

Data Management and Applications at SOCIB

IMDIS 2013
Lucca, Italy

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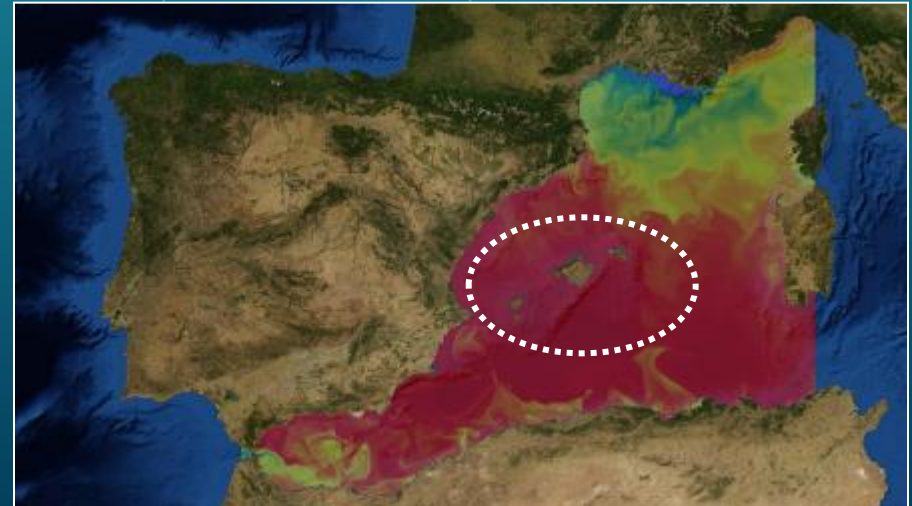
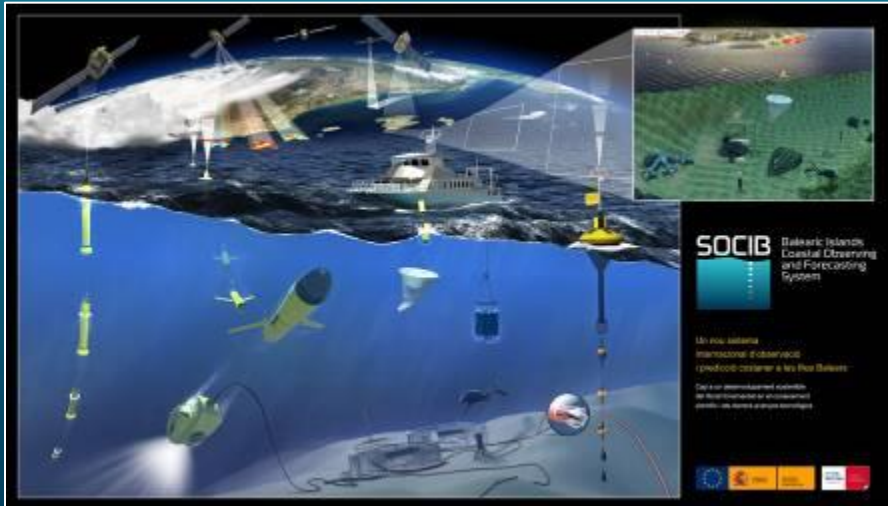
- **What is SOCIB?**
- **Data Management**
- **Applications**
- **Further works**



- **What is SOCIB?**
- **Data Management**
- **Applications**
- **Further works**



- Marine Research **Infrastructure** located in Balearic Islands
- **Integrated** system in implementation phase (2010-2014)
- **Nearshore** to **open sea** (NW Mediterranean)
- 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 society needs



OBSERVING FACILITIES



Research vessel



HF Radar



Glider



Drifting buoys

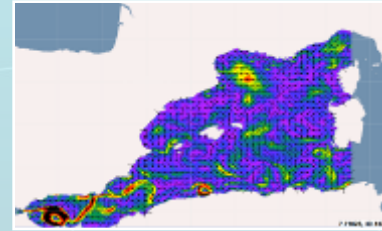


Fixed stations

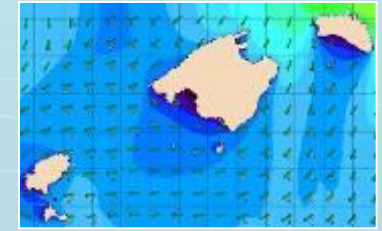


Beach Monitoring

MODELLING FACILITY



Currents (ROMS)



Waves (SWAN)

STRATEGIC ISSUES & APPLICATIONS FOR SOCIETY



Integrated Coastal Management

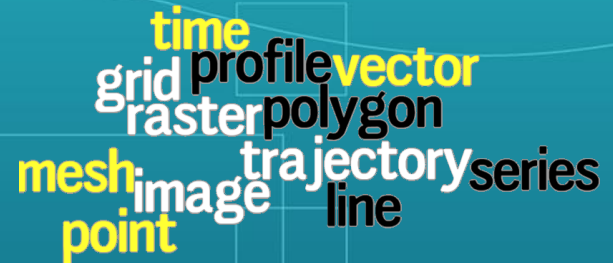


Marine Spatial Planning

DATA SOURCES



DATA TYPES



PARAMETERS



DATA FORMATS



- What is SOCIB?
- **Data Management**
- Applications
- Further works



DATA CENTER FACILITY

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

OPEN DATA PRINCIPLES

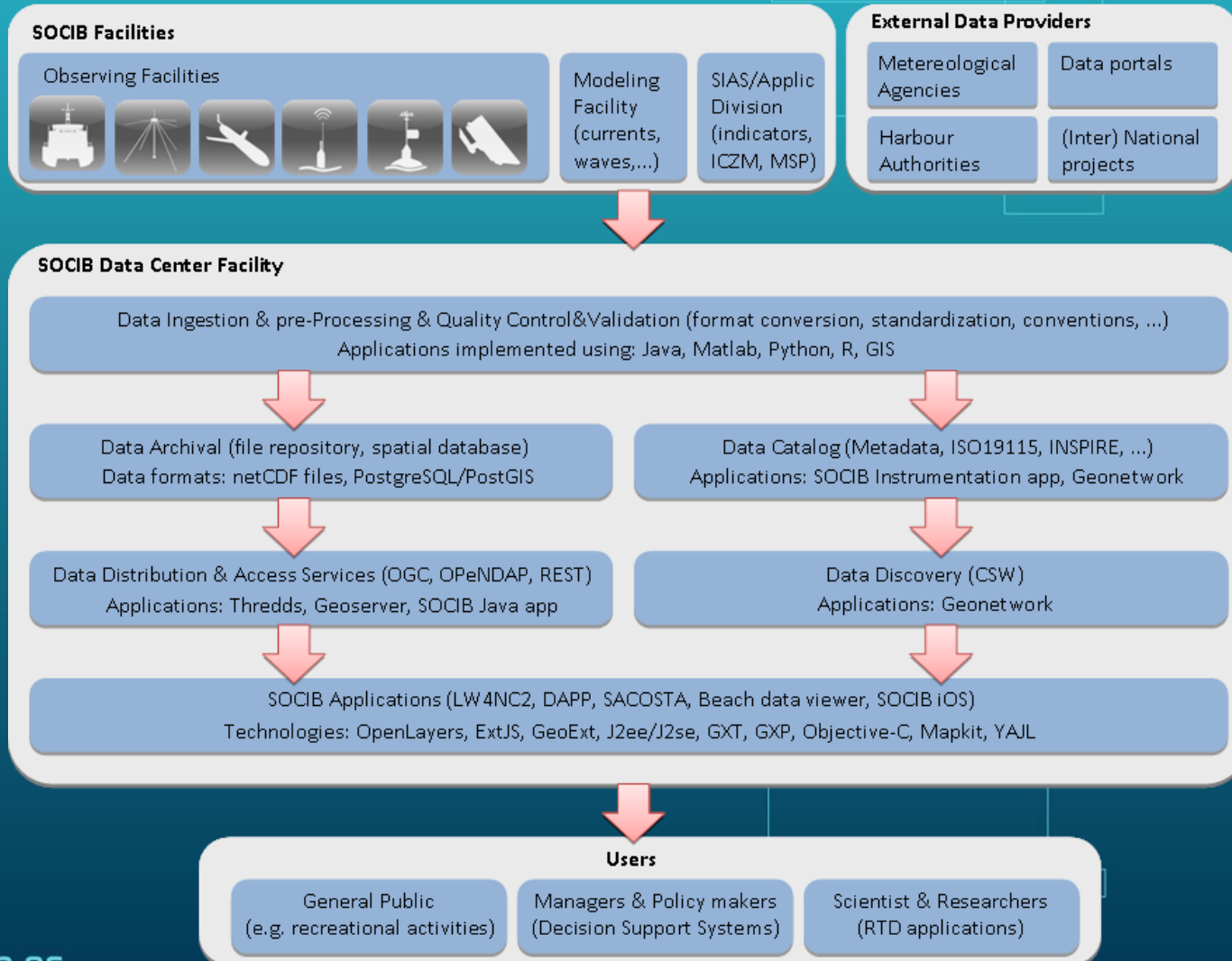
- Discoverable and accessible
- Freely available
- Interoperable, standardized and quality controlled

CHALLENGE

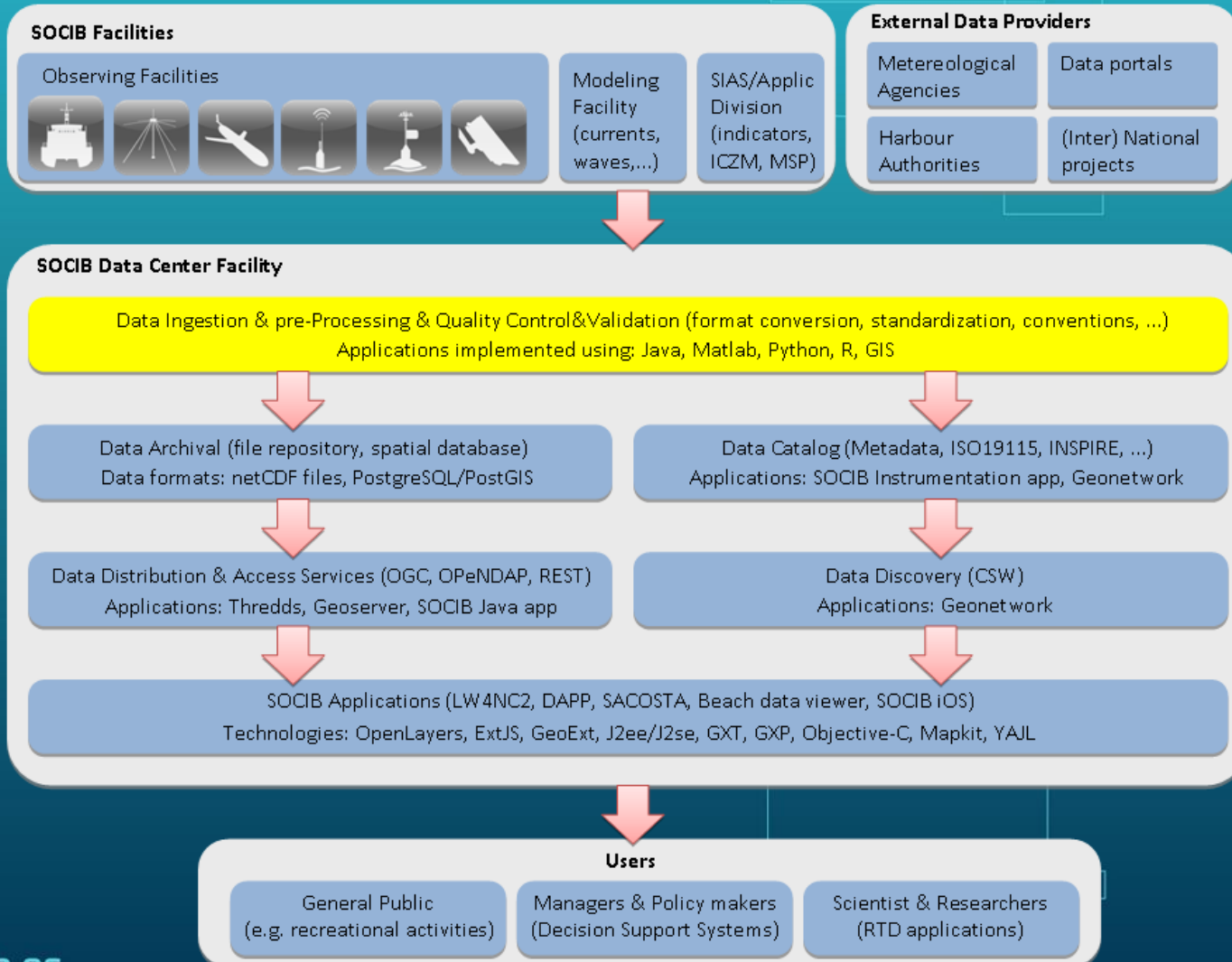
- Implement an integrated data management system



LIFE CYCLE OF DATA



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 (operational / sporadic running)



Java



Matlab



Python



R



GIS

Instrument summary

- IME-APEX001
- IME-APEX002
- IME-APEX003
- SCB-APEX001
- SCB-APEX002
- PDE-BUOY003
- PDE-BUOY002
- PDE-BUOY004
- PDE-BUOY005
- MTF-BUOYLION
- PDE-BUOY006
- PDE-BUOY007
- PDE-BUOY008
- SCB-MET006
- SCB-WAVE002
- SCB-SBE37006
- SCB-YS001
- SCB-AXY001
- SCB-MET010
- SCB-WAVE003
- SCB-AXY002

Show processed platforms from:

- SOCIB
- External
- All

Argo Drifter_APEX004
Data from APEX argo profile drifter. Data is collected by Itremer. SOCIB creates a new NetCDF CF-1.6 compliant without change the data.

- SCB-APEX001
- TUNU: 08h 18m
- LTSR: 2013-09-05 18:31:09
- Thresholds link / WebChart link

Argo Drifter_APEX005
Data from APEX argo profile drifter. Data is collected by Itremer. SOCIB creates a new NetCDF CF-1.6 compliant without change the data.

- SCB-APEX002
- TUNU: 14h 57m
- LTSR: 2013-09-05 02:53:29
- Thresholds link / WebChart link

Buoy_BahiaDePalma

- SCB-MET006
- TUNU: 06h 22m
- LTSR: 2013-09-13 06:30:50
- Thresholds link / WebChart link

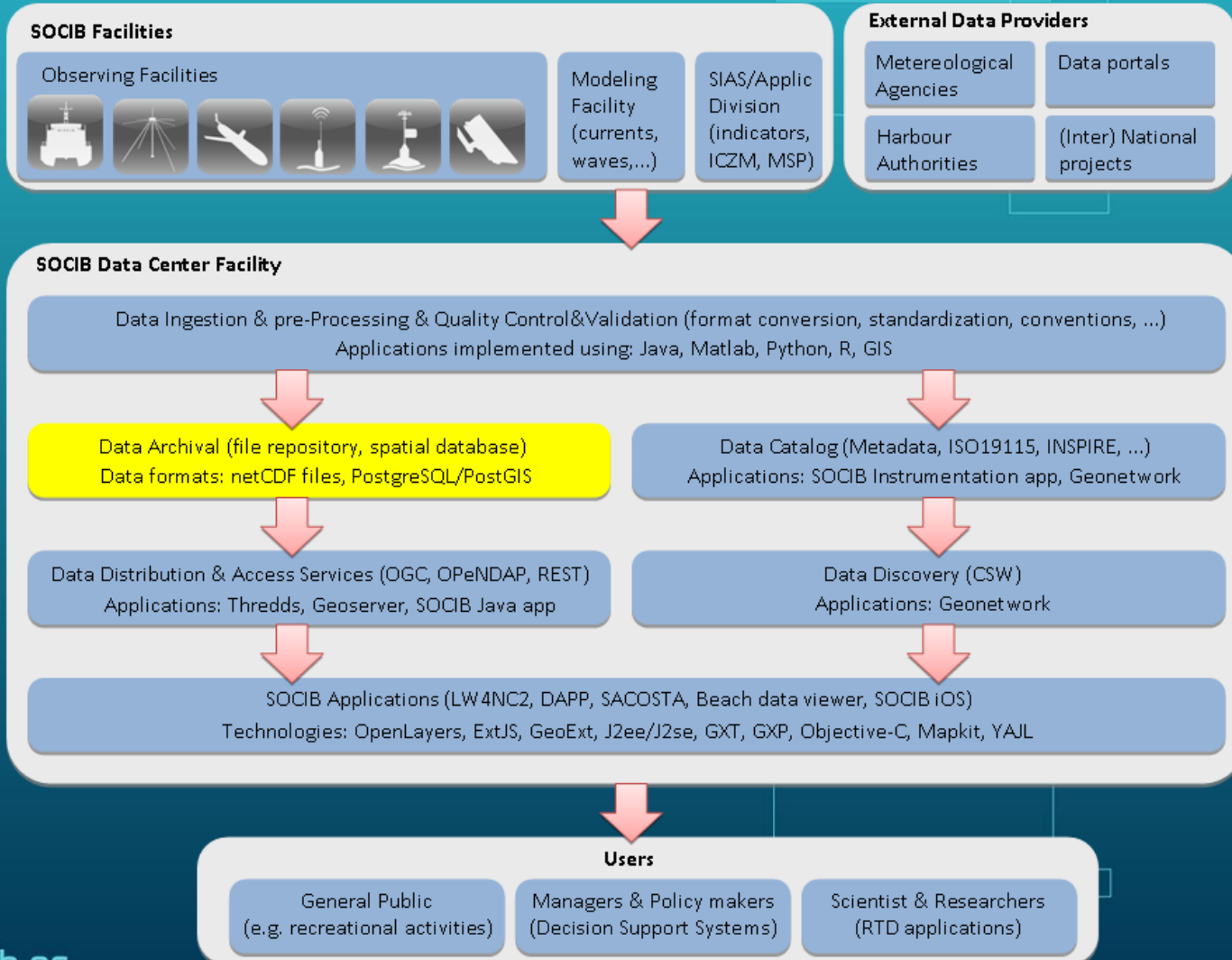
Buoy_CanalDelblza

- SCB-MET010
- TUNU: -20h 37m
- LTSR: 2013-07-09 12:40:00
- Thresholds link / WebChart link

SCB-WAVE002
TUNU: 06h 32m

SCB-WAVE003
TUNU: -20h 37m

LIFE CYCLE OF DATA



DATA ARCHIVAL

netCDF REPOSITORY

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



SPATIAL DATABASE

- POINT / LINE / POLYGON



Catalog <http://thredds.socib.es/thredds/catalog/>

Dataset

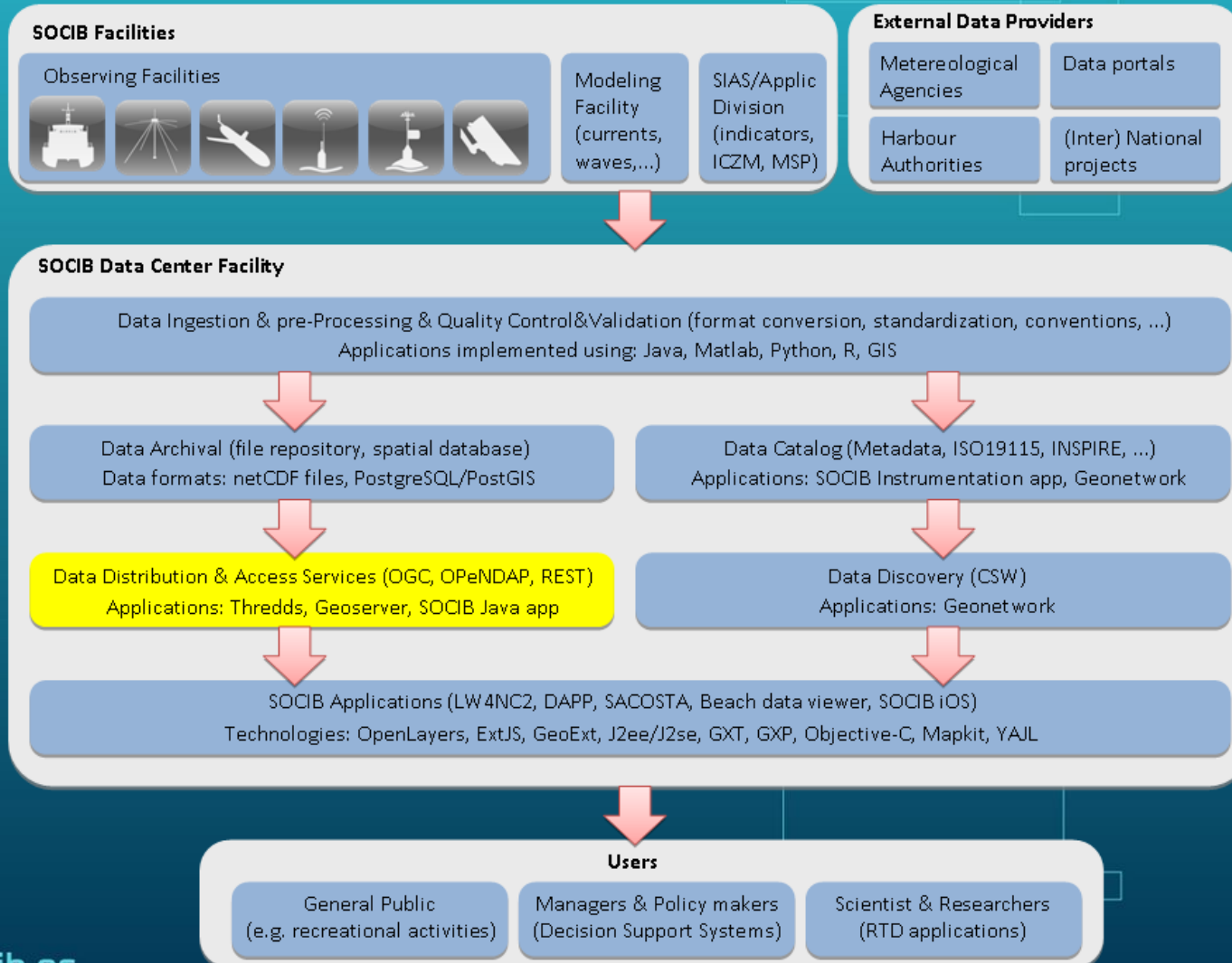
2013

- dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-09.nc
- dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-08.nc
- dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-07.nc
- dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-06.nc
- dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-05.nc
- dep0001_buoy-bahiadepalma_scb-wave002_L1_2013-04.nc
- dep0001_buoy-bahiadepalma_scb-wave002_L1_2013-03.nc
- dep0001_buoy-bahiadepalma_scb-wave002_L1_2013-02.nc
- dep0001_buoy-bahiadepalma_scb-wave002_L1_2013-01.nc

SOCIB TDS at SOCIB see Info
THREDDS Data Server [Version 4.3.17 - 20130507.1631] Documentation

ID	NAME	GEOMETRY	SRID
1	4326
2	4326
3	4326
4	4326
5	4326
6	4326
7	4326
8	4326
9	4326
10	4326
11	4326
12	4326
13	4326
14	4326
15	4326
16	4326
17	4326

LIFE CYCLE OF DATA



DATA DISTRIBUTION AND ACCESS

THREDDS

- OGC (WMS), OpenDAP, jWebChart



SOCIB TDS
THREDDS Data Server

Catalog http://thredds.socib.es/thredds/catalog/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002L1/2013/catalog.html

Dataset: 2013/dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-09.nc

- Data size: 28.49 Kbytes
- Data type: STATION
- ID: mooring/waves_recorder/buoy_bahiadepalma_scb_wave002_L1_2013-09.nc

Access:

1. **OPENDAP:** thredds.tds/OpenDAP/waves_recorder/buoy_bahiadepalma-scb_wave002_L1/2013/dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-09.nc
2. **HTTPServer:** thredds.tds/Server/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002_L1/2013/dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-09.nc
3. **OGC:** thredds.tds/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002_L1/2013/dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-09.nc
4. **OGC:** thredds.tds/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002_L1/2013/dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-09.nc
5. **OGC:** thredds.tds/mooring/waves_recorder/buoy_bahiadepalma-scb_wave002_L1/2013/dep0002_buoy-bahiadepalma_scb-wave002_L1_2013-09.nc

Dates:

- 2013-09-13T12:39:20Z (modified)

Viewers:

- NetCDF Java Toolkit (webstar)
- webduffy
- jwebchart

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

GEOSERVER

- OGC (WMS, WFS, KML)



GeoServer

Capitols

Id	Nome	Formato de Imagem	Alcance	Formato de Saída	WMS/OGC?	OGC/OGC?
1	WMS	image/png	global	image/png	✓	✓
2	WFS	application/xml	global	application/xml	✓	✓
3	KML	application/vnd.google-earth.kml+xml	global	application/vnd.google-earth.kml+xml	✓	✓
4	WFS	application/xml	global	application/xml	✓	✓
5	WFS	application/xml	global	application/xml	✓	✓
6	WFS	application/xml	global	application/xml	✓	✓
7	WFS	application/xml	global	application/xml	✓	✓
8	WFS	application/xml	global	application/xml	✓	✓
9	WFS	application/xml	global	application/xml	✓	✓
10	WFS	application/xml	global	application/xml	✓	✓
11	WFS	application/xml	global	application/xml	✓	✓
12	WFS	application/xml	global	application/xml	✓	✓
13	WFS	application/xml	global	application/xml	✓	✓
14	WFS	application/xml	global	application/xml	✓	✓
15	WFS	application/xml	global	application/xml	✓	✓
16	WFS	application/xml	global	application/xml	✓	✓
17	WFS	application/xml	global	application/xml	✓	✓
18	WFS	application/xml	global	application/xml	✓	✓
19	WFS	application/xml	global	application/xml	✓	✓
20	WFS	application/xml	global	application/xml	✓	✓

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

DATA DISCOVERY

- API RESTful
- JSON/GeoJSON

SOCIB Data Discovery Service (SDDS)

The SDDS is a layer of ICTU web services intended to provide information and data of SOCIB platform. This layer is located at the following URL:

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

List of services

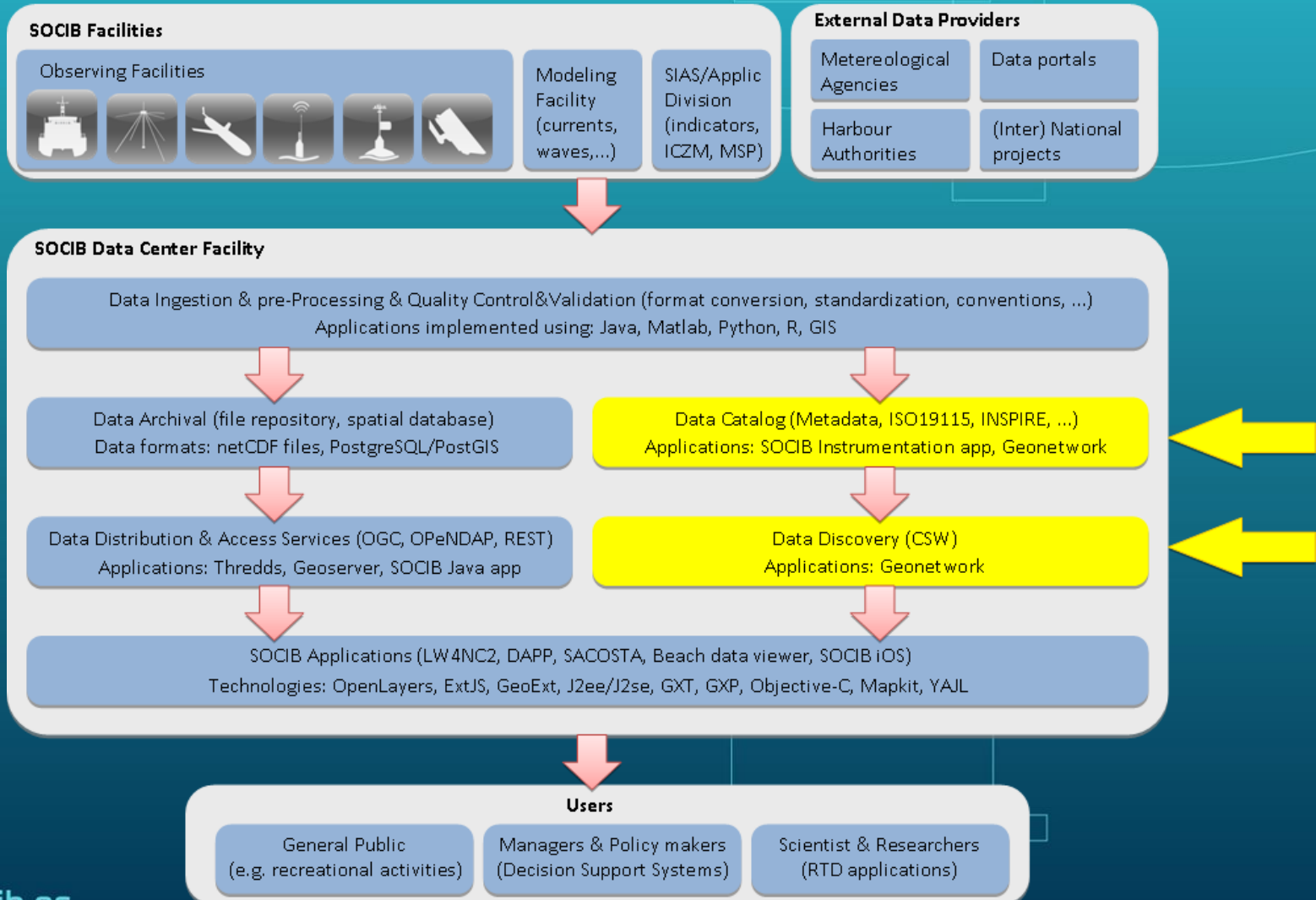
Fixed stations: Deployments data Search monitoring data Glossary of types

Fixed station list

- Description: Fixed station list provides the deployed platform list of type fixed. Each platform has the attributes:
 - id: the platform id
 - name: the platform name
 - boundingBox: the bounding box position in degree format. boundingBox(0) == geometry.get_min_boundingBox(1) == geometry.get_max_boundingBox(2) == geometry.get_max_boundingBox(3) == geometry.get_min_boundingBox(4)
 - platformType: the platform type
 - lastTimeSampleReceived: the latest time sample received in seconds since 1970-01-01T00:00:00Z
 - status: the platform status. "all-operations" = all instrument and platform product data are updated, "all-outdated" = all instrument and platform product data are out dated. "sub-all-updated" = One or more instrument or product data are out dated



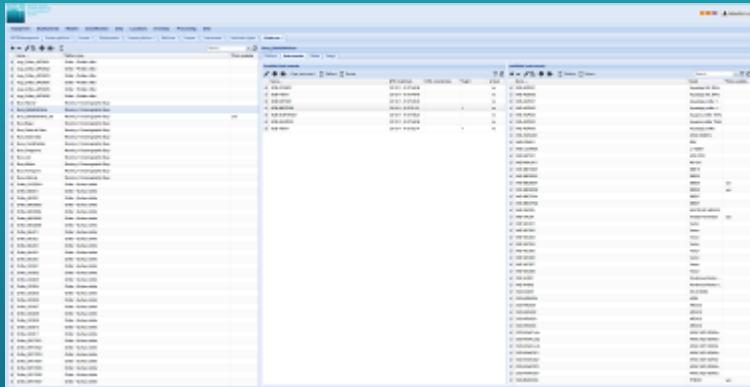
LIFE CYCLE OF DATA



DATA CATALOG AND DATA DISCOVERY

SOCIB INSTRUMENTATION APP

- Observation platforms, CF conventions



GEONETWORK

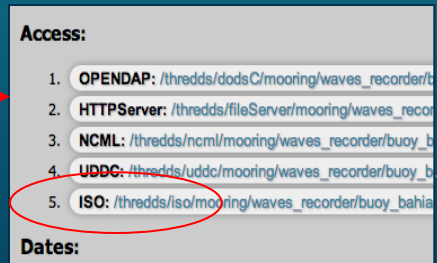
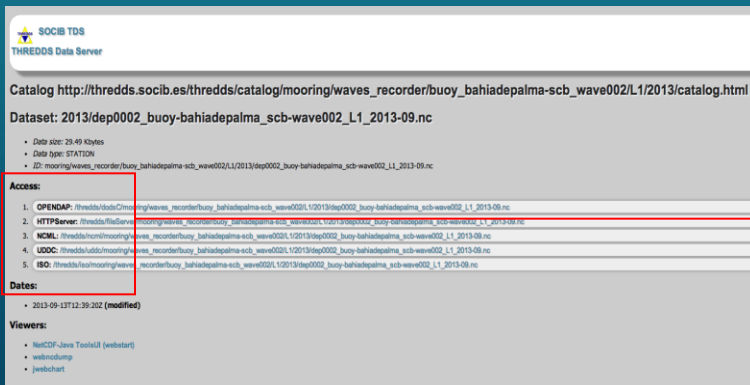
- ISO19115, CSW



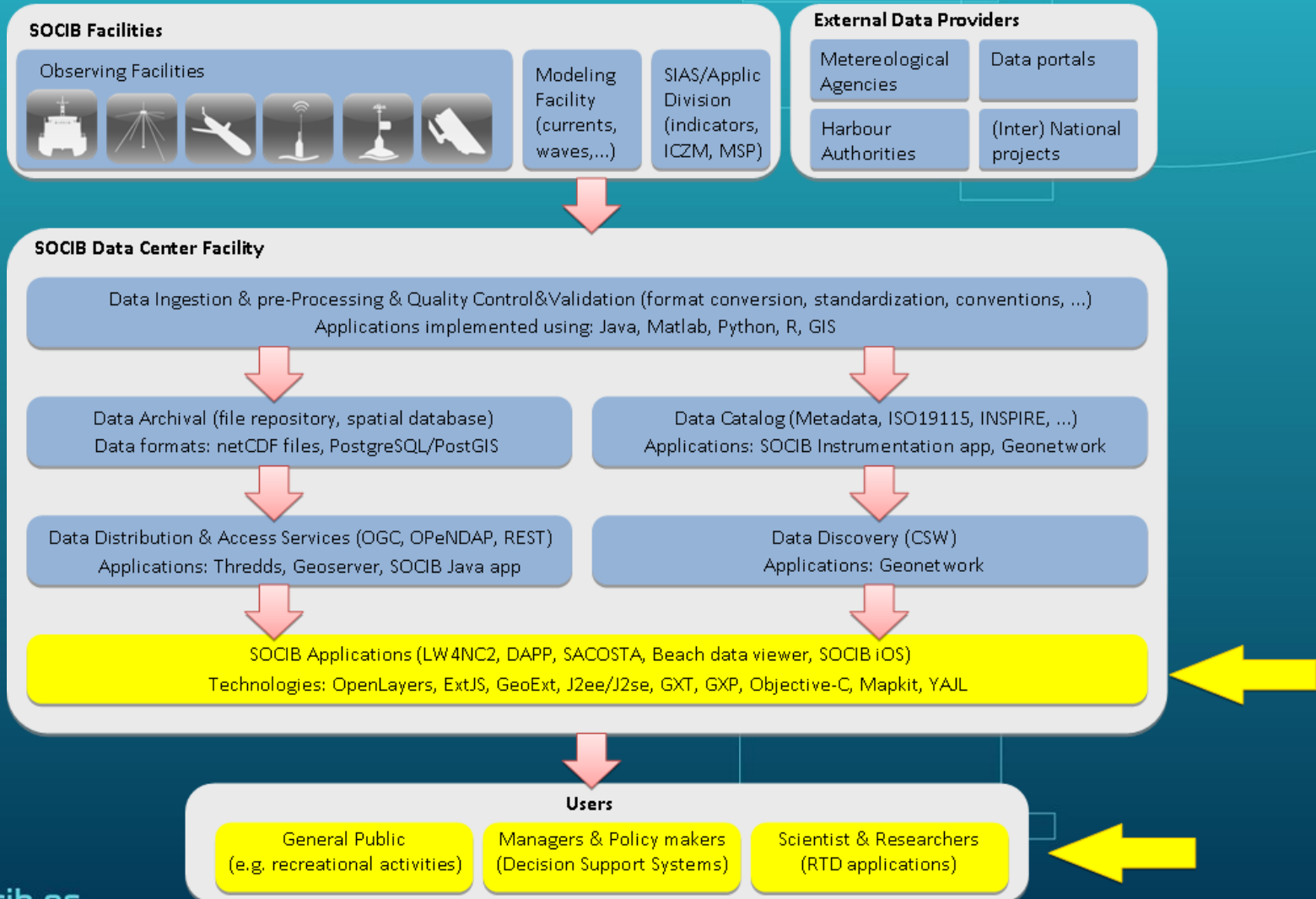
<http://gis.socib.es/geonetwork>

THREDDS

- ncISO



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



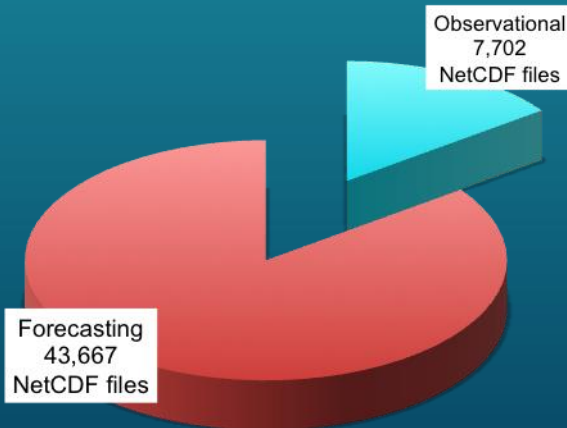
General society



Data Center in numbers 2010 – present

DATA PRODUCTION

- 184 deployments
- 201 instruments
- Serving more than 50,000 NetCDF files (3.1 TB)



CORPORATE WEBSITE

- 248,935 pageviews
- 59,128 visitors (4.21 pages/visit)
- 3'49" Avg. visit duration



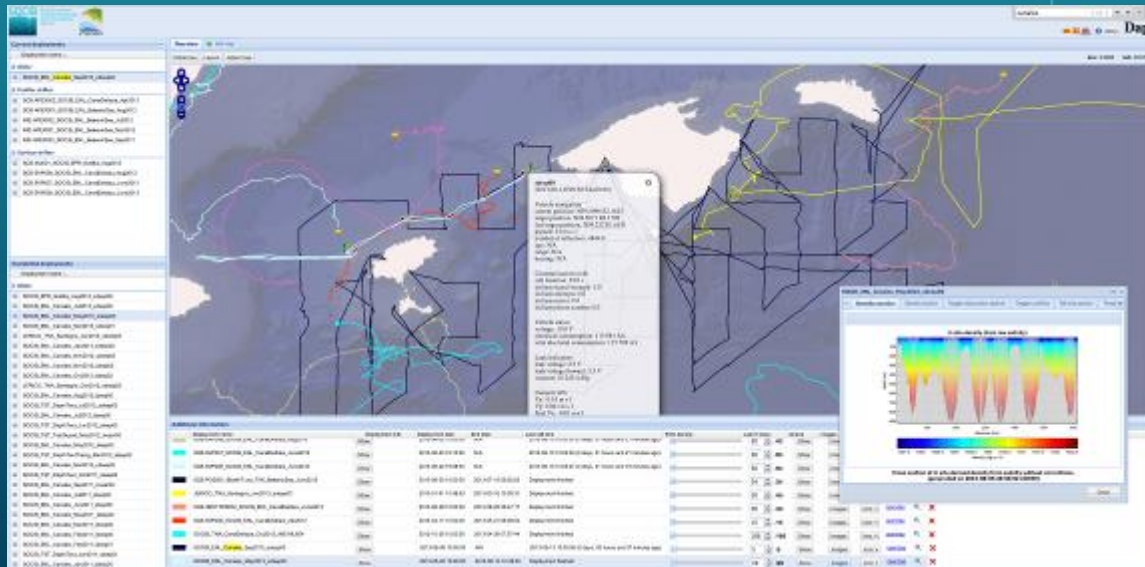
- What is SOCIB?
- Data Management
- **Applications**
- Further works



DAPP – Deployments application

<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



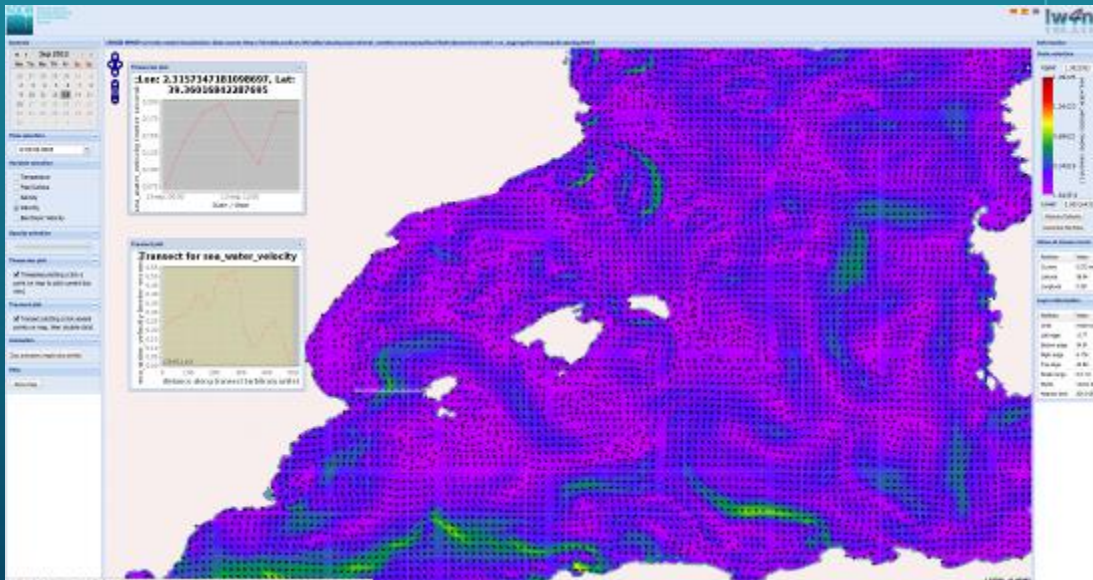
USERS

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

LW4NC2

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

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



TECHNOLOGIES



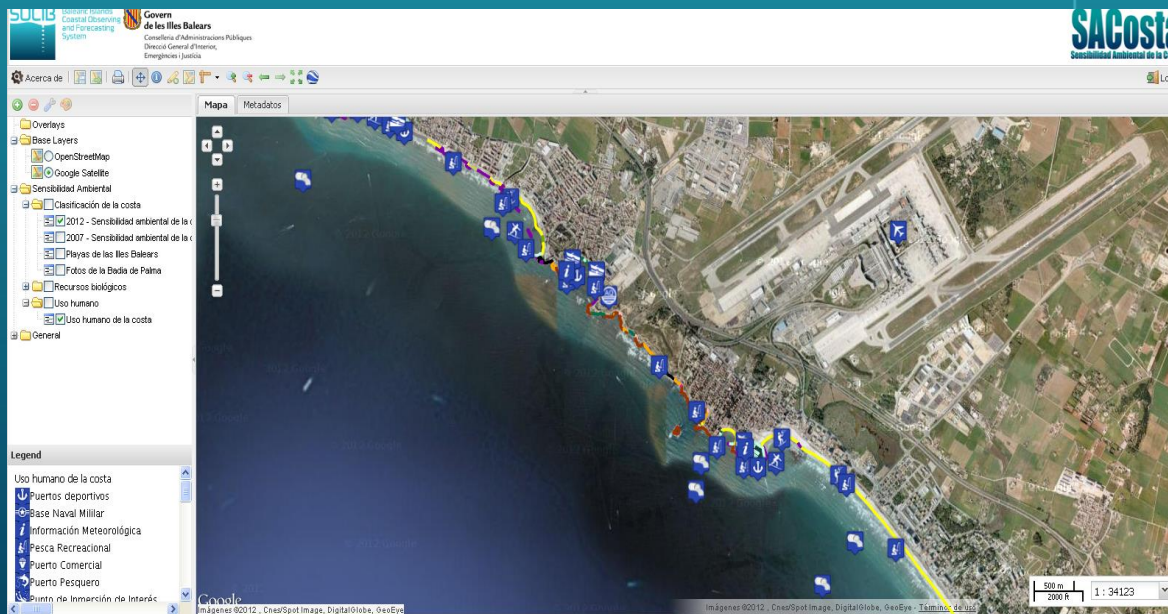
USERS

- 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

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



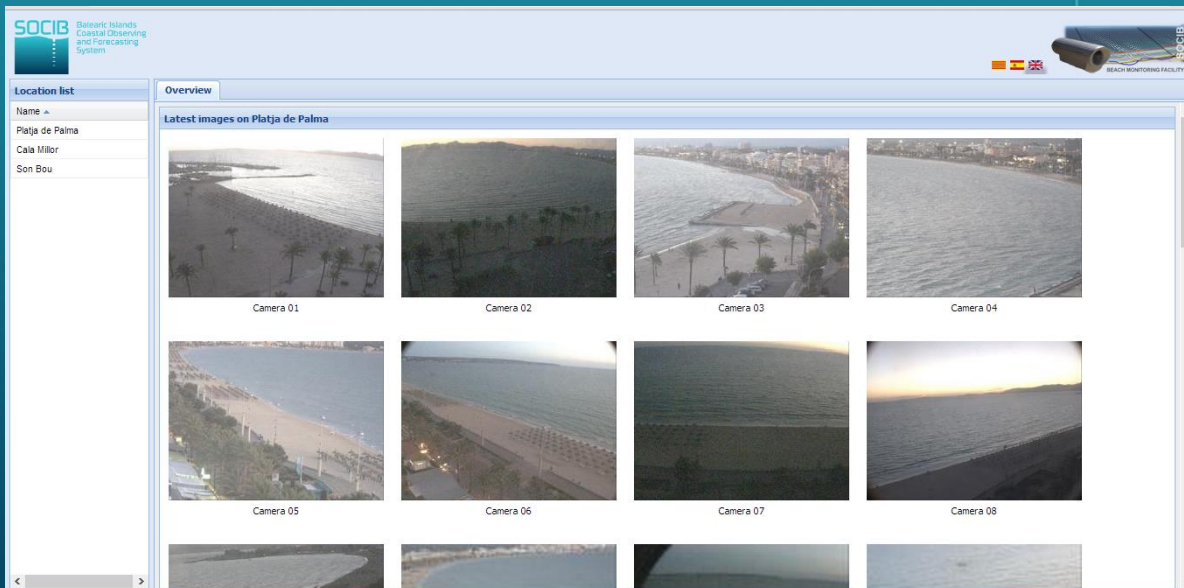
USERS

- Students
- Teachers
- General public

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

SOCIB MOBILE

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



TECHNOLOGIES



USERS

- General public
- Researchers
- Technicians

SOCIB WEBSITE

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

Corporate website to provide an overview of the different Facilities.



TECHNOLOGIES



USERS

- General public
- Researchers

- What is SOCIB?
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MANAGE BIG DATA



OBSERVATIONAL DATA



MONITORING SERVICES



DATA DISCOVERY



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 society needs** and provide support to the Integrated Maritime Policy and the Marine Strategy Framework Directive



THANK YOU!
GRAZIE!
GRACIAS!

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