9th OceanSITES Steering Team meeting

Date: 27-28 May 2013

Location: Seoul National University, Seoul, South Korea

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Kelly Stroker (Project Office)

Meeting information: http://www.jcomm.info/oceansites2013

Revision Information

Date	Prepared by	Reviewed by	Version
07/01/2013	K Stroker		0.1

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1 INTRODUCTION

The 9th Steering Team and 6th Data Management Team meetings of OceanSITES jointly were hosted by Seoul National University. The Steering Committee Meeting was held at the HOAM Faculty House on the campus of SNU. The meeting was made possible with support from the NOAA Climate Program Office and contributions from SNU.

Host and co-chair, Dr. Uwe Send, provided a short introduction on behalf of the Co-chairs. He reviewed the challenges in obtaining funding for the meeting and thanked the participants for making it happen. Dr. Send discussed the structure and overview of OceanSITES for those that are new to the program.

The Steering Team Meeting (reported here), the Data Management meeting (reported separately) and the OceanSITES Executive Committee meeting, took place over four days in Seoul, Korea. The meeting was well attended with 30 participants from 12 different countries and all disciplines and varied expertise.

A list of attendees is provided in Appendix A.

Goals and agenda items:

1 Re-evaluate definition (scope) of the OceanSITES project and characteristics of sites in the system (one goal is endorsement of the new How-To document by the SC). Reconfirm and clarify prior discussions/decisions about narrowed focus of OceanSITES (what kind of sites and data are included/hosted). Sharpen rationale for sustained ocean observations and also explaining the societal need for them and the value to society of doing them.

2 Review concrete requirements and measures of success (metrics). Small disciplinary teams will have created drafts of requirements for each discipline, describing the global networks needed e.g. for surface fluxes, circulation, ecosystem regimes, ocean acidification, etc. In Seoul, the SC will review, edit, and adopt those descriptions, possibly in break-out groups.

3 Review concrete products and indicators. The team will have generated some draft examples of products and indicators before the Seoul meeting. These will be reviewed, and approved or modified, and new ones recommended.

4 Review current network status, discuss/approve and invite new sites. Use the meeting location in Seoul to invite and engage more participation from Korea, China, Taiwan, and discuss sites from there, including data access. Another (recurring) topic is how to distinguish and represent/count the regular TAO/TRITON/PIRATA network versus the enhanced and flux reference sites there.

5 Review modified MOIN document (backbone network of minimalist identical multi-disciplinary sites), the Halifax MOIN workshop proposal, joint actions with global OA program, and steps towards implementation.

6 Path towards sharing of platforms, sensors, data expertise

7 Make contact with other communities and programs, both by inviting their representatives to the Seoul meeting, and by sending OceanSITES representatives to them.

8 Review status quick implementation activities

9 Improve OceanSITES website

10 Funding, outreach, capacity building, future meetings

11 Steps needed to increase data holdings and flows; decide on actions/consequences if sites do not deliver data

12 Steps needed to increase OceanSITES data awareness/usage.

13 Find/recommend new DMT chairs; provide guidance to/work with the Data Management Team.

14 Other (input invited)

2 OCEANSITES SCOPE

2.1 The Chair reviewed the 2009 vision map. One of the main goals of this meeting is to move beyond the vision and status and define the gaps and make sure that the status and vision address these. We need to ensure that we are addressing the requirements.

2.2 The document "How to Become an OceanSITES Site" was presented. The document has been distributed via email in the past and one of the goals of this meeting is to finalize this document. We need to make sure the document is clear and clarifies the following points:

- *Characteristics of the system*
- *Definition of a site*
- *Sharpens the rationale*
- *Explains the societal need/value*

2.3 The task of reviewing the document overnight was assigned and members were to come to the meeting on Day 2 with comments.

2.4 The group recommended that we reconfirm and clarify prior discussions/decisions about narrowed focus of OceanSITES (what kind of sites and data are included/hosted)? Sharpen rationale for sustained ocean observations and also explaining the societal need for them and the value to society of doing them.

2.5 In the past, the system was built from simply the collection of existing sustained sites by any teams who wanted to join OceanSITES. Now we have a lot of sites/platforms and decided at the last meeting to be more selective/focused.

2.6 A review of the document by team members produced a number of comments:

2.6.1 The characteristics and goals of OceanSITES in facilitating mutual goals and interests on deep-ocean sites and their connection to other sites.

2.6.2 Stress the benefits of oceansites in the document and enforce this also in real-life. These are to not only share data, but also share common information about ship schedules and mooring points.

2.6.3 Discuss more or direct people to where they can find data management assistance. What is feasible for people to expect from a DAC or GDAC? Instructions on format of data and these places (NDBC, Ifremer, India) are set up to help. Thierry discussed the resources available to help and how there are few. It must be stated that there are DACs that are available to help. The PIs should try to find a DAC in their region. The structure of a DAC and GDAC needs to be clarified and that a PI can be a DAC.

2.6.4 Double check the document to make sure there is not constraint against shallow water station. (Action)

2.7 OceanSITES Definition - The Chair reviewed the definition of an OceanSITES site and reviewed the requirements and constraints of the network from past discussions and meetings:

- Only observations at fixed locations to enable high frequency data (moorings, virtual mooring, gliders, station-keeping wavegliders, frequent ship visits, cables, etc)
- Include historical open-ocean ship timeseries but complement with moorings going forward (HOT, CalCOFI, PAPA, Iceland,…)
- No shelf/coastal national mooring networks (met and wave buoys, ocean acidification, etc) *Most controversial topic and this is why Laura L, IOCCP, is in attendance at the meeting.
- No gliders, ship repeat sections/surveys, XBT sections, 'float timeseries' (done elsewhere, and too broad) The boundary current sites would only include the mooring component.

2.8 This definition and scope was reviewed with comments from the members. To move forward, OceanSITES must consider the following:

2.8.1 OceanSITES and IOCCP need a closer collaboration. Carbon parameters are becoming more and more important every day. Where the sensors are placed and with what other sensors they are placed. The rate is changing faster there than for deep ocean sites. And to understand the carbon and biogeochemistry, the coastal and deep-ocean must go hand in hand. This includes calibrations to be able to intercompare the data. There is a common scientific thread and interest and if there is a closer relationship that we can build with IOCCP it would benefit several communities. The scientific interpretation could extend from coast to deep-ocean but this is a regional issue. There has been progress made on coastal ocean acidification data management and there is a broad effort to get all of these data (process studies, etc). How to incorporate carbon data into these other systems? Data is archived (PMEL) at CDIAC. State the Oceansites role as a connector from the deep-ocean to the other sites through metadata.

2.8.2 For ship based time series, these data are not as high frequency as mooring. What data is OceanSITES interested?

2.8.3 It depends on the kind of data . Oxygen, ph, total alkalinity, working to include sediment trap data, fluorescence, zooplankton data. (laura) Are Sediment moorings included – yes. is about the multidisciplinary array. A sed trap array (KIOST site) would be a good site for OA.

2.8.4 Inclusion or not inclusion of national met and wave buoy systems. They already have a mechanism for these data. Most are in a national and operational system with their own procedures. Many countries are operating systems around the coast and we do not want to duplicate. At the beginning it was clearer, but with variables like pH and carbon, it becomes less clear.

2.8.5 OceanSITES needs to be careful not to duplicate efforts. In the coastal community there is a lot of coordination that OceanSITES can interact with, but not redo.

2.8.6 Tom Trull discussed the way it works in Australia. The problems are linked depending on what the problem is. The boundary sites run on to the coast for many reasons. Scientists have pointers in the metadata to these adjacent sites and we should consider this for OceanSITES. The DMT could easily come up with an implementation to this. However, maintaining this information is a bit trickier and relies on the PIs.(Action DMT – OceanSITES 2014)

2.8.7 OceanSITES can't do it all, for example OceanSITES won't address certain things like sensors and calibration for carbon sensors. Oceansites is about organizing these long-term stations for global studies. The expertise has to come from different programs and we need to focus on our organization and collaboration of the deep-ocean sites.

2.8.8 To make some statements clearer, a few additional definitions could be included in the OceanSITES documentation, "How to Become" and "User's Guide".

- *What kind of criteria determines coastal vs. deep-ocean sites? Enclosed marginal seas? Yes – i.e. Mediterranean, deep sites and semi-enclosed marginal seas. The Chair indicated that indeed some of these are fuzzy and scientifically driven. We purposefully did not draw a line on depth and distance from the coast.*

- *High- frequency. What is high-frequency in OceanSITES terms? High enough to resolve the seasonal signal.*

- *The clarification of why CalCOFI is included in Oceansites is a good point to enter into the how to document*

2.8.9 Document Charter is needed. In order for some of these questions to be answered, if has been suggested that OceanSITES create a Charter, what it means to be an OceanSITES and who can join. We know we have to be flexible, but this would assist in these discussions in the future. (Action – OceanSITES 2014)

2.8.10 OceanSITES should provide more direct links to other efforts – e.g. carbon time-series, Go-SHIP (Action – project office website)

3 REQUIREMENTS AND MEASURES OF SUCCESS (METRICS)

Funding agencies need these requirements (scientific, political, societal etc.). The executive committee has been working on these categories for the past few months 3 subdisciplines have been defined. The 3 disciplines were then discussed in detail.

1) Air-sea flux

2) Physical time-series (ocean circulation, deep changes)

3) Biogeochemical and ecosystem

3.1 Air-Sea Fluxes [or air-sea flux of X]

3.1.1 Main goal is to reduce regional and global error in reanalyses and numerical weather prediction models and climate models. One metric might be to achieve an accuracy of 2W/m2 over the globe (an estimate of the radiative forcing of the earth by anthropogenic greenhouse gas emissions is 4W/m2, and there is a need to understand where the excess heat goes and how it is distributed).

3.1.2 Some research (e.g. Trenberth and Fasullo (2010[i]) suggests much better than 1W/m2 is needed averaged over the globe.

3.1.3 Assuming no biases and independent sites, the rms error in the global mean is rms/sqrt(N) and 95% of the data will have less than 2rms/sqrt(N) error. Can determine N to get this number to e.g. 0.5W/m2. That could be a goal for the number of sites.

3.1.4 The ACTUAL rms error in global mean could be a metric for information provided. Uwe reviewed this action above and showed the air-sea flux draft map that Bob Weller created for fluxes (Fig 1).

3.1.5 The "critical sites" are seen as places where extreme heat loss occurs (e.g. western boundry currents) and where error can be large enough in model or analysis fields to bias basin or global averages, or as characteristic regime places - trade wind sites, or as places where deep convection in the ocean occurs in response to surface buoyancy flux, or along the well-coupled equatorial regimes in each ocean. Developing the map is aided by efforts such as the CLIVAR Indian Ocean panel that placed flux sites at places where model flux products had large disagreement. Input has been asked from Mark Bourassa and Sarah Gille if the CLIVAR High Latitude flux working group can recommend a set of specific sites to be added.

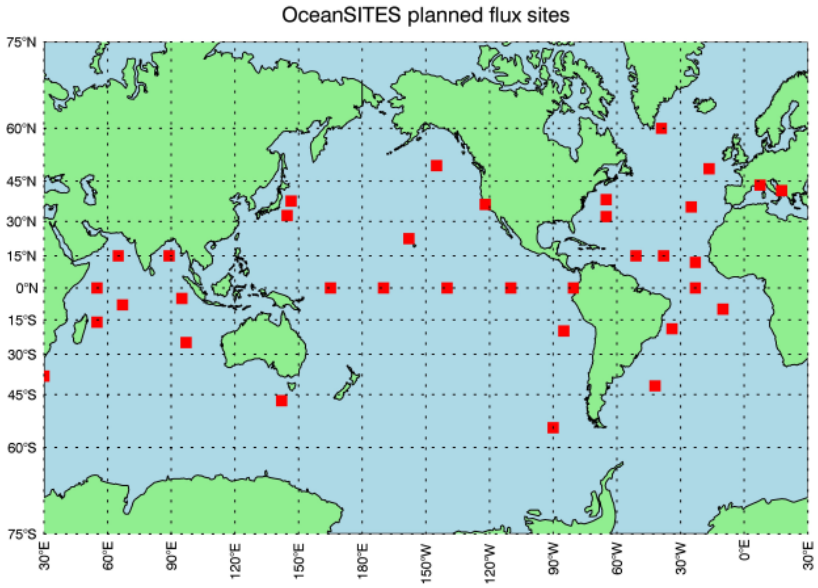


Figure 1 - OceanSITES 2012 flux sites.

3.1.6 Roger Lukas reminded the group that it is not just heat lost to the atmosphere that is important, but also heat gained by the oceans. These are the critical fluxes.

3.1.7 There are not many sites in the southern oceans or in upwelling and downwelling areas. Input is needed on where these sites should be added?

3.1.8 Diane Stanitski emphasized that it is useful as a performance measure to bring the error down. NOAA is always looking for performance measures and if some of the dots do not measure heat flux, then we can have an argument for asking for funding for those but funds must be justified for each program.

3.2 Physical time-series (ocean circulation, deep changes)

3.2.1 The Chair reviewed slides prepared by Roger Lukas and his thoughts on metrics. Roger had listed the following as some possible metrics:

- The number of planned sites; percent operating
- Number of sites * average # of variables * average # years duration [quantify contribution of long, highly-multivariate time-series]
- Within parts of the water column (to be defined) the average over all sites of (number of observed variables)*(years of records)
- A histogram of record lengths for the various sites, per variable/depth-range [User support data screening metrics]
- For each site/depth-range/variable – standard deviation/(record length in years) [a measure of how signal/noise is increasing]
- Depth ranges might be ML, upper- and mid-pycnocline, intermediate, deep and abyssal waters.

3.2.2 The Framework for Ocean Observing (FOO) document states the need for coordinated ocean observations in support of societal requirements.

3.2.3 The overarching physical climate requirements are to close time-varying mass, momentum, heat and freshwater budgets, including the contributions of ocean surface forcing, advection and mixing. These requirements need to be met with a view to support understanding of the net effect of these physical processes on biogeochemical quantities.

3.2.4 Models are needed for combining and interpolating the always sparse ocean observations, but models have many deficiencies and differences among them. Need reference data/benchmarks to test, improve, validate them. Main deficiencies (even when constrained by ARGO, altimetry, repeat hydrography) are air-sea fluxes; mixed layer including the frontal scale dynamics; deep+abyssal circulation; western boundary currents; upwelling regimes; spatio-temporal variability of convection and mixing by eddies, inertial waves and internal tides; flow through straits and passages.

3.2.5 Any budget calculation or model state estimate needs to know the uncertainties of terms. This requires long timeseries with high time resolution to calculate variance and variance changes, covariance functions (for degrees of freedom), aliasing estimates, resolution of intermittent processes (eddies, internal tides, etc) plus pre/post calibrations of sensors. **OceanSITES can do this at benchmark locations**

3.2.6 Based on the above, the resulting required sites would be *located at:*

1. Locations to quantify processes for water mass formation and variability with:
   - Known critical locations with water mass formation (deep convection) sites or other sporadic intense processes
   - Continuation of pre-existing long timeseries as long-term reference sites
   - Distributed observations of mixing/mixed-layer events at sites occupied because of other drivers (air-sea flux, biogeochemistry, etc)

2. Locations to provide accurate reference values, benchmarks and uncertainty for circulation quantities
   - Deep and abyssal circulation, including AMOC
   - Straits and passages
   - Western boundary currents
   - Eastern boundary currents/upwelling regimes
   - Equatorial/monsoonal circulation
   - Distributed reference sites for broad-scale upper layer circulation (use existing sites…)

3. Locations to provide accurate reference values for deep T/S variability (repeat hydrography may be aliased, deep ARGO has unknown accuracy)
   - Use crossings of repeat hydrography sections, and chokepoints of bottom water circulation

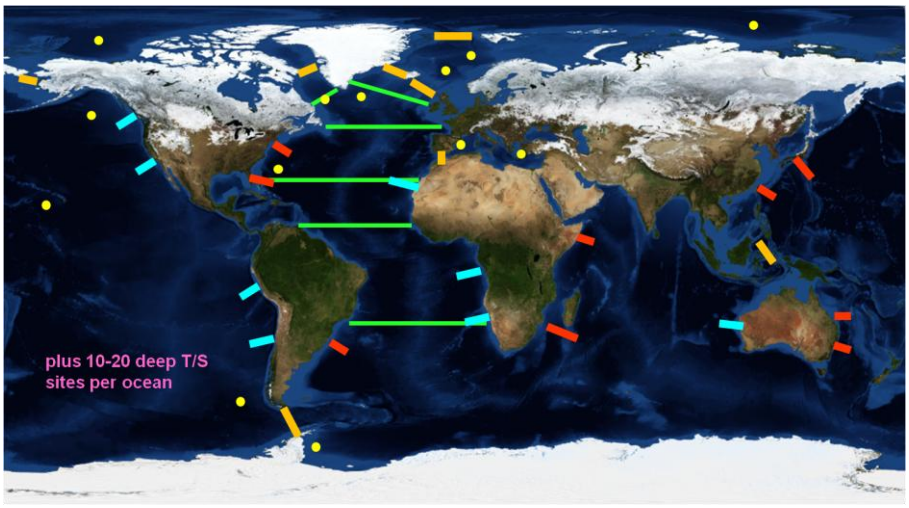


Figure 2-Locations for Sites measuring physical parameters

3.2.7 Project need about 20 sites in larger ocean basins and 20 in smaller basins (Fig. 2)

3.2.8 Discussion on EOF – analysis was for temperature and different suggested approaches. This is the 1st time this is presented for discussion. This is a straw man and the community or the team can comment on if this is a reasonable start.

3.2.9 We need to keep in contact with Greg Johnson and Bernadette Sloyan who are working towards a proposal for deep ocean observing system . Looking to close the budgets of mass and heat and freshwater for climate purposes. The deep observing group is still working on the requirements

3.2.10 New sites are required for deep ocean Eulerian observations. These do not need to be surface to bottom moorings. OceanSITES is the natural homefor such components of a robust deep ocean observing system.

3.2.11 We need to pick out those where OceanSITES can make a difference (Eulerian, multivariate time-series extending from the surface to the seafloor). Then should we stick to the points that are there.

3.3 Biogeochemical and ecosystem

3.3.1 Discussion with relation to MOIN (discussed in Section 2.5) Can MOIN be a first step here?

3.3.2 Doug addressed problem classes (*get presentation)*

3.3.3 Discussed the ocean contribution to the renewal of atmospheric oxygen and the ability of the ocean to continue to moderate atmospheric CO_2 levels

3.3.4 There are few places in the ocean where we can look at this with depth resolved for biological productivity to observe basic processes for this and ***what can we learn from OceanSITES particularly?***

3.3.5 Doug Wallace showed maps of the OceanSITES sites with information pulled from the catalog with sites measuring biogeochemical parameters against various

backgrounds. E.g. bathymetry, dust, sea-air CO2 flux, Longhurst provinces, chlorophyll, salinity, SST. It was noted that some sites are not in the extreme areas (Fig 3).

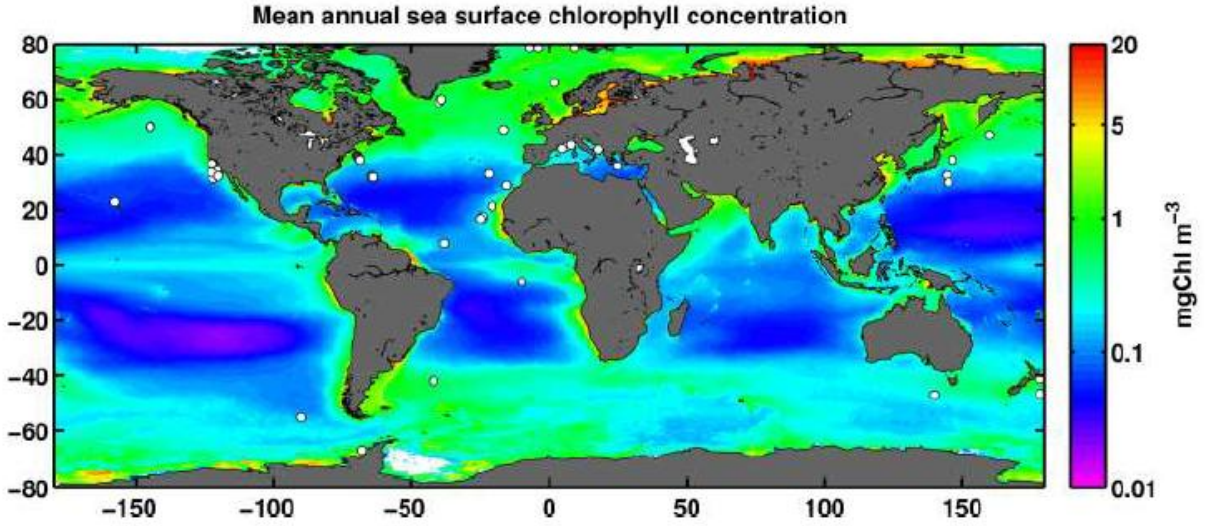


Figure 3 - Biogeochemical sites plotted with Mean Annual sea surface chlorophyll.

3.3.6 These maps start to make excellent metrics (Action – project office to work on adding these maps to the normal inventory)

3.3.7 Out of this we can find some sort of criterion where we need measurements. These climatologies give us some idea of where we need sites

3.3.8 IOCCP (Laura L) would like to lend a hand in where carbon sensor would be useful. Sensor co-location (e.g. oxygen and carbon).

3.3.9 Question on mean sea-air flux – should we have dots in the extreme? Or the variance? Adding sensors to existing sites. Co-location of sensors is everything.

3.3.10 Tom Trull commented on the daily cycles and seasonal cycles. Antje made a very strong point on the ecological vision. These are looking bottom up and maps from the top down (through tagging animals) show a very different picture and we should be talking to the ocean tracking network. They are interested in talking to OceanSITES and are in the process of putting in some deep ocean receivers (Action – Chairs, contacts with tracking network)

3.3.11 Ocean Acidification community – *what* are the key parameters that need to be measured, not so much *where*.

3.3.12 On this topic, Uwe then reviewed the slides from the Seattle Ocean Acidification (OA) meeting in preparation for the next OA meeting in July. This showed the map of existing sites and those that would lend themselves to adding a sensor to measure this (Fig 4)

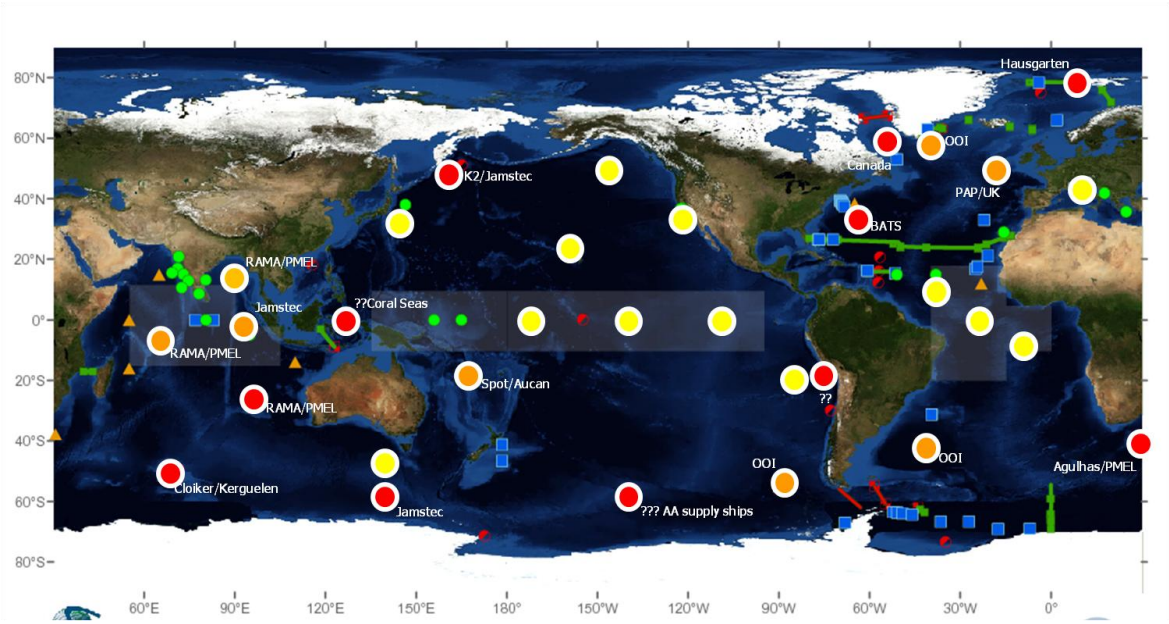


Figure 4 - OceanSITES map with OA parameters. Yellow: collecting SOME OA parameters. Orange : likely to happen in the next few years, Red : unlikely to happen without strong push from community.

4 PRODUCTS AND INDICATORS

4.1 Roger Lukas provided a presentation on his thoughts on Indicators and Products for OceanSITES. The presentation is available on the OceanSITES Meeting page. In his presentation, he outlined the following:

- Temperature, Salinity, Velocity in the mixed layer (ML)
- Stratification at ML base
- Dissolved oxygen-nutrient ratios in intermediate waters
- Deep and abyssal T-S trends
- Salinity trends (focus on deep and bottom water)

The ppt had some requirements and goals for each site:

- Temperature trends (deep and abyssal) = 0.001C/yr
- Salinity trends (deep and abyssal) = 0.001/yr
- Dynamic height (relative to 4 km) trends ~ 0.1 mm/yr
- Annual average transport/unit width ~ 0.5x10-3 Sv/km

4.2 The question on indicators was opened up to the floor and the following additional indicators:

- MOC transport,
- boundary current transport (mass, heat, freshwater, biogeochemical quantities) upper/intermediate/deep,
- upwelling strength index,
- heat content,

- timing of NCP and spring bloom in relation to forcing (stratification, etc) and this needs an indicator for stratification and NCP,
- highly resolved timeseries of mixed-layer depth (hourly),
- seasonal cycle of heat flux (e.g. when switches sign),
- statistical quantities like variance/min-max of variables (pH, CO2, etc) and fluxes, average T of deep microcats (by basin or hemisphere),
- timeseries of CO2 fluxes,
- SSS and other surface variables for satellite calibrations,
- water mass properties at time of deep convection/mode
- water formation/potential vorticity,
- dynamic height differences,
- large-scale impacts of the sites via adjoint calculations using different models,
- quality of food reaching benthos (C-N ratio from sediment traps),
- O2 concentration at minimum level,
- short-term variability of ratio between dissolved CO2 and O2 in oxygen minimum zones,
- sinking particle abundance from backscatter data,
- response to extreme events such as hurricanes (heat content, stratification),
- calibrated air-sea fluxes,

4.3 The NOAA Climate Program Office reminded us that we need to tie this all into societal benefits/impacts and take the next step and have more outcomes on the things people care about and not only the things the scientists care about. Create additional products such as

- Outreach products (e.g. videos and informational brochures)

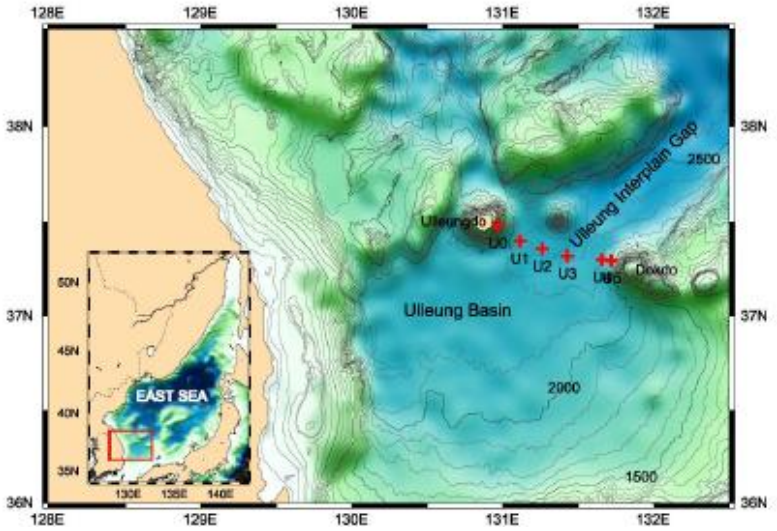
- Lesson plans for a teacher that would be willing to build a lesson plan around OceanSITES data

5 CURRENT NETWORK STATUS

Reviewing and Updating the Network Status. All presentations are available on the OceanSITES website (http://www.oceansites.org/meetings/index.html)

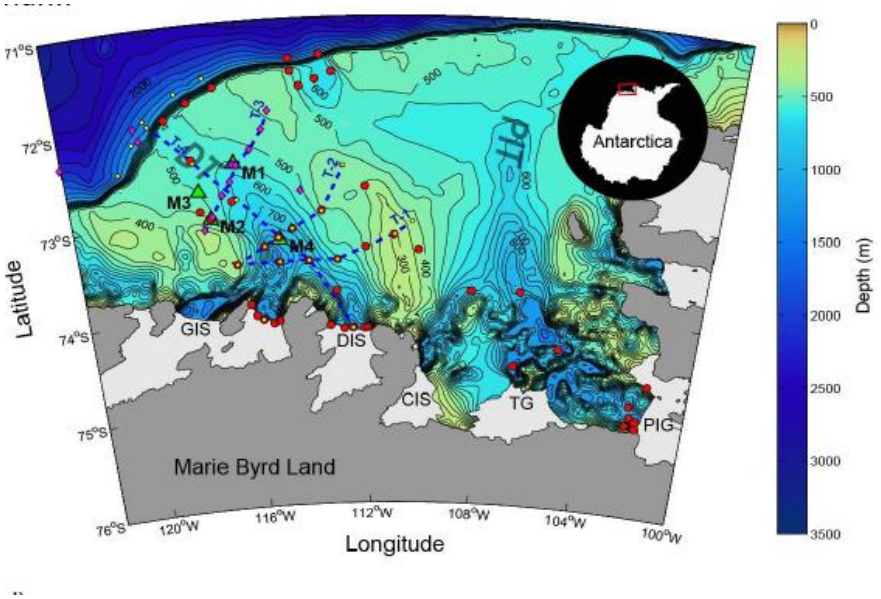
5.1 Site EC1, Marginal Japan Sea (KI Chang, SNU)

- Oceansites provided microcat during last year that were calibrated
- Mooring in place since 1996
- Collaboration
- Approved member



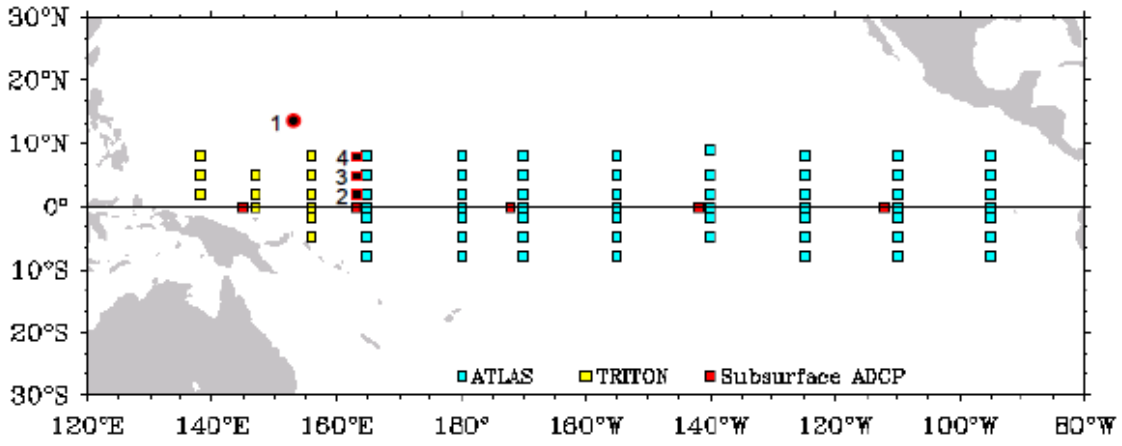
5.2 Amundsen Sea (Ho Kyung Ha, KOPRI)

- Presented pros and cons for their site to become an Oceansite 1st it is a shallow site <1000m
- 4 mooring system M1-M4
- Looking to see if they can be part of Oceansites
- Working under the SOOS
- New station in Antarctic – Jangbogo (under construction)
- Discussion on if this is considered an OceanSITE?
    - They are inside the shelf area, but in an area carved out by glaciers.
    - The scientific objective is open-ocean and the focus is on circum polar deep water.
    - Is the goal to continue to sustain the observations? Yes, as funding allows. Up to 2015.
    - This could be 1 site that we consider and it will have 4 platforms
    - A more general discussion on sharing of resources. Ship time and hardware in Southern Ocean
    - Approved as a new OceanSITE



5.3 KIOST Activity (Jae Hak Lee, KIOST)

- Western Equatorial Pacific, GAIA Project – consideration and approved for OceanSITES inclusion. It was discussed that these are interesting sites to deploy other instruments (ie. OA)

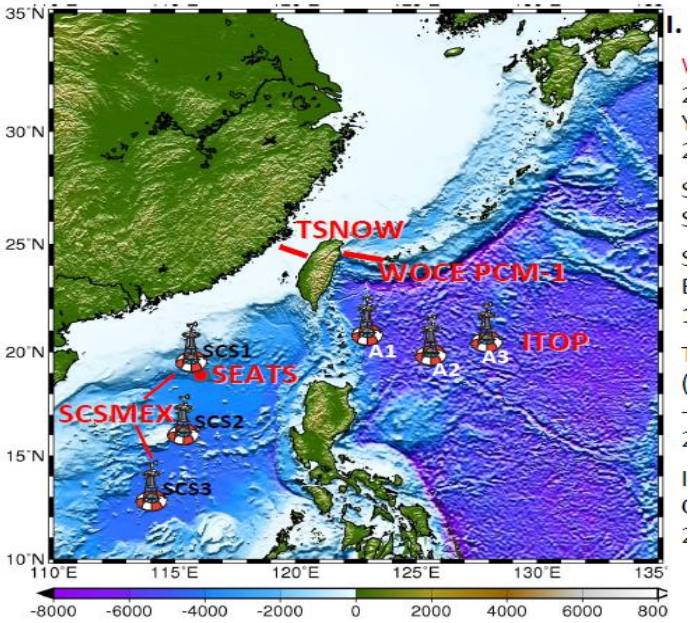


- Activities in the Southern Ocean, Udintsev Fracture Zone
  - CTD casts, moorings, current meters, echo sounders, floats, surface drifters, satellite

5.4 Open-ocean, long-term moorings operated by Taiwan (Sen Jan, NTU)

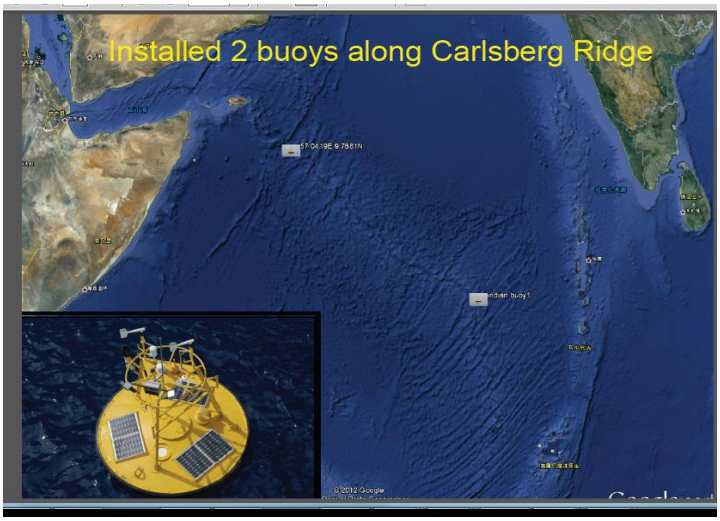
- Historical Observations (past 2 decades)
  - WOCE, SCSMEX, TSNOW, SEATS, and ITOP (past 2 decades)
- Current Observations
  - SEATS and OPTV

- Future Plans
  - SEATS, OKTV, TLOIGO
- OceanSITES Sites (new sites)
- 3 contributions SEATS, OKTV, TLOIGO (for TLOIGO – they may pick 2 sites one at SEATS and one in SE Taiwan). The director shows high interest in participating in OceanSITES



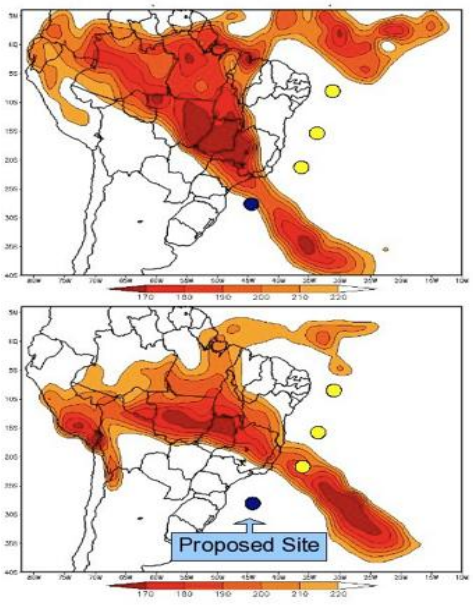
5.5 Chinese Mooring and Buoy Observations (Chujin Liang, SOA)

- Sites installed in the Andaman sea
- Added sites onto oceansites maps (west pac and sw indian) – sites were chosen for the interest in manganese
- SW Indian site
- 2 moorings in the NW Indian ocean near RAMA array (installed May 2012)
- Upcoming plans – 7 moorings and real-time buoys in West IO
- New sites: Chu Jin is PI for 2 sites in SW IO – he would be willing to provide data to OceanSITES at sites 3 and 4



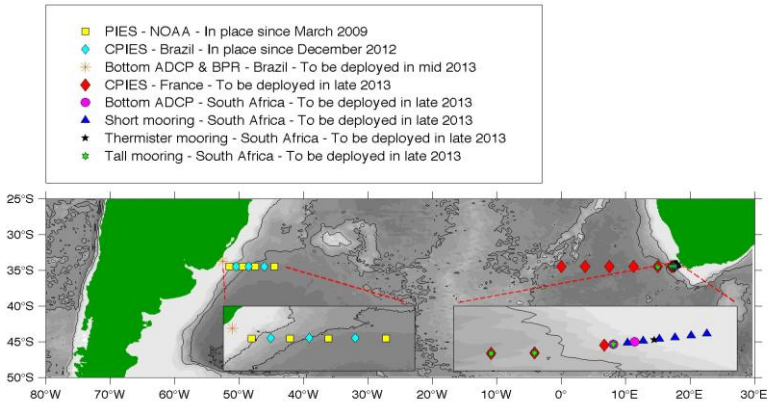
5.6 Brazilian Atlas - B (Olga Sato, USP)

- Atlas B – installed to monitor hurricanes in South Atlantic
- New OceanSITE



5.7 SAMOC Update (Molly Baringer, NOAA/AOML)

- Dr. Baringer provided an update on the SAMOC array and plans for later in 2013



5.8 India's National Data Buoy Programme (VSN Murty, NIO)

- Update on Indian Moorings - next recovery 2014
- Sites outside of EEZ will be available to OceanSITES
- Presentation not available

5.9 INCOIS Update (Pattabhi)

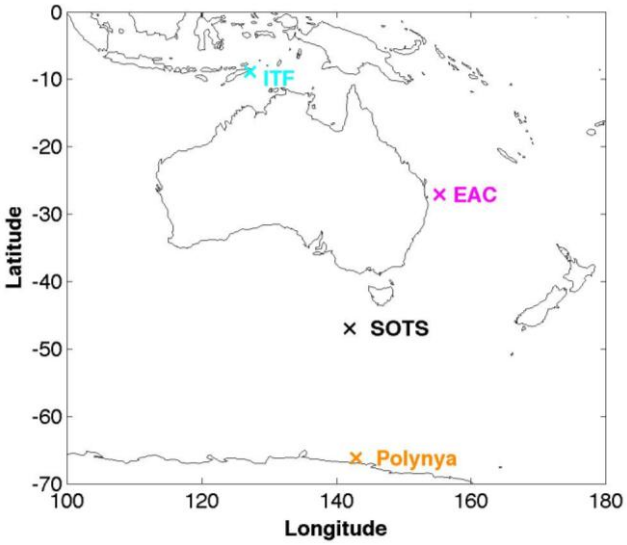
- Dr. Pattabhi presented an update on INCOIS activities
- Presentation not available

5.10 KIOST Update (Dr. Dongchull Jeon, KIOST)

- TIPEX Programme – decided in 1 year
- 135E25N

5.11 Australian Bluewater (Tom Trull, CSIRO)

- Polyna moorings – 2013 not recovered where to deploy next? Issues with ice breaking
- East Australian Current – to be recovered in Sept 2013
- ITF moorings – 2nd ITF recovered in June 2014
- SOFS & SOTS data holdings – recovered and redeployed in May 2013 (recovery again March 2014)
- Funding uncertain



5.12 Station ALOHA: Time Series Science and Status (Fernando Santiago-Mandujano)

- 25 years HOT, 9 years WHOTS, and 2 years ACO
- Fernando showed the salinity trends at the sites
- Data management was discussed and the data portal presented

6 MOIN DOCUMENT

6.1 Doug reviewed the background for The Minimalist OceanSITES Interdisciplinary Network (MOIN). Basic global coverage on how the marine ecosystem functions in relations to physical forcing in the upper ocean. The situation has changed quite a bit since we first started thinking about this.

6.2 We have a lot of platforms that already are collecting this information. We may not need a lot of additional sensors but we do need to have a strong push to the community for upgrading their sites for sustained long-term sites

6.3 Question regarding Chilean buoy off the coast – biogeochemical time series?

6.4 Doug pointed out that there are several steps: 1) figure out where we are in terms of locations and biogeochemical sites, 2) take that information and brainstorm about where we need this information (all intertwined with IOCCP and OA) MOIN partly related to OA and IOCCP but also what are the relationships between all these forcing

6.5 If we just started from zero, where we would want sites and how do we get there? Having a site in the southern Antarctic zone is a high priority.

6.6 OA – will deploy a buoy off of NE Iceland. RAMA mooring on Bay of Bengal will have OA parameters added. There are more CO2 moorings along the equatorial pacific

6.7 If people know of sites that are missing from the site catalog that have biogeochem parameters (e.g. the Chilean) email them to project office

6.8 Gather information about what is planned and active and also look at what is also missing. This could push the national community to recognize and hold workshop.

6.9 Doug Wallace will host a workshop in Halifax spring/early summer 2014. Uwe – that is a year from now. We can't wait that long. Broaden out this group and think about other people who need to be thinking about this. Meeting in winter would be better. Possibly holding it in conjunction with OceanSciences meeting in Hawaii next year might be better. Interested participants are encouraged to let Doug know.

7 SHARING OF PLATFORMS, SENSORS, AND DATA EXPERTISE

7.1 All members were encouraged to announce their ship time opportunities for resource sharing and to minimize any duplication of effort. All cruises should be made available on individual site web portals or through the project office. For example, the ALOHA site has all the cruise plans and information at http://aloha.manoa.hawaii.edu. Request to ensure that the contact person for each site is contacted/consulted if a ship plans to go to that area. This should be more explicit in our documents. Contact the PI. (Action – Steering Committee, Project Office)

7.2 We need to also consider other technologies and alternatives as reducing ship time is a problem.

7.3 OceanSITES Members should have a willingness to add sensors from other OceanSITES members to make sites multidisciplinary and cover the entire water column.

8 RELATIONSHIPS TO USERS AND OTHER COMMUNITIES

OceanSITES needs to develop more collaboration with other communities for sharing of resources. Representatives from these communities should be invited to attend OceanSITES meetings and if possible, OceanSITES members should attend those community meetings.

8.1 Hydrophone sites – LIDO

8.2 Ocean Tracking network

8.3 Deep Ocean initiative

8.4 INDEEP- Intern Network for scientific investigation of Deep sea ecosystems

8.5 Ocean Acidification, IOCCP

Action – develop contact with the above groups, if not already, and engage in meetings.

9 QUICK IMPLEMENTATION ACTIVITIES

9.1 Deep-Ocean Deep Observing Network (DON)

At the December, 2011 La Jolla OceanSITES meeting, it was decided to make use of the many existing OceanSITES platforms in deep water to make an "instant" contribution towards this need and goal. OceanSITES moorings over 50 sites already carry deep temperature/salinity (T/S) sensors. Since the call in 2011, 14 new T/S sensors have been installed and 13 more are planned.

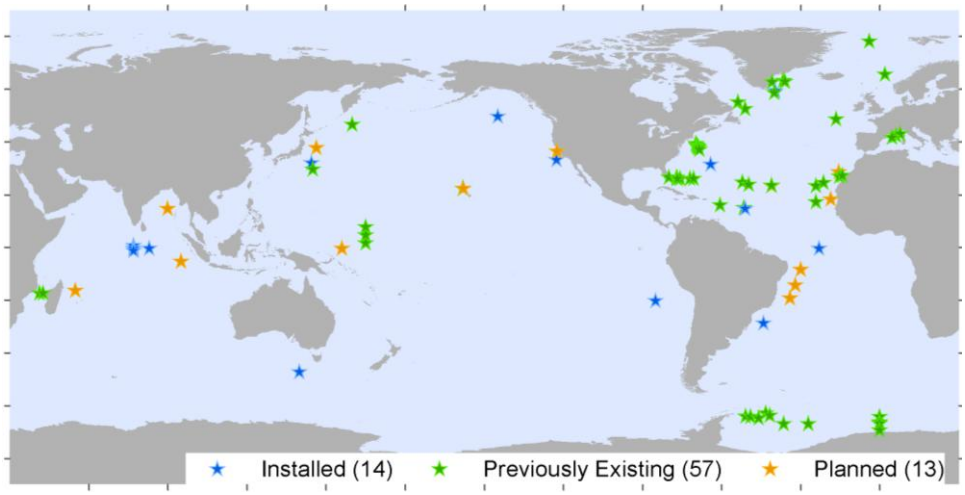


Figure 5 - Status of the OceanSITES Deep T/S Sensors.

There are over 20 microcats available in the matching pool.

Institution	Country	Donor	Matching	New
AWI	Germany	U. Schauer	3	3
Geomar	Germany	P. Herzig	3	3
KIOST	Korea	J-H Lee	2	2
NOC	United Kingdom	R. Lampitt	2	2
Sea Bird	United States	N. Larsen	5	
SIO	United States	T. Haymet	3	3
SNU	Korea	KI Chang	1	1
WHOI	United States	S. Avery	3	3
Total			**22**	**17**
Gap to Goal			**28**	

Sea-Bird Inc has offered free calibrations for the microcat-type sensors that get dedicated/registered for the DON. This will be for a maximum of 50 sites (meaning 100 registered instruments counting the ones needed for swap-out/rotation). Shipping costs are at the expense of the PI for the transport to Sea-Bird, and Sea-Bird has generously agreed to carry shipping costs back to the PI.

Sea-Bird microcat sensors purchased after October 1, 2012, will count towards an aggregate volume discount, such that for every 10 purchased Sea-Bird will donate another microcat to the matching pool.

There was still concern over how some institutions would receive a matching instrument and some institutions are not able to donate outside of their own institution.

The data must be made available from the OceanSITES data portal in the data/ancillary directory.

Action – continue to install deep-ocean sensors and provide serial numbers to Project Office.
Action – DMT/GDACs make data directory for microcat data.
Action – PIs provide data from your microcats to OceanSITES

9.2 JCOMM/GOOS/FOO Deep Observing Strategy Group (G. Johnson, B.Sloyan)

The OceanSITES Deep Ocean Network (above) will contribute to this group. We need to stay involved and attend next workshop.

10 OCEANSITES WEBSITE

10.1 OceanSITES Maps

The project office presented an updated map for discussion. Comments on the map were:

- *We need to have one map where data is actually submitted and highlight those sites. Remove dots for no data? Or an empty circle? Action for project office to explore and produce these maps.*
- *The map should have a standard background (solid color) and not use a bathymetry layer*
- *We need 1 map for the status, 1 that highlights holes and gaps, and 1 for outreach (perhaps this has a bathy background)*
- *We need to provide different background layers – i.e. salinity, currents, temp, etc.*

10.2 OceanSITES Station Catalog

The catalog is stored in a relational database at JCOMMOPS and is updated by the project office when new information is received from PIs. Normally that happens at or before these meetings. Other ideas:

- *Create an interactive system that the PIs can use to update that feeds directly into the database. Action – project office*

10.3 Exchange of Information

We need an area for exchanging information. An ftp site is not enough. Is Google docs a better alternative? The DMT uses Mantis for document sharing and updating, but this might not be the best option for the entire SC.

11 FUNDING, OUTREACH, CAPACITY BUILDING

11.1 Project office support

K. Stroker presented the past year contributions to the OceanSITES Project Office through JCOMMOPS. Members are encouraged to contribute to keep project office support. K. Stroker reviewed the different mechanisms to submit funding: 1) though CLS (JCOMMOPS host office) directly is the easiest and most straight forward with an invoice sent directly to the member institution, or 2) though an international host organization WMO or IOC.

11.2 Funding for Travel

U. Send reviewed how important it is to have this as a line item in a budget. We were very lucky this meeting to get the attendance we did, but many could not attend due to budget cuts in their home institutions. NOAA was again thanked or it's assistance.

11.3 Proposals

Members were reminded to please keep OceanSITES in mind to make an additional request to advance joint work on OceanSITES

11.4 Private foundations

Members are encouraged to approach your department that tries to get donations for research. At Scripps (SIO) there is an office for this, called the Development office.

12 DATA SYSTEM STATUS

12.1 Data holdings

The Chair reviewed the structure of the path to submit OceanSITES data. There are two GDACs (global data assembly centers) for redundancy, which are the users' access points for OceanSITES data. One GDAC is located in France (Coriolis, http://www.coriolis.eu.org), the other one in the USA (NDBC, National Data Buoy Center, http://www.ndbc.noaa.gov). The GDACs handle OceanSITES data, metadata, and index files on ftp servers. The servers at both GDACs are synchronized at least daily to provide the same OceanSITES data. The user can access the data at either GDAC's ftp site.

For this agenda item, the GDAC data holdings were compared. As of the writing of this document (May, 2013) there are over 88 site folders and 8200 files in each of the GDAC directories. However, in the OceanSITES catalog there are 285 sites. Thus, only 30% of the members are submitting any data in OceanSITES format.

12.2 How to increase data flow, enforce data delivery?

The team discussed what to do when operators are not submitting data. The OceanSITES project needs to be more proactive in following up with data providers and start removing sites from the OceanSITES map or turning black to indicate that they are not following through with commitments.

The data has to be made public and many of the PIs are providing the data in real-time or freely available from their own web portals. The issue is the time to format the data to OceanSITES format.

A discussion was held on what incentives we can offer to ensure that scientists want to provide data. Uwe then posed the question to the group? What brings you to these meetings? Responses were science and metadata, sharing resources and ideas. The CARINA (Carbon in the Atlantic Ocean) data is only accessed if you submit data. We have to find a way to find a bigger "carrot" to offer to PIs.

An emphasis on publications and collaborative work will entice scientists. We need to maintain a publication database that uses OceanSITES data.

12.3 Funding of data management activities

Each proposal should include information and funding for data management.

13 DATA AWARENESS AND USAGE

13.1 Will keep only data and products from OceanSITES sites in the data system.

13.2 Where do we keep the ancillary products? We should really focus on what we do and what we need to do and not keep data for everyone who does not have a home. The deep-ocean T/S data should be kept in the OceanSITES framework.

13.3 We do have to be clear about what we do not include and why? Make sure we understand the reason for it

13.4 Thierry Carval, Ifremer GDAC, showed download statistics. These statistics will be cleaned up to remove the robots and they will provide them every 6 months. Action - GDACs

14 QUESTION/NEEDS FROM DATA MANAGEMENT TEAM MEETING

14.1 Data Management Team Chairs – The DMT has been without a proper Chair since January, 2012 when Bill Burnett left NDBC. The DMT has still managed to hold montly meetings without leadership under the interim chairing committee: T.Carval, J.Zhou, M.Lankhorst, M.Pagnani, N.Galbraith

14.2 The Steering Committee is invited to nominate a member from their institution as Chair.

14.3 The SC must work with the DMT closely on any data issues and is encouraged to utilize resources from the GDACs or DACs for formatting data to OceanSITES format.

15 ADD ON AGENDA ITEMS

15.1 **Historical Shipboard Information**

15.1.1 How to track this and where does the information go. (work with Martin)

15.1.2 Meghan – historical ocean weather ship data. This should be considered as some point. Some of this data is being lost. E.g. PAPA data – different data versions are being found. Where is the home and where is the international ship data. Uwe – those sites that are part of OceanSITES, we should have them as part of our framework. This issue is scheduled to discussed in the DMT portion of the meeting

16 WRAP UP AND ACTIONS

16.1 The Steering Committee Meeting concluded at 17H30 on May 28, 2013. The team thanked the hosts, Dr. KI Chang and his staff at SNU for their hospitality and warm welcome to Seoul.

16.2 Action Items from the meeting are in Appendix C

17 FUTURE MEETING

17.1.1 Location and Date of Next Meeting

17.1.2 It was decided to keep the meeting jointly with the data management team (DMT). Possible locations discussed were: South Hampton or Brazil. Time frame 1.5 years from this meeting – Fall of 2014.

Appendix A

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Appendix B

Data Management Team Report

The meeting of the DMT was held over 2 days with a very full agenda. The main agenda items were:

- **DMT Agenda Items here**

The full meeting report for the DMT is available at on the OceanSITES website. The entire document will not be included in this report.

Appendix C

Action Items

N°	topic	priority	description	who	when	date of completion
1	OceanSITES Scope		Review the OceanSITES "How-to" Document and ensure there is no constraint against shallow water stations			
2	OceanSITES Scope		Review the metadata and allow for a field that points to adjacent sites.	DMT		
3	OceanSITES Scope		Draft an OceanSITES Charter	Exec Committee	OS2014	
4	OceanSITES Scope		Provide more direct links to other efforts on the website	Project Office		
5	Metrics		Finalize metrics and writing teams			
	Metrics		White papers for each OceanSITE Metric			
6	Metrics		Maps showing OceanSITES with various parameters and backgrounds	Project Office/JCOMMOPS		
7	Metrics		Make contact with Ocean Tracking Network			
	Products and Indicators		Finalize and publish the list of indicators			
8	Sharing of Platforms		Publish ship time opportunities on a website or send to the project office	All		
9	Deep-ocean Network		Pis to continue to install deep-ocean T/S sensors at their sites and inform Co-Chairs and Project Office of serial no., location, model numbers and provide data to OceanSITES	All PIs		
10	Deep-ocean Network		GDAC to add a directory for microcat data	GDACs		

11	OceanSITES Website		All Pis to send Project Office updates to their sites	All PIs		
12	OceanSITES Website		Make a new map with those sites not providing data as an empty circle	Project Office		
13	OceanSITES Website		Investigate and set up a new area for exchange of information. Wiki? Google Docs? An ftp area is not good enough	Project office, Johannes		
14	Funding		Pis to approach their departments for funding opportunities. Look at specific departments within your organization that works to get donations for research.	All		
15	Data Status		Produce reports on number of downloads	GDACs		
16	Funding		Pis to include in proposals a portion of funding for data management activities			
17	DMT Chairs		Identify new Chairs for the DMT	Exec Committee	ASAP	
18	Publications		Compile a list of OceanSITES publications. Where OceanSITES data was used and referenced	All		

[ii] Trenberth, K., Fasullo, J.T., Tracking Earth's Energy. *Science 16 April 2010: 328 (5976), 316-317. [DOI:10.1126/science.1187272]*