Observing System Evaluation
Task Team

Peter Oke (CSIRO) and Gilles Larnicol (CLS)
and the TT members

November 2016
Overview

- OSEval-TT overview
- Progress and achievement since last meeting
- Future plans - Issues
OSEval-TT Overview

To provide consistent and scientifically justified requirements and feedbacks to agencies in charge of Global and Regional Ocean Observing Systems

Provision and dissemination of Observation Impact Statements (OIS) based on OSEval evidence

Evaluation studies
- Perform impact studies of GOOS and ROOS on forecast and reanalysis GODAE systems
- Methodologies: OSE, OSSE and alternative methods
## Summary of OSEs & OSSEs

<table>
<thead>
<tr>
<th>Type</th>
<th>Observing System</th>
<th>Area</th>
<th>Which Centers?</th>
<th>Key Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSE</td>
<td>All</td>
<td>Brasilian coast</td>
<td>REMO</td>
<td>Impact of the different observing system (SST, ARGO T/S, Altimetry) Inclusion of tides degrades SSH and thermocline</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Australia</td>
<td>UNSW (University of New South Wales)</td>
<td>Impact of the different observing system for constraining alongshore shelf transport: SST, HF radar, Sheriff moorings, SSH, Gliders</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Global ocean</td>
<td>JMA</td>
<td>Focus on altimeter constellation and SSS impacts</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Global ocean</td>
<td>Mercator</td>
<td>Focus on altimeter constellation and SSS impacts</td>
</tr>
<tr>
<td>NRT OSE</td>
<td>TPOS</td>
<td>Tropical Pacific</td>
<td>NCEP (GODAS, CFSR), GFDL, ABoM, ECMWF, JMA, NASA, MetOffice, MERCATOR</td>
<td>The ensemble spread of a multi-member ensemble provides indication of forecast skill and gaps in the observing system</td>
</tr>
<tr>
<td>OSSE</td>
<td>SWOT</td>
<td>Atlantic West shelves</td>
<td>Mercator</td>
<td>Significant impact of SWOT but need to combine with nadir altimeter missions</td>
</tr>
<tr>
<td>OSSE</td>
<td>Glider</td>
<td>IAS &amp; Open Atlantic</td>
<td>RSMAS</td>
<td>Gliders seem more efficient to correct model bias rather than improve mesoscale signal. Importance of Nature Run that benefit to all OSSE groups</td>
</tr>
<tr>
<td>OSSE</td>
<td>Glider</td>
<td>Central Eastern Australia</td>
<td>CSIRO</td>
<td>Best Glider design: deep with daily surfacing</td>
</tr>
<tr>
<td>OSE</td>
<td>Sea Ice from SMOS</td>
<td>Arctic</td>
<td>TOPAZ</td>
<td>Kind of data useful to improve initialisation of forecast model</td>
</tr>
<tr>
<td>OSSE</td>
<td>In-Situ Obs Syst (physic &amp; biogeo)</td>
<td>Atlantic (north)</td>
<td>H2020 AtlantOS project (all European centers) Collaboration with US &amp; Canada</td>
<td>On going work: nature run and design of the OSSE</td>
</tr>
<tr>
<td>OSE</td>
<td>SSS from satellite (SMOS, Aquarius, SMAP)</td>
<td>Tropical Pacific</td>
<td>ESA SMOS-Nino15 project (CLS, Mercator, MetOffice)</td>
<td>Just started: design of the OSE</td>
</tr>
</tbody>
</table>
RODAS – HYCOM 1/24° with tides (2009-2010)  
(C. Tanajura, REMO)  
24-h forecasts evaluation against OSTIA SST

ENSEMBLE/CONTROL NOTIDES 1.37 °C

CONTROL TIDES 1.36 °C

assim SST 0.61 °C

assim TS 1.16 °C

assim SLA 1.06 °C

assim ALL T/S SLA SST 0.54 °C
RODAS – HYCOM 1/24° with tides (2009-2010)
24-h forecasts evaluation against Argo T

ARGO RMSD 34S-12S 54W-32W (Jan-08 - Dec-09 - TOTAL BUOYS 913)

Similar results for Salinity

- assim sst: 1.17 °C
- assim ts: 0.94 °C
- assim sla: 0.80 °C
- sst ts sla: 0.99 °C
- sst: 0.77 °C
A high resolution reanalysis for the East Australian Current: ROMS model (Kelly et al. UNSW)

- Variable horizontal resolution
  - 2.5-6km cross shore
  - 5km alongshore
  - 30 s-levels

- Smoothing with emphasis on maintaining shelf width, key to EAC separation

- BRAN 3p5 initial and boundary conditions

- ACCESS-R 12km for atmospheric forcing
A high resolution reanalysis for the East Australian Current: Reanalysis performance

AVISO SSH

HF radar velocities
Which observations best capture the dynamics?

**Analysis sensitivity diagnostics**

<table>
<thead>
<tr>
<th></th>
<th>Mean % of all observations</th>
<th>Mean % impact Brisbane</th>
<th>Mean % impact Coffs Harbour</th>
<th>Mean % impact Sydney</th>
<th>Mean % impact Narooma</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVISO SSH</td>
<td>10.1</td>
<td>-2.7</td>
<td>19.2</td>
<td>17.6</td>
<td>15.1</td>
</tr>
<tr>
<td>NAVO SST</td>
<td>40.6</td>
<td>49.7</td>
<td>32.9</td>
<td>27.3</td>
<td>35.5</td>
</tr>
<tr>
<td>HF radar</td>
<td>19.3</td>
<td>26.0</td>
<td>33.2</td>
<td>32.8</td>
<td>30.6</td>
</tr>
<tr>
<td>EAC array</td>
<td>12.1</td>
<td>15.9</td>
<td>2.5</td>
<td>8.7</td>
<td>9.9</td>
</tr>
<tr>
<td>Gliders</td>
<td>6.9</td>
<td>6.6</td>
<td>4.9</td>
<td>9.1</td>
<td>3.4</td>
</tr>
</tbody>
</table>

![Map showing SSH values at various latitudes: 27.5S, 30.3S, 33.9S, 36.2S]
OSE: Impact of the altimeter constellation on the 1/12° Atlantic system (Remy et al. Mercator)

- 1-year OSEs (2012)
- SLA observation error:
  - Jason2: 2 cm, Jason1g: 3 cm,
  - CryoSat2: 4 cm + 2D SSH
- Representativity error.

<table>
<thead>
<tr>
<th></th>
<th>SST</th>
<th>In situ</th>
<th>J2</th>
<th>C2</th>
<th>J1n-J1g</th>
</tr>
</thead>
<tbody>
<tr>
<td>No altimeter</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exp 3 altimeters</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Exp 2 bis altimeters</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Exp 2 altimeters</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Exp 1 altimeter</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ \text{RMS (SSH}_{\text{NoAlt}} \text{ } \text{SSH}\text{J2);} \]
\[ \text{RMS (SSH}_{\text{J1g, J2, C2}} \text{ } \text{SSH}\text{J1g, J2}) \]

Differences between the analysed fields of different OSE experiments

GOVST-VII, KOCHI Nov 2017
Impact of the altimeter constellation

\[
(\text{Var}(\text{err}_x) - \text{var}(\text{err}_{\text{ana3sat}}))/\text{var}(\text{err}_{\text{ana3sat}}) \quad \text{en } \% 
\]

Error increase on the SSH estimation

- An increased number of altimeters allows a global reduction of the SSH analysis and error forecast,
- The impact highly depend on the region considered and the altimeter specificities (error, sampling orbit),
- The misfit to temperature and salinity profiles is slightly reduced.

(Study supported by CNES fundings)
✓ Evaluating values of satellite data in ocean/climate monitoring and forecasting is essential to establish successive satellite missions.
✓ Evaluation of satellite altimetry is performed continuously in several studies.
✓ Evaluation of other data (SST, SSS, wind stress, etc.) is also required.

Impact of the number of altimetry satellite on the representation of the Kuroshio meander by JMA’s eddy-resolving 4DVAR system.

Assimilation of Aquarius SSS affects on 100-m TS due to the deep mixed layer in winter, and the influence remains even in summer. Results of OSE using JMA’s global 3DVAR system.
# Summary of OSEs & OSSEs

<table>
<thead>
<tr>
<th>Type</th>
<th>Observing system</th>
<th>Area</th>
<th>Which centers?</th>
<th>Key messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSE</td>
<td>All</td>
<td>Brasilian coast</td>
<td>REMO</td>
<td>Impact of the different observing system (SST, ARGO T/S, Altimetry) Inclusion of tides degrades SSH and thermocline</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Australia</td>
<td>UNSW (University of New South Wales)</td>
<td>Impact of the different obs sys for constraining alongshoreshore shelf transport: SST, HF radar, Sherf moorings, SSH, Gliders</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Global ocean</td>
<td>JMA</td>
<td>focus on altimeter constellation and SSS impacts</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Global ocean</td>
<td>Mercator</td>
<td>focus on altimeter constellation and SSS impacts</td>
</tr>
<tr>
<td>NRT OSE</td>
<td>TPOS</td>
<td>Tropical Pacific</td>
<td>NCEP (GODAS, CFSR), GFDL, ABoM, ECMWF, JMA, NASA, MetOffice, MERCATOR</td>
<td>The ensemble spread of a multi-member ensemble provides indication of forecast skill and gaps in the observing system</td>
</tr>
<tr>
<td>OSSE</td>
<td>SWOT</td>
<td>Atlantic West shelves</td>
<td>Mercator</td>
<td>Significant impact of SWOT but need to combine with nadir altimeter missions</td>
</tr>
<tr>
<td>OSSE</td>
<td>Glider</td>
<td>IAS &amp; Open Atlantic</td>
<td>RSMAS</td>
<td>Gliders seems more efficient to correct model bias rather than improve mesoscale signal Importance of Nature Run that benefit to all OSSE groups</td>
</tr>
<tr>
<td>OSSE</td>
<td>Glider</td>
<td>Central Eastern Australia</td>
<td>CSIRO</td>
<td>Best Glider design: deep with daily surfacing</td>
</tr>
<tr>
<td>OSE</td>
<td>Sea Ice from SMOS</td>
<td>Arctic</td>
<td>TOPAZ</td>
<td>kind of data useful to improve initialisation of forecast model</td>
</tr>
<tr>
<td>OSSE</td>
<td>In-Situ Obs Syst (physics &amp; biogeo)</td>
<td>Atlantic (north)</td>
<td>H2020 AtlantOS project (all european centers) Collaboration with US &amp; Canada</td>
<td>on going work: nature run and design of the OSSE</td>
</tr>
<tr>
<td>OSE</td>
<td>SSS from satellite (SMOS, Aquarius, SMAP)</td>
<td>Tropical Pacific</td>
<td>ESA SMOS-Nino15 project (CLS, Mercator, MetOffice)</td>
<td>just started: design of the OSE</td>
</tr>
</tbody>
</table>
Real-Time MultiORA Intercomparison for TPOS (led by Y. Xue, NCEP)

- Proposed in La Jolla for real-time monitoring of impacts of TPOS
- Members: NCEP (GODAS, CFSR), GFDL, ABoM, ECMWF, JMA, NASA, UKMO, MERCATOR
- Results of comparison are opened in near-real time via internet and NCEP Ocean Briefing. (Updated every month.)

The ensemble spread of a multi-member ensemble (for seasonal prediction) provides an indication of forecast skill – and “gaps” in the observing system.

The multi-system ensemble spread becomes larger where the number of profiles is small.
# Summary of OSEs & OSSEs

<table>
<thead>
<tr>
<th>OSE</th>
<th>Type</th>
<th>Area</th>
<th>Observing System</th>
<th>Which centers?</th>
<th>Key Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSE</td>
<td>All</td>
<td>Brasilian coast</td>
<td>REMO</td>
<td>REMO</td>
<td>Impact of the different observing system (SST, ARGO T/S, Altimetry)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inclusion of tides degrades SSH and thermocline</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Australia</td>
<td>UNSW (University of New South Wales)</td>
<td></td>
<td>Impact of the different obs sys for constraining alongshoreshore shelf transport: SST, HF radar, Sherf moorings, SSH, Gliders</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Global ocean</td>
<td>JMA</td>
<td></td>
<td>focus on altimeter constellation and SSS impacts</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Global ocean</td>
<td>Mercator</td>
<td></td>
<td>focus on altimeter constellation and SSS impacts</td>
</tr>
<tr>
<td>NRT OSE</td>
<td>TPOS</td>
<td>Tropical Pacific</td>
<td>NCEP (GODAS, CFSR), GFDL, ABoM, ECMWF, JMA, NASA, MetOffice, MERCATOR</td>
<td></td>
<td>The ensemble spread of a multi-member ensemble provides indication of forecast skil and gaps in the observing system</td>
</tr>
<tr>
<td>OSSE</td>
<td>SWOT</td>
<td>Atlantic West shelves</td>
<td>Mercator</td>
<td></td>
<td>Significant impact of SWOT but need to combine with nadir altimeter missions</td>
</tr>
<tr>
<td>OSSE</td>
<td>Glider</td>
<td>IAS &amp; Open Atlantic</td>
<td>RSMAS</td>
<td></td>
<td>Gliders seems more efficient to correct model bias rather than improve mesoscale signal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Importance of Nature Run that beneficiate to all OSSE groups</td>
</tr>
<tr>
<td>OSSE</td>
<td>Glider</td>
<td>Central Eastern Australia</td>
<td>CSIRO</td>
<td></td>
<td>Best Glider design: deep with daily surfacing</td>
</tr>
<tr>
<td>OSE</td>
<td>Sea Ice from SMOS</td>
<td>Arctic</td>
<td>TOPAZ</td>
<td></td>
<td>Kind of data usefull to improve initialisation of forecast model</td>
</tr>
<tr>
<td>OSSE</td>
<td>In-Situ Obs Syst (physic &amp; biogeo)</td>
<td>Atlantic (north)</td>
<td>H2020 AtlantOS project (all european centers)</td>
<td>Collaboration with US &amp; Canada</td>
<td>On going work : nature run and design of the OSSE</td>
</tr>
<tr>
<td>OSE</td>
<td>SSS from satellite (SMOS, Aquarius, SMAP)</td>
<td>Tropical Pacific</td>
<td>ESA SMOS-Nino15 project (CLS, Mercator, MetOffice)</td>
<td></td>
<td>Just started: design of the OSE</td>
</tr>
</tbody>
</table>
Evaluation of Atlantic Ocean OSSEs - Impact of gliders

V. Kourafalou, Univ. of Miami-RSMAS/NOAA-AOML Joint Ocean Modeling and OSSE Center (OMOC)

Assimilation of Existing Ocean Observing System Components

Panels show existing altimetry and in-situ observing systems assimilated from 1 March through 31 October 2014.

Satellite SST data that were assimilated (MCSST) are not shown.

This experiment is referred to as the Control experiment.

An unconstrained FM simulation is used as a reference to represent no assimilation.
Assimilate profiles from 14 underwater gliders (both alone and added to the existing ocean observing system) from June-October 2014.

Statistics calculated from 15 July through 31 October.

Corrected skill scores

Mean bias correction

T-S profiles to 1000 m are assimilated. Glider assimilation is more effective at correcting mean bias than at correcting mesoscale structure.
Can gliders be kept on station in the presence of a strong western boundary current? What strategies are best?

CSIRO (P. Oke)

Three cases considered:
1. Deep glider (0-1000 m sampling)
2. Deep glider with daily surfacing
3. Shallow glider (0-200 m sampling)

Four 6-month deployments with different starting points

Assumptions:
- Horizontal glider speed is 25 cm/s;
- Vertical glider speed is ~11 cm/s
- 22 degree glider angle
- Glider heading adjusted every time it surfaces
- Deep gliders dive 0-1000 m over 6 hours
- Shallow gliders dive 0-200 m every hour
Simulated glider paths $f(x,y)$

Results:
- Deep glider takes $\sim9.2$ days per section;
- Deep daily gliders take $\sim8.3$ days per section;
- Shallow gliders are hopeless;
- Deep gliders sometimes escape (6 escapees in 6 months ... monthly rescue missions);
- Deep gliders with daily surfacing look pretty good!
How many gliders are needed?
OSSE for the future SWOT mission
(E. Remy, Mercator)

**Observations** from different type of altimeter are simulated:
- a large swath altimeter,
- three nadir altimeters.

-> the efficiency of those two scenarios to constrain the ocean high resolution circulation is compared (zoom on the Mediterranean outflow region).
OSSE for the future SWOT mission

Correlation of the estimated SSH in the different OSSE experiments compared to the « True » Ocean (Nature) over one year (2009)

- NR/FreeSim: Mean = 59%
- NR/SWOT: Mean = 72%
- NR/3Nadir: Mean = 80%

GOVST-VII, KOCHI Nov 2017
Key message:
SMOS Sea Ice Thickness observations compliment conventional observations for initialising sea-ice in TOPAZ forecasts

Experiments:
- Series of OSEs with and without SMOS
  - Assimilated SMOS Sea-Ice by every week, QC checks
  - SMOS Sea-ice thickness less than 0.4 m in the day prior to assimilation
- Observations further than 30 km from the coast
- excluded if uncertainty larger than 5 m
Relative impact (DFS) of observations in March 2014

SIC

SIT

T^{(c)} profile

SST^{(d)}

SLA^{(e)}

S^{(f)} profile
### Summary of OSEs & OSSEs

<table>
<thead>
<tr>
<th>Type</th>
<th>Observing System</th>
<th>Area</th>
<th>Which Centers?</th>
<th>Key Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSE</td>
<td>All</td>
<td>Brasilian coast</td>
<td>REMO</td>
<td>Impact of the different observing system (SST, ARGO T/S, Altimetry) Inclusion of tides degrades SSH and thermocline</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Australia</td>
<td>UNSW (University of New South Wales)</td>
<td>Impact of the different observing system for constraining alongshore shelf transport: SST, HF radar, Sherf moorings, SSH, Gliders</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Global ocean</td>
<td>JMA</td>
<td>Focus on altimeter constellation and SSS impacts</td>
</tr>
<tr>
<td>OSE</td>
<td>All</td>
<td>Global ocean</td>
<td>Mercator</td>
<td>Focus on altimeter constellation and SSS impacts</td>
</tr>
<tr>
<td>NRT OSE</td>
<td>TPOS</td>
<td>Tropical Pacific</td>
<td>NCEP (GODAS, CFSR), GFDL, ABoM, ECMWF, JMA, NASA, MetOffice, MERCATOR</td>
<td>The ensemble spread of a multi-member ensemble provides indication of forecast skill and gaps in the observing system</td>
</tr>
<tr>
<td>OSSE</td>
<td>SWOT</td>
<td>Atlantic West shelves</td>
<td>Mercator</td>
<td>Significant impact of SWOT but need to combine with nadir altimeter missions</td>
</tr>
<tr>
<td>OSSE</td>
<td>Glider</td>
<td>IAS &amp; Open Atlantic</td>
<td>RSMAS</td>
<td>Gliders seems more efficient to correct model bias rather than improve mesoscale signal Importance of Nature Run that benefit to all OSSE groups</td>
</tr>
<tr>
<td>OSSE</td>
<td>Glider</td>
<td>Central Eastern Australia</td>
<td>CSIRO</td>
<td>Best Glider design: deep with daily surfacing</td>
</tr>
<tr>
<td>OSE</td>
<td>Sea Ice from SMOS</td>
<td>Arctic</td>
<td>TOPAZ</td>
<td>Kind of data useful to improve initialisation of forecast model</td>
</tr>
<tr>
<td>OSSE</td>
<td>In-Situ Obs Syst (physic &amp; biogeo)</td>
<td>Atlantic (north)</td>
<td>H2020 AtlantOS project (all European centers) Collaboration with US &amp; Canada</td>
<td>Ongoing work: nature run and design of the OSSE</td>
</tr>
<tr>
<td>OSE</td>
<td>SSS from satellite (SMOS, Aquarius, SMAP)</td>
<td>Tropical Pacific</td>
<td>ESA SMOS-Nino15 project (CLS, Mercator, MetOffice)</td>
<td>Just started: design of the OSE</td>
</tr>
</tbody>
</table>
The objective of the SMOS-Niño15 project is:

- The design, the implementation and the reporting of an Observing system Evaluation of satellite SSS during the strong El Niño 2015/16 event in the Tropical Pacific Ocean.
- The ESA’s SMOS products will be primary used jointly with other SSS products (NASA’s Aquarius/SMAP) and ocean remote-sensing and in-situ observations.
- ESA support to GODAE Ocean View

Means:

- Design, implement and perform an Observing System Experiment of the Sea Surface Salinity (SSS) with two different operational ocean forecasting systems.
- Provide feedbacks to the operational forecasting community (GODAE Ocean View) and ocean and climate science community
  - Through a dedicated web site
  - Observation Impact Statement Report
  - Organization of workshop to promote and enhance the use the SSS SMOS products.

KO: October 2\textsuperscript{th} 2016 ; 2 years project

Partners:  

Associated partners:  

GOVST-VII, KOCHI Nov 2017
The Experiments

Design of the OSEs to be consolidated by the end of the year

- Period: January 2014 – March 2016

- Simulations performed by

<table>
<thead>
<tr>
<th>Planned experiment</th>
<th>Main Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assimilate current network of observations without satellite SSS.</td>
</tr>
<tr>
<td>2</td>
<td>Assimilate current network plus SMOS satellite SSS observations.</td>
</tr>
<tr>
<td>3</td>
<td>Assimilate current network plus SMAP/Aquarius satellite SSS observations.</td>
</tr>
<tr>
<td>4</td>
<td>Assimilate current network plus all SSS satellite observations (using datasets giving the best improvement, if any).</td>
</tr>
</tbody>
</table>

- Adaptation to the Model/Assimilation component: Observation error, SSS bias correction,
Expected outcomes

- Provide recommendations to OSEVal-TT community on:
  - the use of SSS data assimilation (error and observation operator)
  - the implementation complete set of metrics (based on GOVST OSEVal-TT community best practice) to evaluate the impact of satellite SSS

- Demonstration of usefulness of SSS data through scientific articles

- Provide Observation Impact Statement (GOV-OSEVal-TT contribution)

Example extract of an observation impact statement from a previous project
Observing System Experiment with Satellite SSS
Impact of Sea Surface Salinity (SSS) data assimilation on El Niño 2015

Salinity is a key ocean parameter which plays an important role in the ocean variability. Monitoring Sea Surface Salinity (SSS) is crucial for understanding and forecasting the ocean circulation, water cycle and the changing of the climate. The recent satellite missions of ESA’s SMOS and NASA’s Aquarius have made it possible for the first time to measure SSS from space.

Although several studies have already demonstrated the usefulness of satellite SSS measurements the data are not widely used by the ocean modeling communities mainly due to technical challenges assimilating SSS data and assessing its impact. To improve the uptake and the use of SSS data for ocean forecasting this project aims to design, implement and perform Observing System Experiments (OSEs) of Sea Surface Salinity using ocean modeling and assimilation systems linked to GODAE OceanView.

The 2015/16 El Niño Southern Oscillation (ENSO) event has been chosen as a case study for this project. One scientific question is the understanding of the mechanisms at work during one of the strongest El Niño events. 

[Read more]
European Commission H2020 project; Budget ~ 20 M€; 57 partners
Started in April 2015 for 4 years;

To deliver an advanced framework for the development of an integrated Atlantic Ocean Observing System that goes beyond the state-of-the-art, and leaves a legacy of sustainability after the life of the project.
H2020 AtlantOS project

OSEs for demonstrating the impact of real data

OSEs for global/pan-Atlantic context

OSEs for regional context (North & South Atl subpolar gyre)

→ Coordinated work involving different Copernicus systems to get more robust conclusions on in situ network evolution in the Atlantic
WP 1 OSSEs (lead Mercator)

- Workshop organized in September 2016 to agree on the main OSSEs that will be carried out from October 2016 to early 2018.

**Experiment for Physical variables:**
- “Backbone” experiment: Satellite altimetry (3 sat), SST, Argo, moorings and XBT,
- Addition of Argo profiles in western boundary currents and tropics (doubling of sampling),
- Impact of deep Argo profiles (4000 and/or 6000 m depth),
- Impact of gliders and their possible extensions,
- Impact of drifters equipped with an additional thermistor chain from the surface down to 150 meter depth.

**Experiment for Biogeochemistry variables:**
Focus on nutrients, oxygen, Chl-a and pH observations
Testing value of Bio-Argo (BGC-ARGO) as well as the value of satellite ocean colour data. The following scenarios will be assessed:
- Backbone experiment: Ocean colour data
- Ocean colour data and BGC-Argo on ¼ of existing Argo array (1000 floats).
- Ocean colour data and BGC-Argo on full existing Argo array (4000 floats).
Summary

- OSEval-TT members are active in performing OSE/OSSEs with relevant results
  
  But
  
- Except for Multi ORA intercomparison and recent European funded projects, these studies are done by a single center → no community OSE/OSSEs as it was proposed during the OSEval-TT workshop (Toulouse)

- Despite good feedback during the 2013 review difficulties appear to maintain the momentum and really set up “Community OSE/OSSEs”, part of the activities are done in the frame of other TTs (IV, DA, ...) or initiatives (GSOP)

- Funded projects (as AtlantOs, SMOS-Nino15) is a good way to perform “Community OSE/OSSEs”
Summary

- OSEval-TT leadership: Peter & Gilles would like to step down
  → identification of new Co-Chairs and a transition to new leadership with new ideas and energy

Discussion planned during the TT co-chair breakout session
OSEval next workshop?

- 11/2007 (Paris) – OSEval TT established;
- 6/2009 (Toulouse) - Towards routine monitoring (promotion of routine DA-derived metrics for routine observing system assessment);
- 6/2011 (Santa Cruz) – joint mtg IV (promotion of class-4 inter-comparisons with an intention to be used for routine OSEval ... but the final step hasn’t been accomplished);
- 12/2014 (Toulouse) – joint mtg with CLIVAR/GSOP – provided a forum for exchange of ideas etc in OSEval area (as community OSE/OSSEs)

- mid-2017 (Sanya, China, TBC) – Theme TBC. to be coordinate with
  AtlantOS will organise a wks in Nov/Dec 2017
  DA-TT have proposed a joint workshop in 2018
Thank You