Critical Success Factors of the ReefTEMPS sensors-oriented environmental information system for a real operationality.

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Critical Success Factors of the ReefTEMPS sensors-oriented environmental information system for a real operationality
ReefTEMPS
Network of coastal oceanic sensors since 1953

3 research teams

4 data management sub-networks

Component of the French Seashore and Coastal Research Infrastructure

Global ReefTEMPS pacific zone
Institute of Research for Sustainable Development
University of South Pacific
South Pacific Community
University of New Caledonia
More than 60 years of data collection

- Temperature, sea pressure, salinity, wave, turbidity, conductivity
- Global warming, Lagoon water circulation, Tsunamis, Coral bleaching, Algae proliferation, decision manager

164 sensors
94 platforms
14 countries
51 M measurements
175 timeseries
NetCDF following Climate and Forecast (CF) Convention and OceanSites Data Format Reference

Data cycle

- NetCDF following Climate and Forecast (CF) Convention and OceanSites Data Format Reference
- Data qualification includes manual and automatic controls

Live

60s / 30mins acquisition rates

72 sensors in activity

±70 data imports per year

+5 M measurements per year (exponential growth)
Data dissemination

Findable
- Ensure data continuity in a virtual warehouse or data center logic
- Diffuse data in catalogs

Accessible
- Make data accessible and validated to the community

Interoperable
- Be interoperable and provide data to data warehouses
- France: Ex: CORIOLIS
- Europe: Ex: SeaDataNet,
- South Pacific region, International: Ex: SOPAC, PI-GOOS, IMOS

Reusable
- Produce and disseminate maps and indicators
- Clear and accessible data usage licence

Objectives

Understandable formats for (all kind of) researchers

> NetCDF, WMS, WFS, SOS, CSW, CSV, raw images access formats availables

> Compliance with FAIR data practices
AODN portal is the Australian Ocean Data Network

Information system design v.1 - 2010

> AODN portal is the Australian Ocean Data Network

> Standards and Open sources software deployed as a Server/Client architecture
SOS v.1

DescribeSensor

SensorML

Standard ← Our data

System

Platform

Component

Timeserie

Data cycle

GetObservation

Geospatial sensing conference, September 3rd, 2019
SOS v.1 - GetObservation

SOS Server limitation of the request set to 1 year

Pressure measurements frequency up to every 60s

Requesting one year returns more than 500,000 entries

XML file generated size is in hundreds of Mo

Download reaching 10mins

Geospatial sensing conference, September 3rd, 2019
## Strength & Weakness SOS v.1

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Findable</td>
<td>✗ Interoperable</td>
</tr>
<tr>
<td>→ Well referenced</td>
<td>× SOS mapping</td>
</tr>
<tr>
<td>✓ Accessible</td>
<td>✓ Reusable</td>
</tr>
<tr>
<td>→ Data easy to get</td>
<td>× Response time</td>
</tr>
</tbody>
</table>

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SEANOE is a publisher of scientific data in the field of marine sciences. It is managed by the ODATIS data center of France’s Earth System research.
ReefTemps, réseau d'observations des eaux côtières du Pacifique Insulaire

Station CDK Manihiki Atoll 01

Date de début: 27/10/2012

Graphe quotidien des données de la station sur la dernière année de mesures

Reeftemps dataset for CDK Manihiki Atoll 01

http://reeftemps.science
Critical success factors #1

- **SOS v2**
  - SOS v1 was too permissive
  - Offering as physical parameter instead of platform prevented us from using 52North client solution
  - SOS v2 is more explicit
Critical success factors #2

- XML generation is too expensive
- XML download is too heavy
- JSON is a better data exchange format.
- XML is a better document exchange format.
- REST is easy of implementation
- JSON is easy to read
Critical success factors #3

- Ad hoc database is to be kept
- SQL Join are heavy with volumetry
- SQL Views are the same
- Materialized views are an option
- Duplication of data in dedicated SOS schema is fast
Critical success factors #4

- No user identification required
- No delay due to id validation
- No permission to ask
- Users will get used to using a DOI for data used in publication
- Seamless interface
Critical success factors #5

- Oceanograph physicists can use NetCDF
- Sensor Information systems can use SOS
- Ecologists (among others) can understand CSV
- Catalogs can browse CSV
- Geo Catalogs can browse GIS
- People can have a quick look at the data on images
- Remote systems can listen to data publications updates
- As in marketing strategy, the implementation of services competing with SOS leads to an increase in the attractiveness and use of SOS

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Conclusion

More usages / visits / citations

More datas and types of data

How to cite
Future

- From timeseries to series
- NoSQL?

- Integration of profile data is ready to go
- Document oriented = direct insertion of netcdf files?
- Handling exponential growth of data

Geospatial sensing conference, September 3rd, 2019
THANK YOU!

http://reeftemps.science