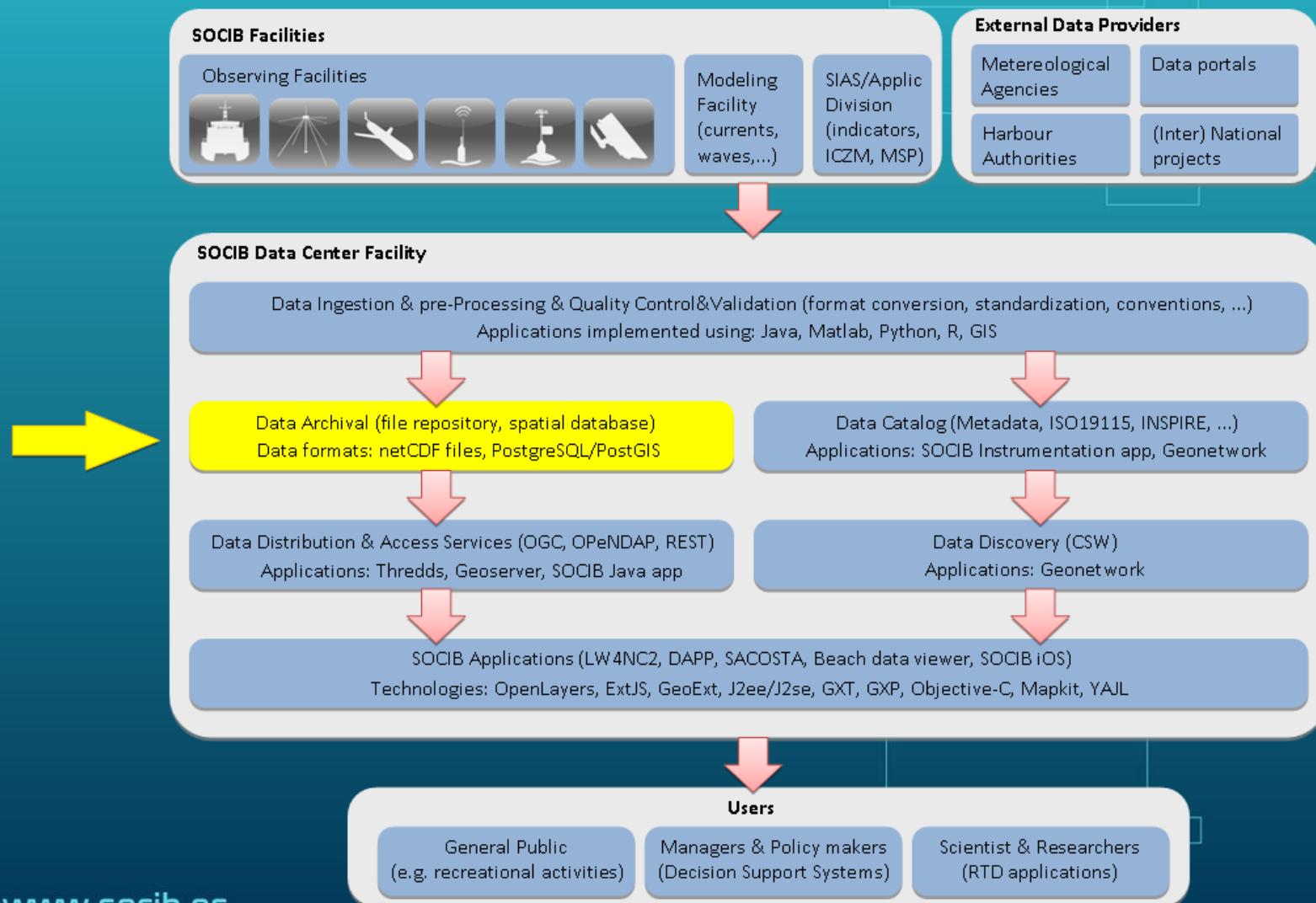
R



GIS



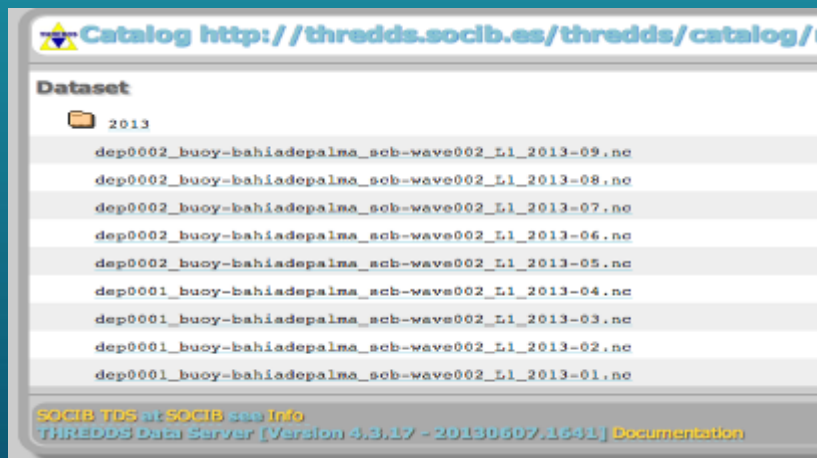
LIFE CYCLE OF DATA



DATA ARCHIVAL

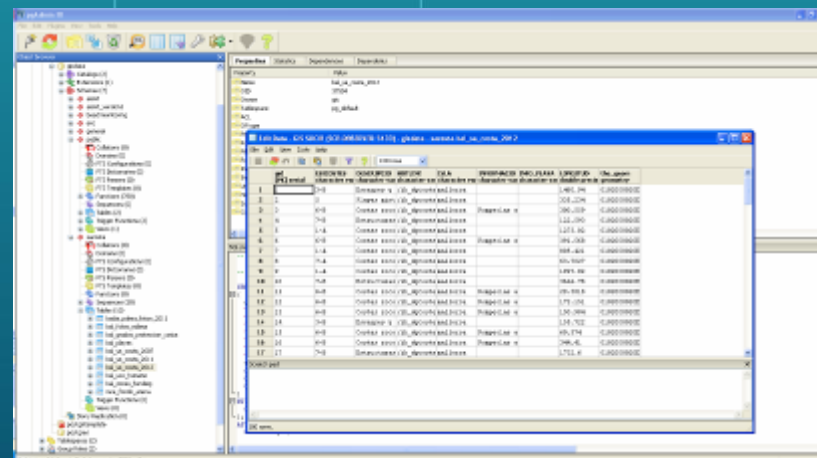
netCDF REPOSITORY

- CF conventions
- GRID / RASTER / MESH / TIME SERIES

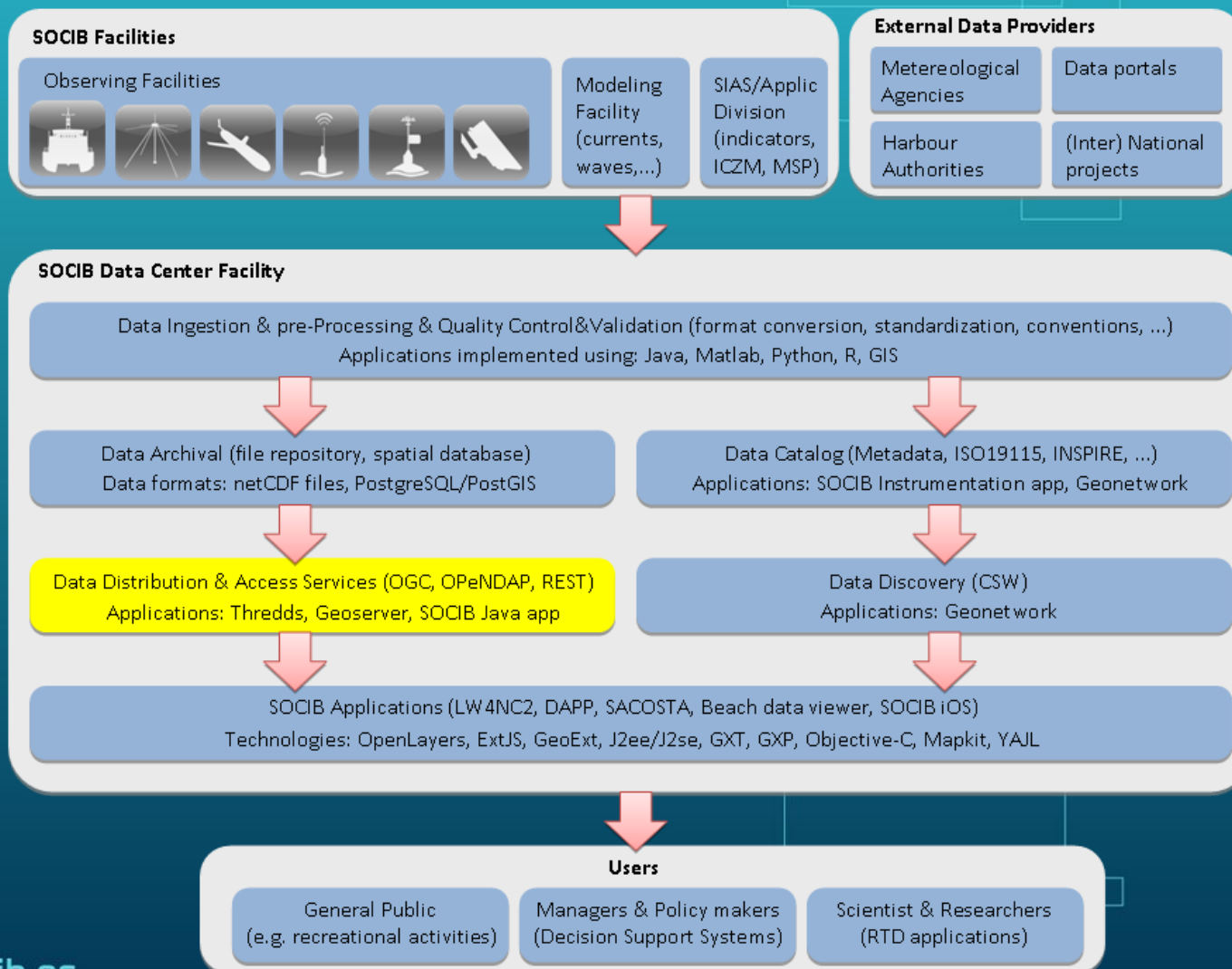


SPATIAL DATABASE

- POINT / LINE / POLYGON



LIFE CYCLE OF DATA



THREDDs

- 



- 
- GeoServer

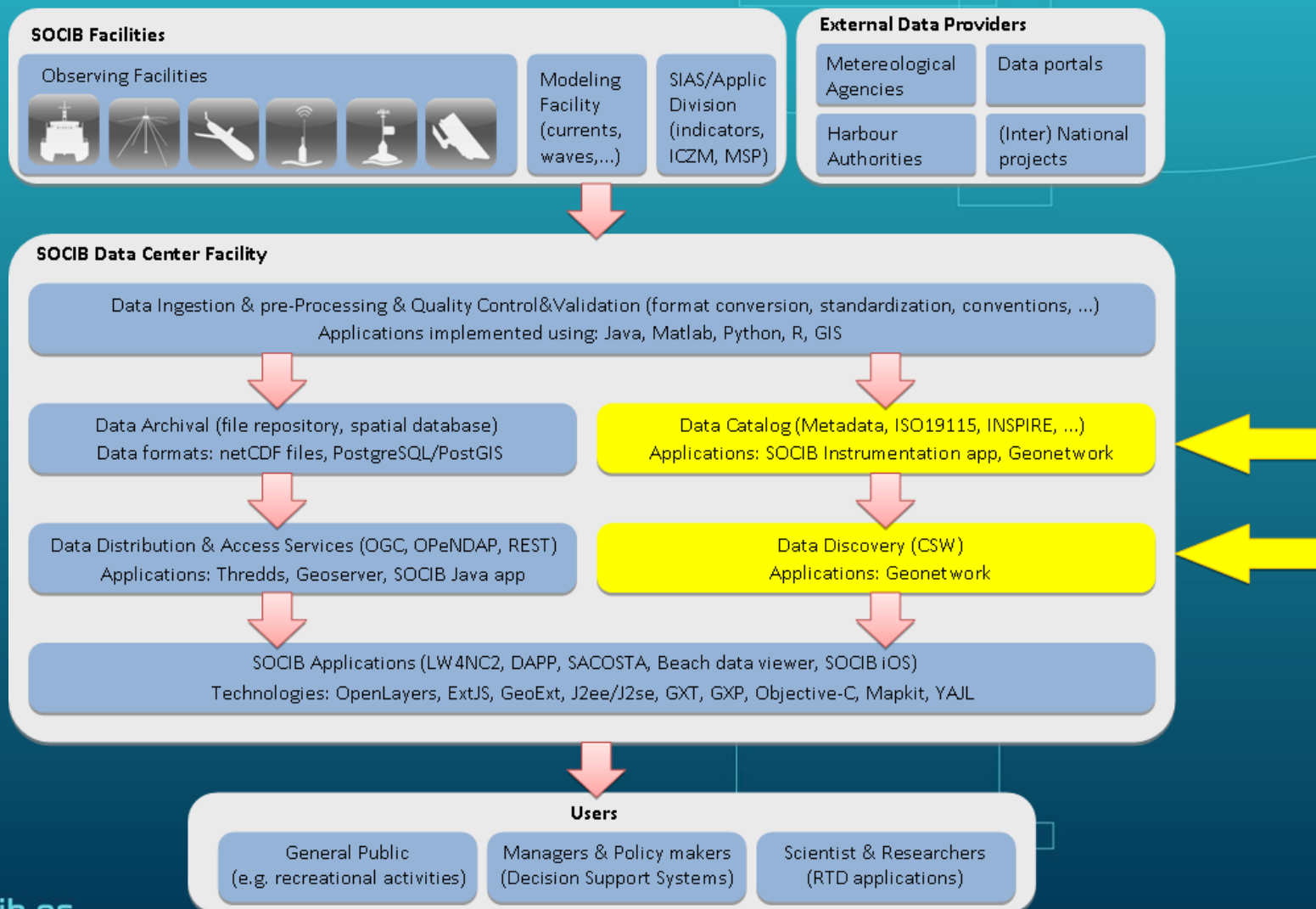


<http://gis.socib.es/geoserver>

- API RESTful
- JSON/GeoJSON



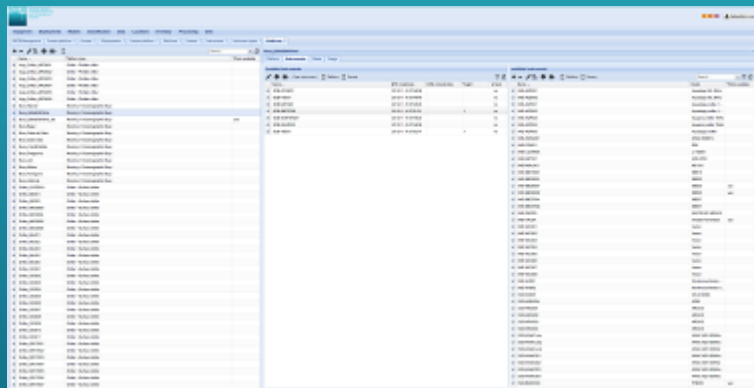
LIFE CYCLE OF DATA



DATA CATALOG AND DATA DISCOVERY

SOCIB INSTRUMENTATION APP

- Observation platforms, CF conventions



GEONETWORK

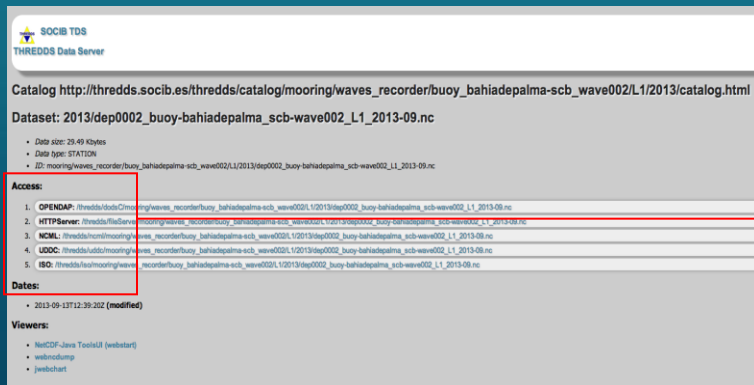
- ISO19115, CSW



<http://gis.socib.es/geonetwork>

THREDDS

- ncISO

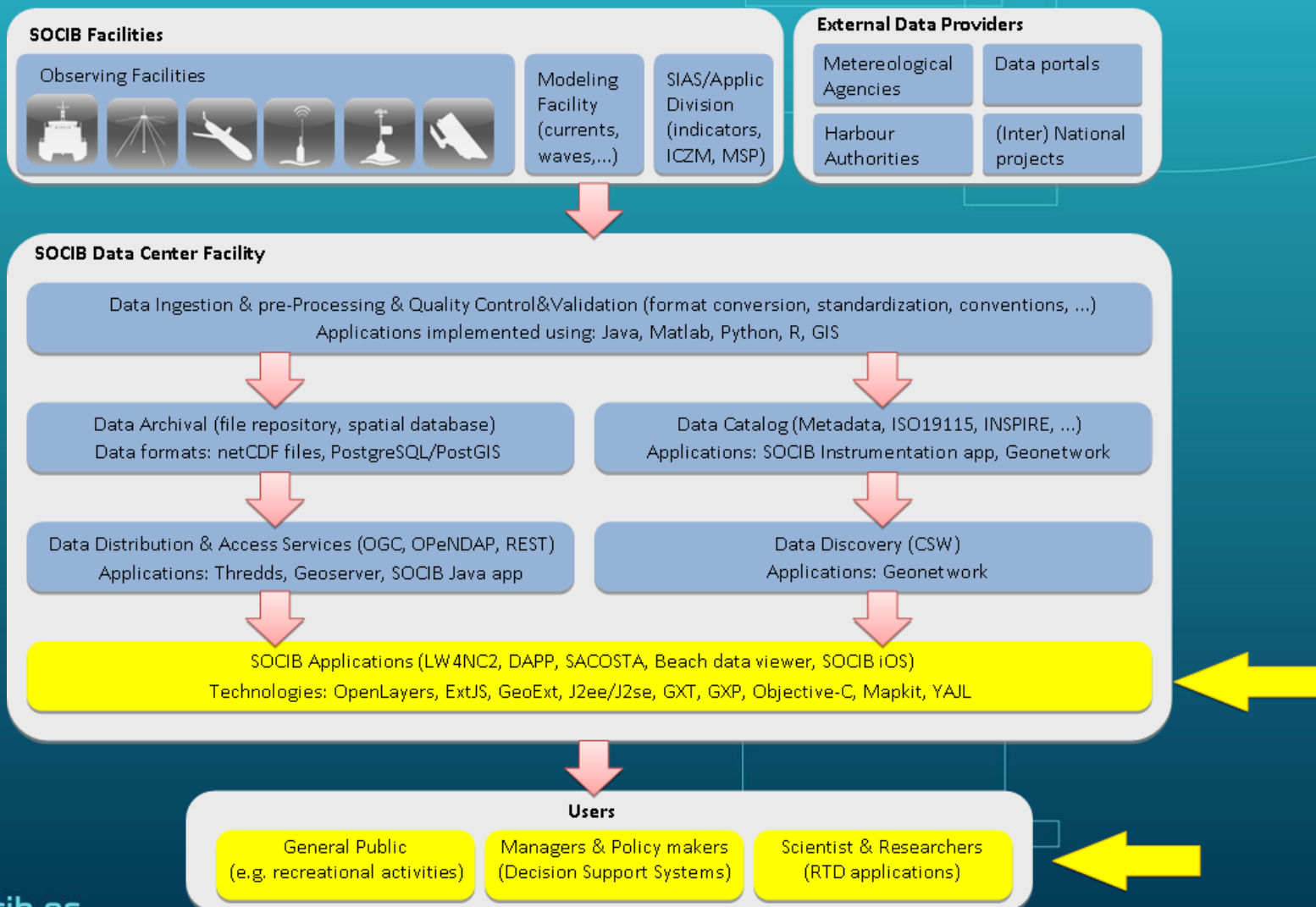


Access:

1. **OPENDAP:** /thredds/dodsC/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002/L1/2013-09.nc
2. **HTTPServer:** /thredds/fileServer/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002/L1/2013-09.nc
3. **NCML:** /thredds/ncml/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002/L1/2013-09.nc
4. **UDDC:** /thredds/uddc/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002/L1/2013-09.nc
5. **ISO:** /thredds/iso/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002/L1/2013-09.nc

Dates:

LIFE CYCLE OF DATA



APPLICATIONS AND USERS

WEB DEVELOPMENT



MAPPING LIBRARIES



OpenLayers

GeoExt

Google Maps

MULTIPLE DEVICES



Desktop / Web



Mobile

USERS



Researchers
and
Technicians



Policy and
decision makers

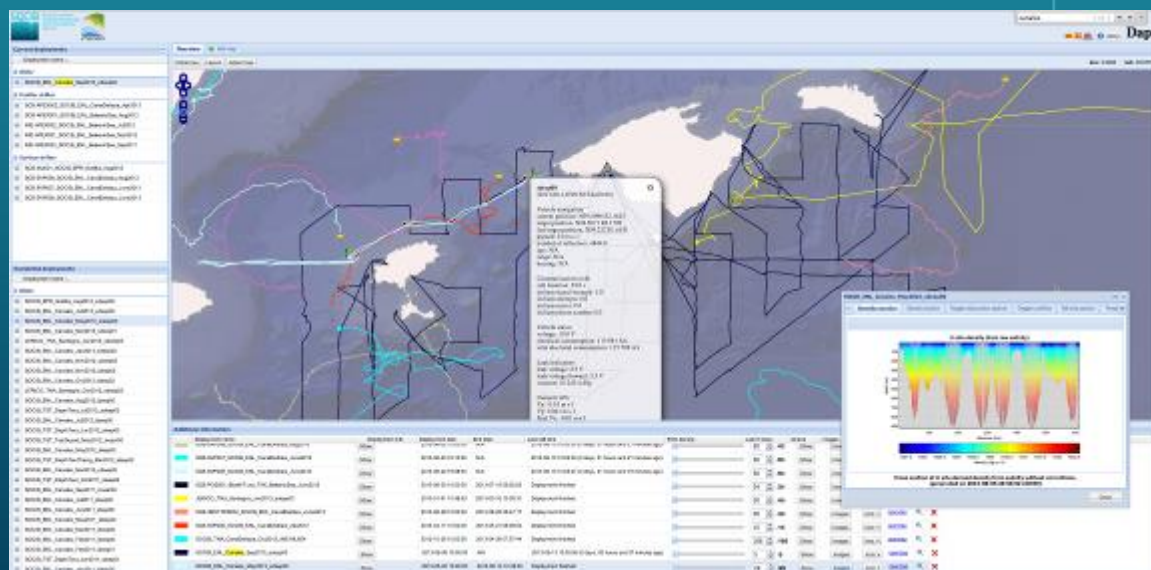


General society

Deployments application (DAPP)

<http://apps.socib.es/dapp/>

Web application to display information related to trajectories from mobile platforms (e.g., gliders, drifter buoys, ARGO profilers, research vessel)



TECHNOLOGIES



USERS

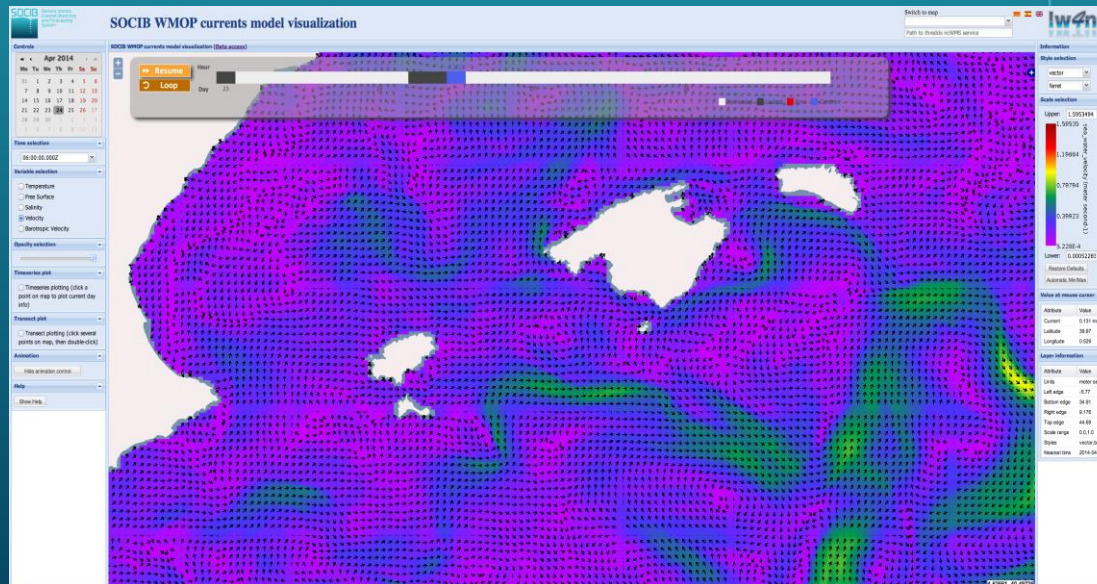
- Scientists & Researchers
- Technicians
- Search and Rescue (SAR)

200 visits/month

Lightweight viewer for netCDF (LW4NC2)

<http://thredds.socib.es/lw4nc2>

Web application for multidimensional (grid) data from netCDF files, usually from numerical models or HF radar.



TECHNOLOGIES



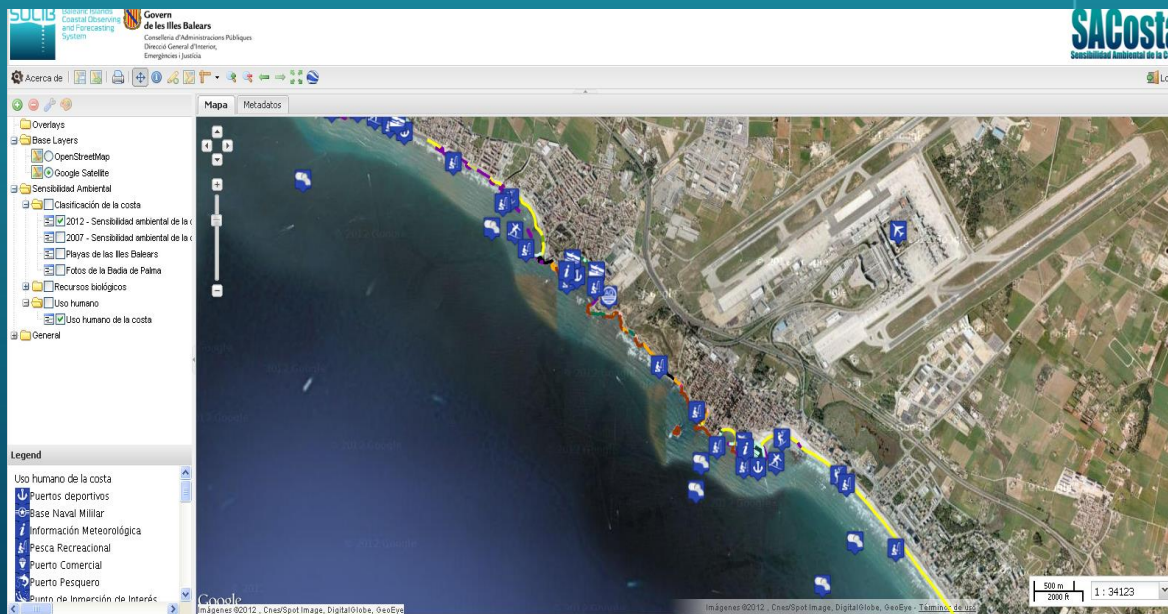
USERS

- Researchers
- Technicians

SACOSTA

<http://gis.socib.es/sacosta>

Web-based map viewer for cartographic data such as environmental sensitivity of the coastline



TECHNOLOGIES



USERS

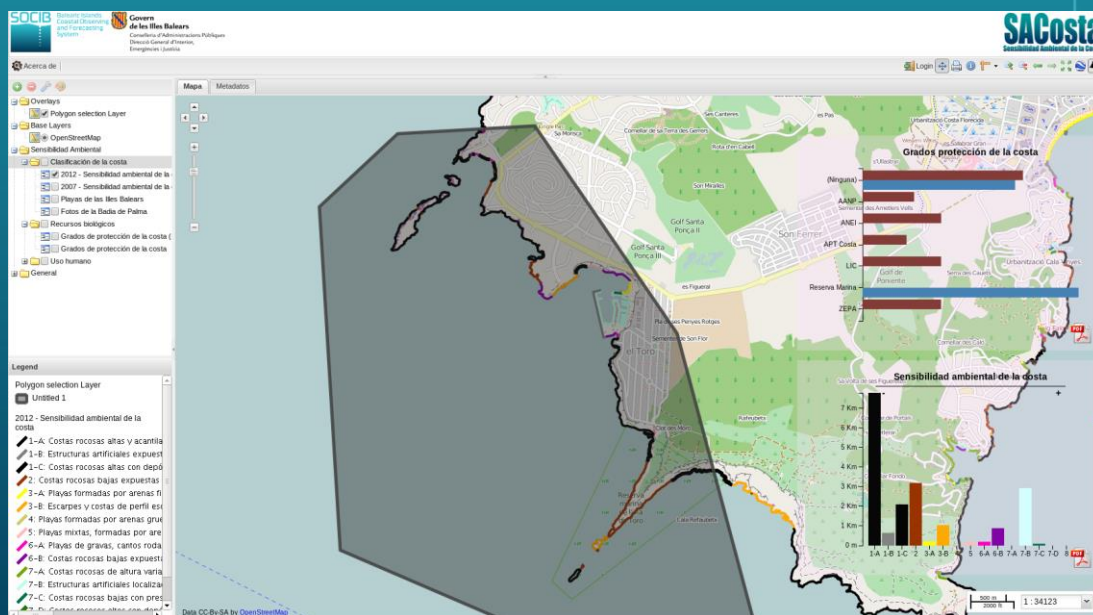
- Search and Rescue (SAR)
- Policy makers

100 visits/month

SACOSTA

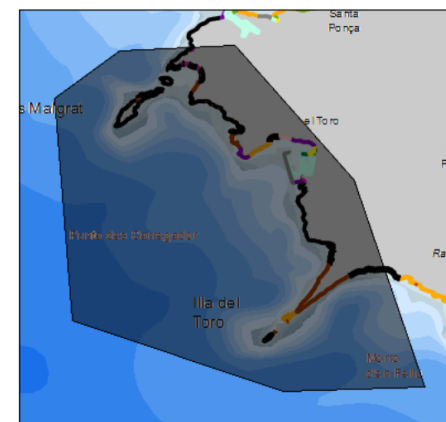
<http://gis.socib.es/sacosta>

Added new geospatial functions and automated reporting



Sa Costa

Sensibilidad ambiental por tipo de costa



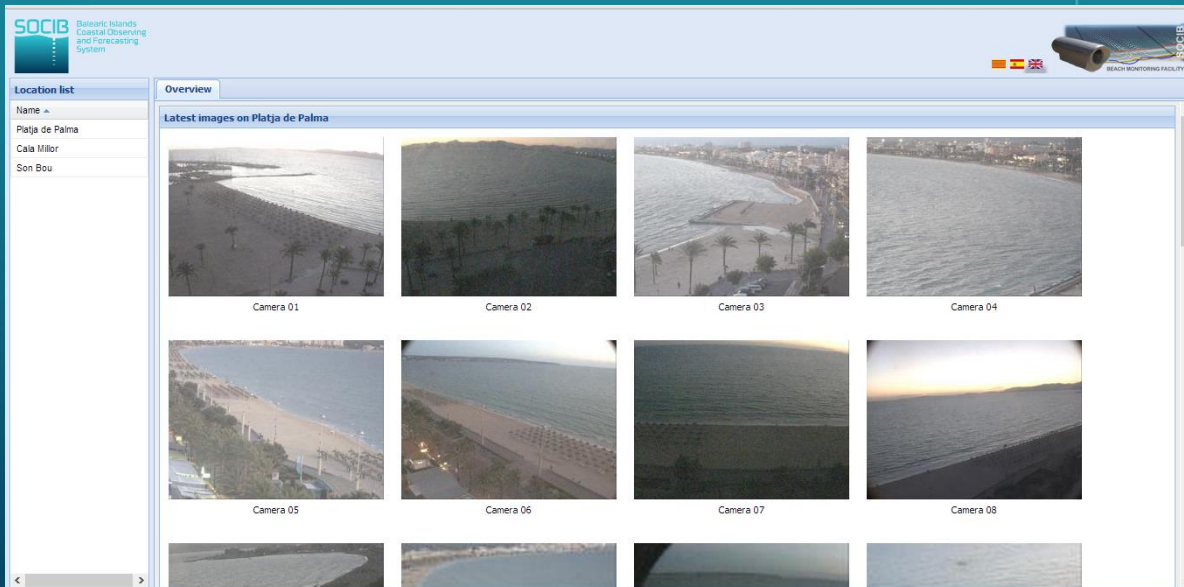
Análisis del tipo de la costa

Código	Descripción tipo de costa	Longitud
1-A	Costas rocosas altas y acantilados expuestos a la incidencia directa del oleaje	7.79 km
1-B	Estructuras artificiales expuestas a la incidencia directa del oleaje	0.65 km
1-C	Costas rocosas altas con depósitos de derrubios y acumulación de bloques en la base expuestas a la incidencia directa del oleaje	2.10 km
2	Costas rocosas bajas expuestas a la incidencia directa del oleaje	3.19 km

BEAMON

<http://apps.socib.es/beamon>

Web tool to display real time data of beach images acquired by the beach monitoring facility.



TECHNOLOGIES



USERS

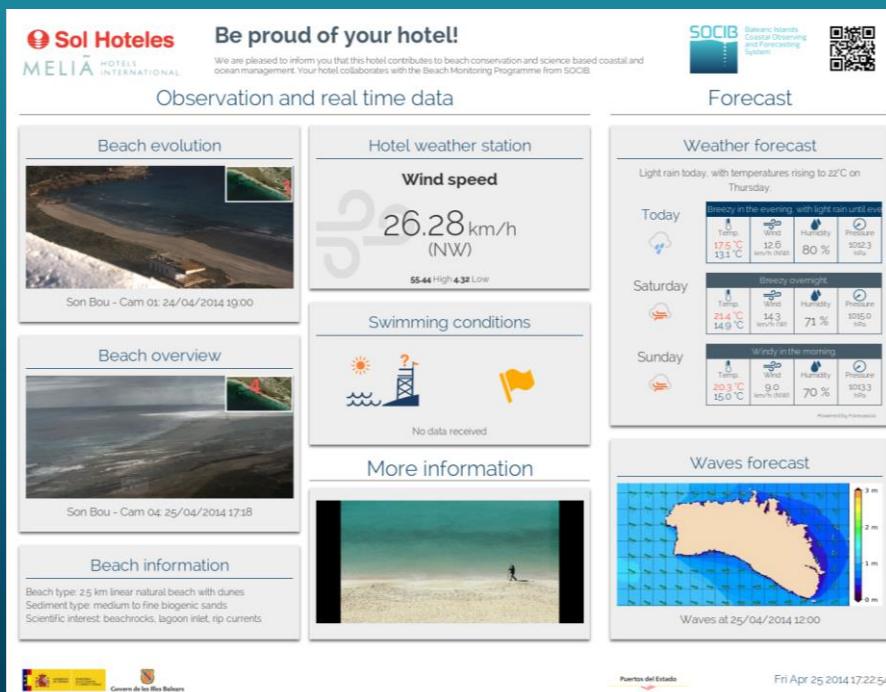
- Researchers
- Surfers, anglers
- General public

100 visits/month

SEABOARD

<http://seaboard.socib.es>

Web tool to disseminate SOCIB real time data to entities that collaborate with the SOCIB Beach Monitoring Facility



TECHNOLOGIES



USERS

- Hotel guest
- Beach users

FOLLOW THE GLIDER

<http://followtheglider.com/>

Educational web tool aimed to present the autonomous underwater gliders and gain awareness of their importance for coastal research.



TECHNOLOGIES



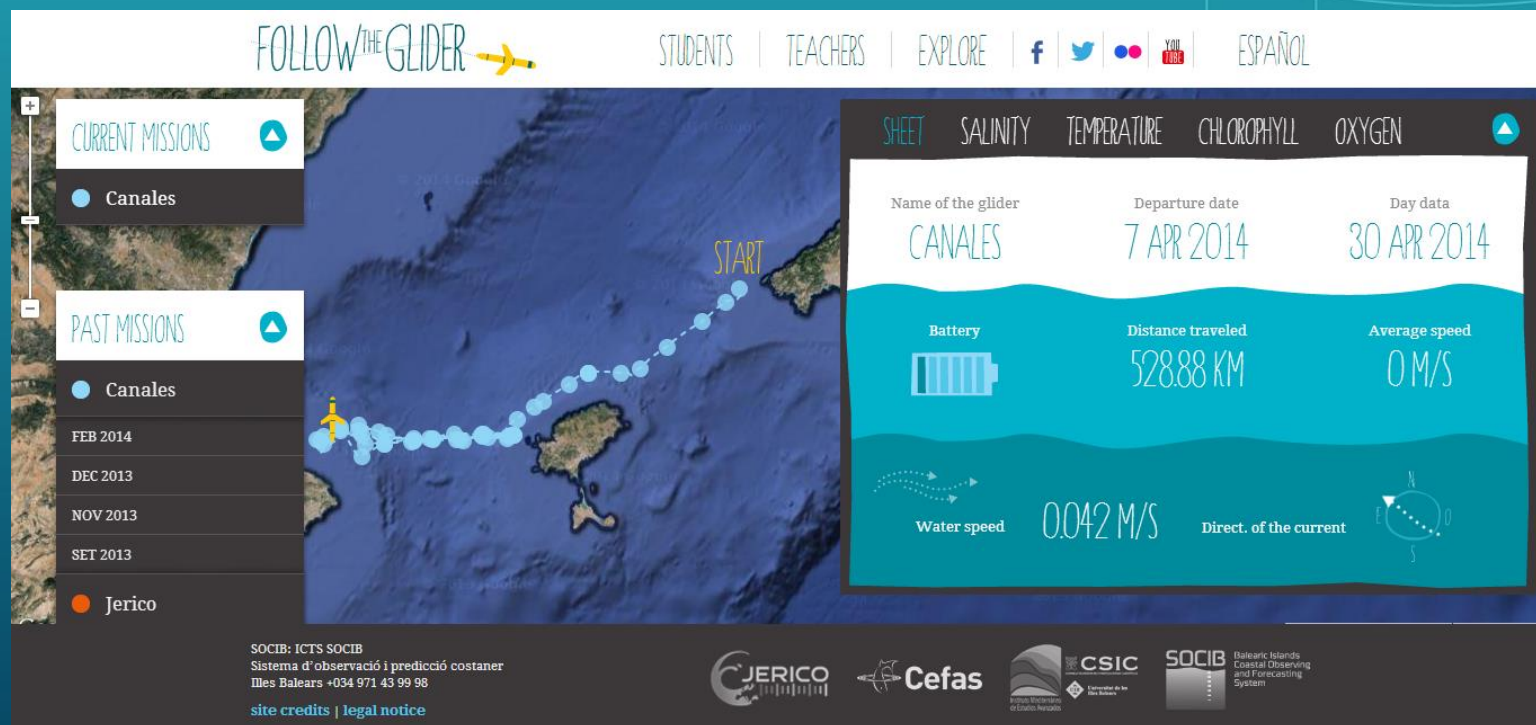
USERS

- Students
- Teachers
- General public

250 visits/month

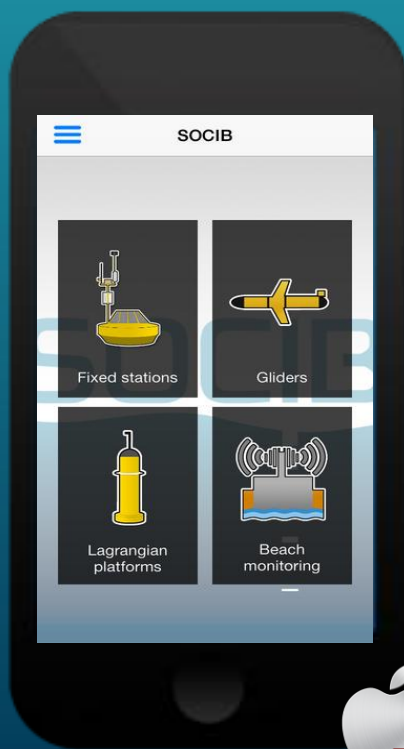
FOLLOW THE GLIDER

<http://followtheglider.com/>



SOCIB MOBILE

Apps for real-time data from fixed stations (oceanographic buoys, sea level stations and coastal weather stations, etc.) and glider trajectories



900 downloads



300 downloads

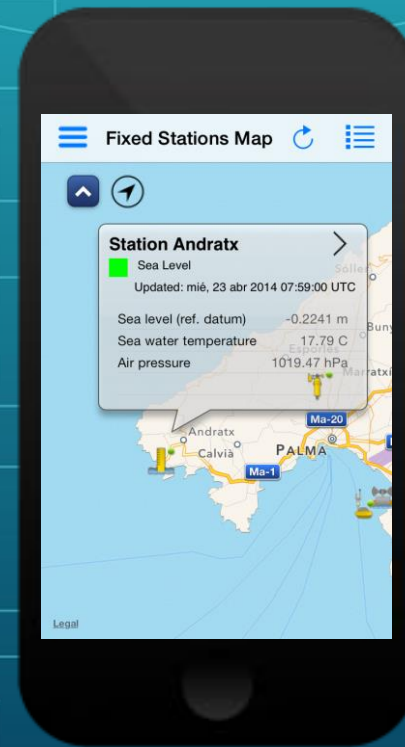
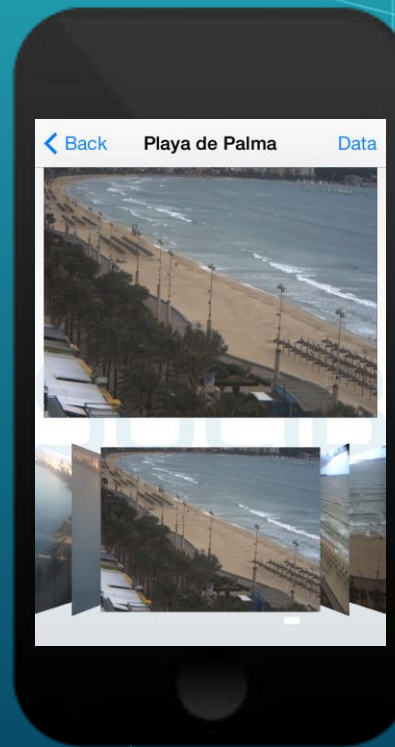
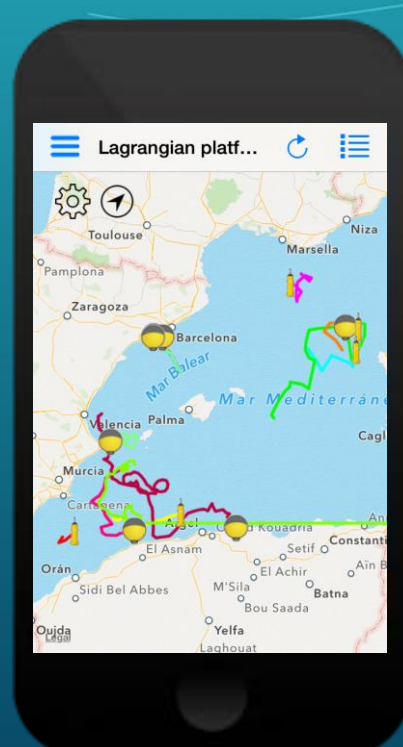
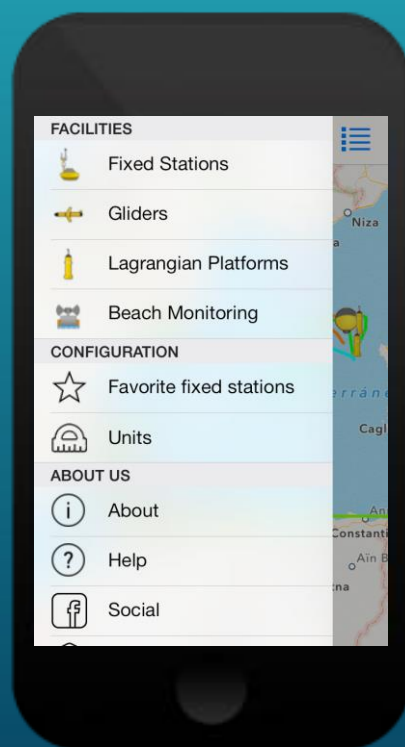
TECHNOLOGIES



USERS

- General public
- Researchers
- Technicians

SOCIB MOBILE



SOCIB WEBSITE

<http://www.socib.es/>

Corporate website to provide an overview of the different Facilities.



TECHNOLOGIES



USERS

- General public
- Researchers

MANAGE BIG DATA



VS



OBSERVATIONAL DATA



MONITORING SERVICES



DATA DISCOVERY



GeoNetwork
OpenSource



NEW APPLICATIONS



- SOCIB Data Centre is an example of the **marine information systems** of new ocean observatories and/or marine research infrastructures
- **Open Data principles** in line with the INSPIRE Directive and other important European initiatives such as Emodnet or Copernicus
- **Response to societal needs** and provide support to the Integrated Maritime Policy and the Marine Strategy Framework Directive



THANK YOU! GRACIAS!

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