8th OceanSITES Steering Team meeting

Date: 1-2 December 2011

Location: La Jolla, California USA

Authors: Uwe Send (Scripps Institution of Oceanography)
Robert Weller (Woods Hole Oceanographic Institution)

Meeting information: http://www.jcomm.info/oceansites2011

Revision Information

Date	Prepared by	Reviewed by	Version
05/12/2011	K Stroker		0.1
23/03/2012	U Send	Revised	0.2
25/04/2012	K Stroker	Small Revisions for publication on website	1.0

Table of Contents

1 INTRODUCTION

The 8th Steering Team and 5th Data Management Team meetings of OceanSITES jointly were hosted by the Scripps Institute for Oceanography in La Jolla, California USA. The meeting was made possible with support from the NOAA Climate Program Office and contributions from the SIO director's office.

Host and co-chair, Dr. Uwe Send, provided a short introduction on behalf of the Co-chairs. He reviewed the considerable gap in time that has occurred since the last OceanSITES Steering Committee Meeting which took place in Venice in 2009. During this meeting in Venice, it was decided that all PI's and operators of OceanSITES, and future OceanSITES, would be represented on the Steering Committee. Dr. Send discussed the progress made at the Data Management Committee Meeting, which preceded this event and whose meeting report is presented separately. For the past 15 months, the project office position has been vacant and the impacts of this were discussed. Ms. Kelly Stroker has joined the OceanSITES team and will be filling the role of Project Office, replacing Ms. Hester Viola who departed in September, 2010.

The Steering Team Meeting (reported here), the Data Management meeting (reported separately) and the OceanSITES Executive Committee meeting, took place over four days in La Jolla, California.

A list of attendees is provided in Appendix A.

The objectives of the meetings were:
1. Reinvigorate OceanSITES activities after being without Project Office for nearly 2 years
2. Connect with the Data Management Team (provide guidance/input/answers to questions)
3. Steps needed to increase data holdings and flows
4. Discuss a possible broadening of OceanSITES (boundary currents, coastal carbon, etc)
5. Decide on quick implementation activities resulting from OceanObs09 (low-hanging fruit) and path forward (who does what, funding them, etc)
6. Metrics of network completion
7. Products and indicators
8. Review current network status, discuss/approve and invite new sites
9. Prepare feedback to POGO and input for JCOMM meeting at Ocean Expo Korea (needed by IOC)
10. Funding, outreach, capacity building, future meetings

The meeting was well attended with over 40 participants from 14 countries and all disciplines and varied expertise. Two agencies were also represented (NOAA, NASA).

The Steering Committee meeting agenda items were the following, which will be discussed in detail:
- Report from the Co-chairs and Project Office
- Implementation ideas following OceanObs09
- Demonstrating the progress and value of OceanSITES and time series data
- Network status and planning
- Network presentation

- Definition of an OceanSITES site
- Data System Status
- Question/needs from Data Management Team meeting
- Relationships to users and other communities
- OceanSITES Website
- Feedback to POGO and input for JCOMM meeting at Ocean Expo Korea

2 STEERING TEAM MEETING

2.1 Report from Co-Chairs

2.1.1 The Co-Chairs of the OceanSITES Program reported on the progress and limitations since the previous OceanSITES Steering Team met in Venice, prior to OceanObs09. The main limitation was the lack of project office support for the past 15 months. This gap has been filled and Ms. Kelly Stroker is currently employed at JCOMMOPS in Toulouse.

2.1.2 Uwe Send discussed the Steering Team and their role. At the OceanObs09 Steering Team meeting, it was decided that the Steering Team would include all PIs and operators of OceanSITES stations. The attendance at this meeting reflects that and many participants/teams attended for the first time.

2.1.3 Prior to this Steering Team Meeting, the Data Management team (DMT) met on 29-30 November. A separate meeting report is included in Appendix B for that meeting. It was well attended by over 30 data managers. Some representatives attended both sessions.

2.1.4 A brief discussion was held on the OceanSITES executive committee and changes and departures. There are currently 3 available spots that will become vacant.

2.1.4.1 Dr. Bill Burnett, co-chair of Data Management Team, will be taking a new position. An interim “chairing team” was decided to fill this gap on the data management team until a new leader is decided upon. This team consists of: Thierry Carval, Maureen Pagnani, Nan Galbraith (absent), Ruth Curry, Matthias Lankhorst, and Jing Zhou. Since then, Ruth Curry has excused herself from participation in this Chairing Team.

2.1.4.2 Sylvie Pouliquen, co-chair of Data Management Team, has expressed that she is too overwhelmed and is not be able to act as Data Management Co-Chair and thus as member of the Executive Committee. She will participate in the DMT when available.

2.1.4.3 Tony Knap will also be stepping down from OceanSITES duties.

2.1.5 Bob Weller attended POGO-12 in Seoul, Korea in January, 2011. The partnership was extremely supportive of OceanSITES and outlined their efforts in the Seoul Declaration as “Establishment of a globally-coordinated network of time series observation stations in the oceans to monitor a rapidly changing Earth System through OceanSITES.” POGO has asked that the OceanSITES team hold a meeting on *Coordinating Ocean Observations*. The team will discuss this meeting further at POGO-13 in January 2012. POGO also pledged some financial support for OceanSITES (see below).

2.1.6 Bill Burnett presented on OceanSITES at the 27th Session of the Data Buoy Cooperation Panel (DBCP).

2.1.7 Meghan Cronin has published a book chapter that provides an overview of sustained ocean time series observing sites. (Cronin, M. F., R. A. Weller, R. S. Lampitt, and U. Send. Ocean reference stations. In: Earth Observation, R.B. Rustamov and S.E. Salahova (eds.), InTech, Rijeka, Croatia, ISBN: 978-953-307-655-3. *In Press*, 2011.)

2.2 Report from the Project Office

2.2.1 The new Project Office coordinator, Kelly Stroker, presented an update from the project office. She reminded the group that she was part of JCOMMOPS: which is an operational program support centre resourced by two technical coordinators and one half time IT staff member (employed by CLS with funds provided by the USA for OceanSITES). JCOMMOPS provides support for the Argo Float Program & Ship Observations Team (70% and 30% respectively of Mathieu Belbeoch's time) and the Data Buoy Cooperation Panel and OceanSITES (70% and 30% of Kelly Stroker's time) on behalf of the JCOMM Observations Program Area.

2.2.2 The Project Office reviewed the main duties and responsibilities of the project office and outlined the priority tasks in the previous year, which were:

- Updating documentation and maps to get a clearer Network status
- Updating and improving websites
- Updating contact details and user groups
- Supporting the Data Management Team in getting data (and metadata) onto GDACs
  - Maintaining Site Catalog, monitoring data flows and GDAC structure
- Seeking Sustained funding for the Project Office Support
- Meeting organization, preparation of reports

2.2.3 The Project Office reminded the group that JCOMMOPS has created photo albums for all observing networks stored on Google Picasa, an OceanSITES album has been created at http://picasaweb.google.com/JCOMMOPS/OceanSITES#, and participants are encouraged to share images for the album.

2.2.4 The funding situation for the project office was then discussed. Currently the project office funds are provided by the US NOAA, Australia; Ifremer has announced support and POGO is providing a one-time contribution (both new this year).

2.3 Implementation ideas following OceanObs09

2.3.1 New Framework for Sustained Ocean Observing

Under this agenda item, Eric Lindstrom presented a talk entitled "A Framework for Ocean Observation: OceanObs09", which reviewed the international effort to follow up on the OceanObs09 meeting with a defined path forward for sustained ocean observing. He discussed the frustration at that meeting on the slow growth of the observing system network and one outcome was to create a Framework of Ocean Observations, which OceanSITES is a part of. The Framework will address the challenge and opportunity to grow the system with more biogeochemical and ecosystem components, and is meant to integrate components while making use of existing structures. The approach is to represent the framework through a very simple concept: REQUIREMENTS are driving the PROCESS (observations, deployments, maintenance,…) leading to OUTPUTS (data product creation). That means that societal issues lead to requirements which lead to Essential Ocean Variables (EOVs), similar in concept to the Essential Climate Variables (ECVs). The output/information should lead to an impact on the issues (this can be checked and validated).

Example framework activities are SST, ocean acidification and carbon, zooplankton. The framework also is trying to make the link between operational systems and research/science, by introducing the concept of "readiness levels" for global sustained observing (concept→pilot→mature).

One outcome of Framework activities was the Deep Ocean Observing Strategy, initiated with a workshop 30 March-1 April, 2011 at UNESCO. Initial definition of "deep" is "below 2000m". Challenge is to get physics, biogeochemistry, and ecosystem observations together. The Strategy has an Executive Committee and a Writing Team. OceanSITES seems well positioned to insert itself into that strategy with actual observations, and platforms for biogeochemical and ecosystem sensors.

Action: OceanSITES needs to participate in/contribute to/offer infrastructure to the Deep Observing Strategy.

Eric made some of the following points relevant for OceanSITES that lead to discussion amongst the group.

- Grouping observations by essential ocean variables (EOVs) is the approach that should be taken rather than grouping by platform
- The Essential ocean variables are still being developed and a task team is working on defining metadata requirements for these variables
- What are the drivers/requirements for the OceanSITES observing system (societal needs and benefits for the next decade)
- What observations are needed to provide the needed information? How do the products justify the observations?
- Readiness level – define the steps from concept to mature to get to sustained observing system
- What metrics are seen as evaluating our success?
- OceanSITES needs better coordination with other groups, such as: deep hydrography, Argo, Deep gliders, etc.

- Eric reminded the group that we need to make clear what requirements drive OceanSITES, what are its unique data and information products, how it is connected with other elements of the observing system to deliver on societal needs.

2.3.2 Broadening Ecosystem Contributions

It is not so clear which ecosystem component and variables we should focus on or add. This need was a main outcome of OceanObs09. The discussion was around the question 'What could OceanSITES do to expand and help the system grow and expand and this direction?'

- OceanSITES should be connecting with the communities that have other capabilities to collect ecosystem observations and those that are interested in collecting ecosystem data.
- We need to consider the scale of the measurements and of the processes. Biology is patchy and fisheries needs volume surveys. Can timeseries supplement ship surveys, either to guide them or to deconvolve space and time variability ?
- What spatial observations do we need in addition to the sustained timeseries observations that we are focused on? Satellites, gliders, etc ?
- How can fixed point time series measurements be used to complement efforts to observe the scales of the ecosystem ? What can timeseries contribute best?
- Are there provinces/regions where single point data give useful information? Can we use models to find those?
- Links between the observing systems could be made through some assimilative models and we could assess the relative impacts in model forecasts.
- There are synergies with the Ocean Tracking community on where we need OceanSITES and where it also happens to be a good place to monitor fish movements, etc.
- We need to work with other communities for the spatial footprint, i.e. mobile systems or stock assessment surveys, and leverage that. We should not try to extend our own work into the broader spatial domain.
- Autonomous vs. interventive (e.g. sediment trap, zooplankton samples, benthic cores) data. Autonomous timeseries data are complementary to interventive data: the latter ca help understand or ground-truth the former, while timeseries data help interpolate/give time dimension to interventive data. An example is Zooplankton samples and bioacoustics. Need good metadata for this.
- There was a workshop on operational biodiversity observations. This and other efforts will lead to variables that merit observations, in certain habitats. Action: make contact with this group and try to participate.

Decided to let the PI/operator of sites define which ecosystem variables he/she wants to submit. If no format or variable names are defined yet, a request will be made to the Data Management Team to review this and decide whether it can be easily implemented.
Action: Roger Lukas will make an initial list of ecosystem variables from HOT which he wants to submit, and will work with Steve Diggs to make it happen.

Action: Need to encourage BATS and CalCOFI to do the same.

2.4 Requirements for and value of OceanSITES and time series data

2.4.1 What is the value of OceanSITES and of being a site in the network?

Under this agenda item, the group discussed the OceanSITES website and the clearer mission statement and purpose that OceanSITES serves. This needs to be front and center on the site (see more details under section 2.11).

Some items, which may be used in the “value”, “mission”, or “requirements” category, were:

- The OceanSITES sites should and will attract other studies, cruises, modeling efforts, which need the background information for planning and conducting their projects. They will be places for testing ideas and hypotheses
- Need the global network, to be able to assess net changes in the ocean (productivity, pH, oxygen, etc)
- Concept of reference stations is useful
- Need presence in different regions and provinces, to get “Keeling Curves” of the ocean, or take the “Pulse of the Ocean”.
- Both representative places, and dynamic hotspots to learn about important processes
- Provide calibration information for the distributed networks

2.4.2 Requirements driving and justifying OceanSITES:

- Provide high temporal resolution (at least diurnal cycle) to directly observe processes/interactions and events (the “pulse”)
- Provide long climate timescales to recognize slow global change
- Build a network that can be analyzed together/as a whole
- Enable research/field work/process studies that build on background information from OceanSITES
- Contribute to and embrace/use requirements from other groups (e.g. Biodiversity Framework)

Sites in OceanSITES that do not yet satisfy the requirements should make every effort to make enhancement in order to enable that.

2.4.3 Long-term goals of OceanSITES:

- Secure long-term support for existing OceanSITES stations;
- Upgrade stations with new sensors to record a host of physical, chemical and biological variables, enabling cross-discipline comparisons;
- Install new stations in key regions of the globe to collect long-term records for the first time;
- Rapidly distribute the data stream over the Web - for use by the OceanSITES team, the larger scientific community and the public;
- Refine existing sensors and develop new ones to usher in continuous surface measurements in even the most brutal sea conditions.

2.4.4 How do we measure metrics of network completion, timeline?

OceanSITES has gone beyond the point where “more is better”. Need to be guided by requirements now. But since existing investment is substantial and funding is sparse, need to build on and make use of existing system, and add to it incrementally.

In a system such as OceanSITES it is difficult to measure completion as there are many different parameters that are being measured and each parameter has their own community and own idea of what a complete network consists of. Currently, OceanSITES has a vision map. This map should be redefined based on the various community needs. If OceanSITES is a system, then it needs to have its own set of requirements, which is currently absent.

- Each discipline/community needs to develop the requirements for a global network, determine gaps, and argue with science how many sites are needed
- State why N sites are needed to determine a quantity to within some error
- ACTION: Set a target for this group to develop a series of white papers to define the target criteria or statistics of completion for each network (i.e. discipline, e.g. carbon, air-sea flux, ecosystem, circulation, Longhurst provinces, boundary currents, throughflows, etc)
- ACTION - IPCC Meeting in March, we should approach them with a request to incorporating their needs for timeseries into the meeting (for detecting global change, testing/validation, fingerprinting)
- ACTION - Executive committee needs to look at the notes and come back with recommendations
- ACTION: Also need metrics that measure data delivery, data holdings, etc.
- ACTION: Need metrics for users (which users, number of accesses, value generated, modeling usage, etc)

2.4.5 Product Generation

Under this agenda item, there was discussion about whether or not products should be included as part of the OceanSITES data delivery system. Some examples that were discussed were derived data (e.g. transports), aggregated data sets (multi-deployment or multi-platform files), indicators, and key or iconic results from sustained observing. It was decided that OceanSITES should provide these value added products but on a volunteer basis, and they would need to come with associated metadata about the creation of the product and reference to the original OceanSITES data file with the complete metadata information. The OceanSITES team will create an additional ‘product’ directory on the current ftp site for open access and distribution. ACTION – create an additional product directory to add products on a volunteer basis

- Processed and aggregated data sets will be provided as products on a voluntary basis
- A product type that has impact would be an indicator, i.e. a derived time series that, for example, captures a mode of ocean variability or change. Some indicators, such as the El Nino index, have clear relations to impacts on land and on society and thus are a great help in explaining the need to sustain the observations used to compute the indicator.
- Need for products (such as indicators) that make clear the societal and scientific value of the sustained observations at the OceanSITES. This, in turn, makes clear the negative impacts of ending these sustained observations.

- Key/iconic results should be provided as products on the website, and maybe in "products" data directory
- Remember that some products should be integrated across platforms and disciplines, e.g. SST products are generated by the space, drifter, mooring, modeling communities
- Users from the public sometimes discover and develop their own use of timeseries as indicators useful to them (e.g. roofers in California look at altimeter maps of tropical Pacific). Therefore provide simple data views as products.

2.5 Path forward

- Until now, OceanSITES provided a structure for collecting and disseminating existing stations. Now need to start designing the future network that closes gaps and addresses societal needs.
- At the same time, with scarce funding need to make use of what is there already and build on it. So continue to include all sites that satisfy requirements but strive to use them to deliver strategic needs
- Work towards opening all platforms to other OceanSITES members for adding sensors. This adds value to the sites, leverages support in both directions, and makes people want to be part of OceanSITES

2.5.1 Path towards the Core/Backbone network

Previously it had been proposed to work towards a backbone of sites having a minimum set of common, multidisciplinary instruments. The types of observations and sampling depths have been discussed in the MOIN document (need reference). To implement this at a minimum set of sites would costs in the order of US$2million, which we believe is possible (but this only addresses the sensor purchases, not maintenance and expertise).

Goal is to provide a homogeneous subset of sites that can contribute to OceanObs09 requirement of a merged physical, biogeochemical, ecosystem observing system.

Homogeneous measurements add value to OceanSITES since they enable network analyses.

The previous draft should be revised to account for deep observations and (where reasonable/useful) Essential Ocean Variables. But since this is meant to be the MINIMUM to address multidisciplinary needs, it will differ from the EOVs, and it will not do everything that one might want.

The plan should be endorsed or modified by the SOLAS and IMBER community; we need their buy-in and participation/contribution. Doug Wallace to take this to the next SOLAS workshop.

It is 90% done, what does it take to get the remaining 10%? Justify required additional funding in terms of needs – what additional questions could be answered?

Funding models:

- Existing operators/PIs that already operate a site seek funding for the additional sensors. Requires cooperation of the funding agency.
- An additional PI is involved who gets funding for adding additional sensors to moorings of others.

If a site adds additional sensors from other PIs, we need to work with those PIs who have the expertise and possibly come with their own funding, in order to implement setup, calibration, data processing, etc. A new instrument needs to comes with a person.

Renewed agreement to push this in the next 1-2 years, since it gives a lot of impact for each $ spent since platforms and cruises already in place, and a lot synergy/leveraging is generated. This is a low-hanging fruit.

The next step would be to invite various countries to participate/contribute.

Work with GOOS Steering Committee to embrace/endorse this and spread the word.

2.5.2 Challenge to add deep T/S sensors to existing OceanSITES moorings (with matching contribution)

Dr. Uwe Send posed the challenge for the OceanSITES team to add a deep ocean climate-quality T/S sensor (e.g. microcat) to existing (or planned) moorings. This would have low cost compared to mooring operation costs (about US$5k) and great value; the need for data from depths greater than 2,000 m was the focus of a workshop in Paris this past summer (Deep Ocean Observing Strategy, organized by IOC and OOPC). OceanSITES already has platform at 100 sites in the water and could make an immediate contribution and impact.

The idea is to add 1 sensor as deep as possible in each mooring (above the acoustics release or just above backup flotation). The initial challenge for the group was to commit to adding 50 sensors and with every commitment, there would be a match of another one for swap-out during mooring service. A counter on the OceanSITES website front page would show status of pledges from PI's and from donors for matching pool.

Several questions arose from this proposal.

- The issue of calibration needs to be considered. How could we do this effectively? Define procedure for QA and maybe rotate instruments among teams. Discussion about involving Sea-Bird in the calibration.
- Concern was raised about a load cage, but users have found it possible to clamp the instruments directly to the mooring wire.
- It is critical to know the depth at which the measurements are made, so the instrument needs to have a pressure sensor accurate to few decibars in full ocean depth.
- Need to define more clearly the need and requirements. How many? Where?
- Where would the matching instruments come from?
    - Director of SIO pledged to match some. Perhaps other organizations could do the same or donors could be found.

Aside from the concerns, the group thought that this was a great way to move forward with little cost and could really benefit the community. Several members committed on the spot to adding Microcats to their moorings. Other members will check with their respective organizations and reply to the request upon return after this meeting (Action: Send, Weller, Project Office – follow up with the following: Murty, JAMSTEC, Ingo, Rod Johnson, Steve Cucullu, Domingo Urbanos, Chris Meinen for PIRATA extensions)

Scientist	Organization	Commitment	Notes
Bob Weller	WHOI	3	NTAS, Stratus, WHOTS
Uwe Send	SIO	2	
Meghan Cronin	PMEL	2	
Johannes Karstensen	Ifm-GEOMAR	2	1 with Doug Wallace
Richard Lampitt	Southampton	1	
Kuh Kim	Korea	1	1 in place already
Franscisco Chavez	MBARI	1	
Total so far		**12**	

There are also deep-ocean microcats that are currently in place. (ACTION: Project Office – compile these into a spreadsheet and create a map)

2.6 Network status and planning

2.6.1 Under this agenda item, presentations were given from countries or programs not yet fully represented in OceanSITES or its data system, or who attended OceanSITES meetings for the first time. Presentations are available from the OceanSITES website.

2.6.1.1 Open-ocean sustained time series observation sites run/co-run by NOAA/AOML (presenter: Chris Meinen)

- Florida Current transport measured by cable. Data available in real-time (30 years now) on website www.aoml.noaa.gov/phod/floridacurrent/
- MOC array consists of the "Western Boundary Current" timeseries (NOAA), MOCHA (NSF), and UK RAPID
- All MOC data are available publicly, typically with 6 month delay (microcat data already at BODC, dynamic height data at NOC). E.g. www.noc.soton.ac.uk/rapidmoc has 5 years of data now.
- How can we get the data into OceanSITES format? Need to see whether S.Cunningham is willing to allow resources for reformatting data into OceanSITES format (either PI or DAC needs to do this for participation in OceanSITES). Action Chris Meinen
- South Atlantic MOC program: SAMOC at 35S, currently has 4 PIES as western Boundary Pilot array (NOAA funded with partners from Brazil/Argentina) and is expected to grow into a full trans-basin array. The French participants just came through with funding for the PIES on the eastern end of the array
- Northeast extension of the PIRATA array has been operated since 2006 (funded and operated by NOAA). Chris will investigate about these for microcat additions. All PIRATA data flows through PMEL (QC and website dissemination there), but they do not end up on the OceanSITES GDAC. Follow-up how this can be resolved (Chris, Uwe, Kelly).
- AOML and RAPID community would be happy to share all their data. Cable data would not be transformed but would just be a link. DMT team and Kelly work with Chris to make this happen.
- Gridded dynamic high profiles are made available on the NOC website. Data in NetCDF format.

- Current (water current) data on BODC. Would data be reformatted by BODC? How much effort would this be? Concern for the resources.

2.6.1.2 PredIction and Research mooring Array in the Tropical Atlantic (PIRATA). (Presenter: Domingos Urbano)

- The Brazilian PI is Paolo Nobre, Domingos participates in the program (not to confuse with his brother Carlos who is setting up the new ocean agency in Brazil).
- Presented the array (Figure)
- All these sites should be on OceanSITES and the data should be on the GDAC
- Plans to install a new site in the center of the Atlantic
- Vandalism is less and less each year.
- Several buoys have CO2 and/or O2
- Future of PIRATA and TAO may be the new PICO buoy – an easy to deploy TAO.
- Communications may move from Argos to Iridium
- New proposed site at 28 South 42 West, ATLAS-B by Edmo Campos
- Brazil is also using island stations as a platform with Tide gauge

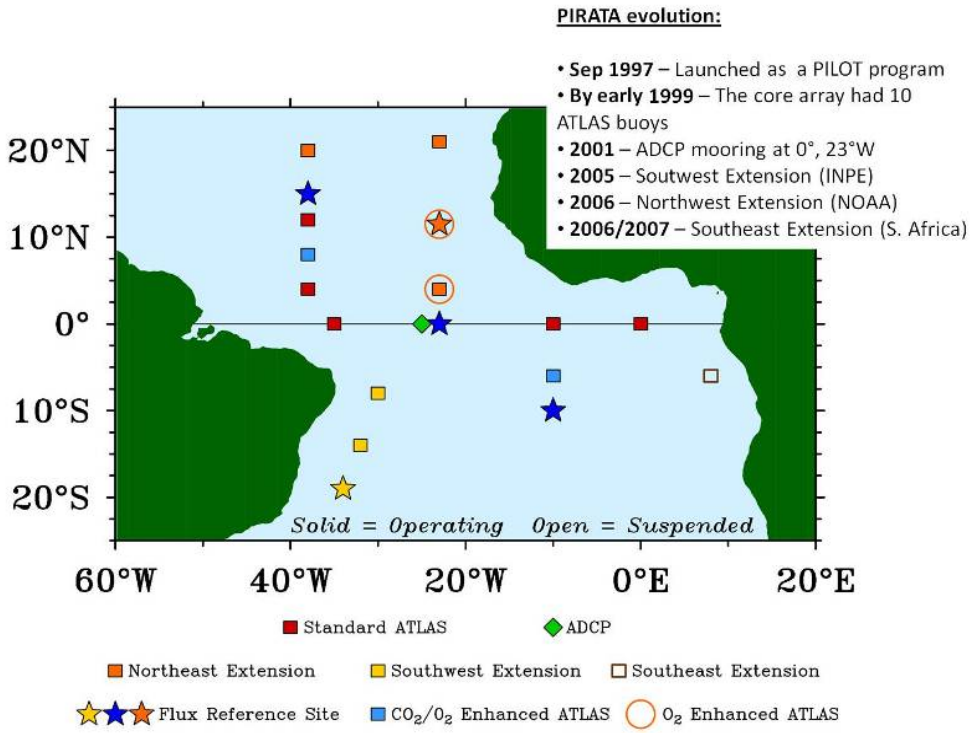

Figure – Evolution of the PIRATA array

2.6.1.3 Deep Ocean Monitoring : the East Sea (Sea of Japan) (presenter: Kuh Kim)

- Request to enroll EC1 asan OceanSITES site (Figure)
- Data sharing will be free and open, available within 12 months of instrument recovery
- Site was approved by OceanSITES Steering Team

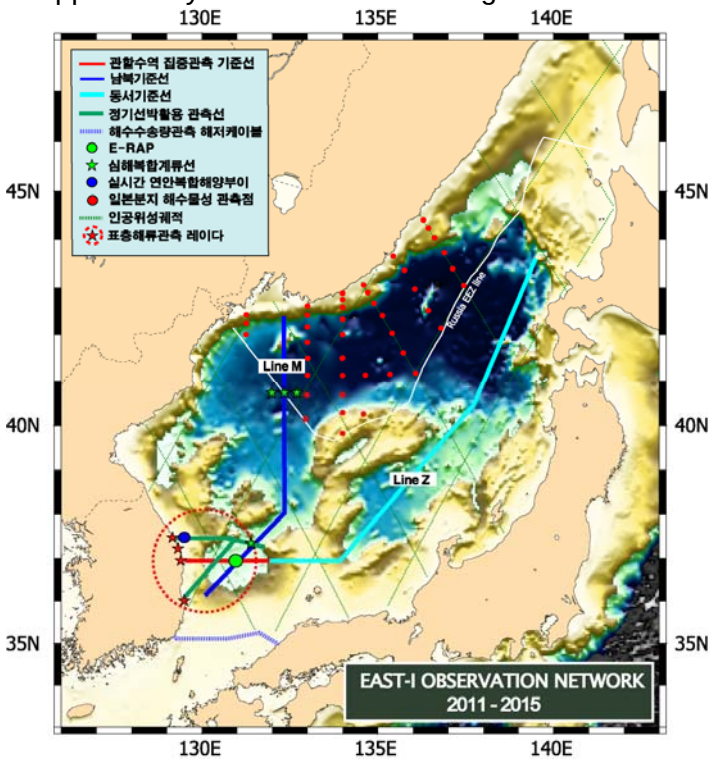

Figure – EC1 and associated time-series stations in the East Sea.

2.6.1.4 Status on Equatorial Indian Ocean – OceanSITES (presenter: Dr. VSN Murty)

- Equatorial Indian Ocean (EIO) moorings
- "OOS program": 7 equatorial subsurface moorings, EQCM3, EQCM2, EQCM1
- Data since 2010, is processed and placed on website for public
- Is data going on GDAC? Data are meant to be included in OceanSITES
- Murty will add deep microcats above acoustic release in all 7 moorings.
- The moorings are currently marked at RAMA but they are really part of the IOOS (Indian Ocean Observing System).
- New Biogeochemical site in Arabian Sea – included in OceanSITES?
- Follow up with Murty on biogeochemical site and whether coastal moorings might be accepted.

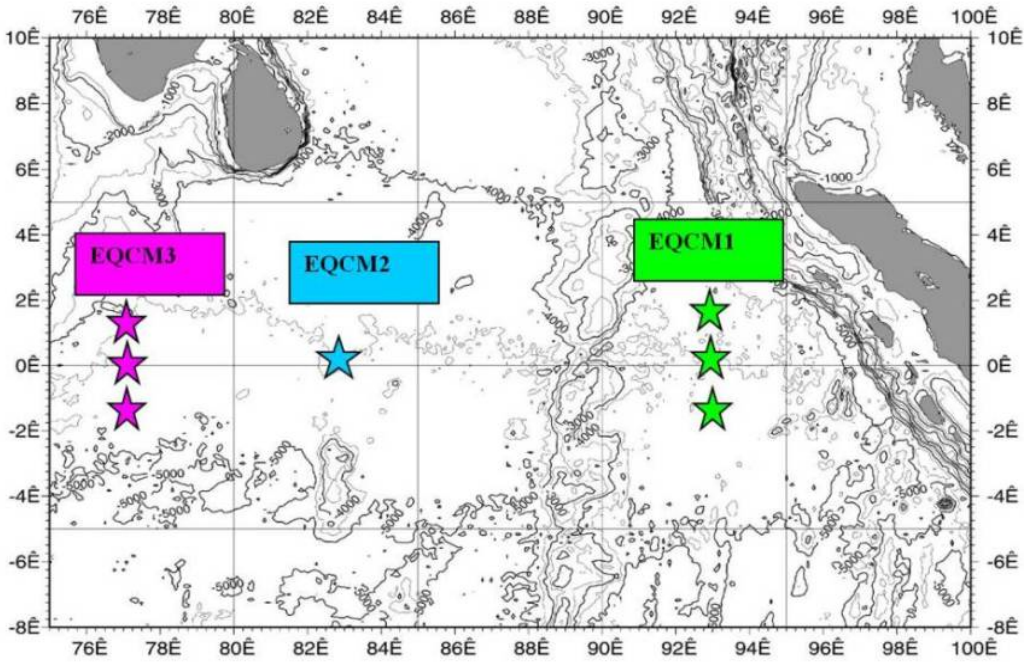

Figure – Equatorial Indian Ocean array

2.6.1.5 OceanSITES – STATUS on NDBP (presenter: E. Pattabhi Rama Rao)

- Surface mooring network around India
- Ocean Observing System – India
- Google Earth display – moored buoy network India
- 15 Moored Buoys and 6 tsunami buoys – plan is for 12 buoys at any given time
- Bay of Bengal buoys and Arabian sea Buoys
- Active buoys 11 as of 26 Nov
- A few moorings are not in economic zone, and those should be allowable for OceanSITES. From the other moorings, only the met data is public (according to WMO treaties).
- Are data going into GDACs?
- Ocean Data and Information System (ODIS)
- Add another 4 buoys in the coastal region

2.6.1.6 Med Sea Open Ocean mooring (Presenter: Laurant Coppola)

- All the Med Sea Open Ocean mooring now comprise the MOOSE network
- French government supports 5 different moored stations.
  - Billion (2 sites in canyons on the slope, 1000m) 1993 - present
  - Antares 2004-present
  - Dyfamed 1988 - present
  - 42N5E “Lion” (Gulf of Lions) 2007-present
- OceanSITES needs to get these data, especially from Lion
- MOOSE plans to implement more biochemical sensors

- Real-time transmissions existing or planned for Dyfamed and Lions (check/confirm)
- Cross validation with Argo and gliders
- All data is going to Coriolis and should then just be pushed to OceanSITES GDAC

2.6.1.7 Integrated Marine Observing System (IMOS). (Presenter: Marty Hidas, IMOS)

- The IMOS Blue Water component has 4 arrays of Deepwater moorings
- SOTS – Southern Ocean Time Series, Tom Trull
  - SAZ sediment trap mooring – since 1997
  - Pulse mooring (biogeochemical) – since 2009
  - Data will be made available by early 2012
  - SOFS – southern ocean surface flux mooring (Eric Shultz)
    - Started March 2010
    - Duplicate mooring being built at WHOI to allow continuous monitoring
    - Data available early next year
- Indonesian Throughflow Array (B.Sloyan) – deployed June 2011-Sept 2012
- Polynya Array (B.Sloyan) – deployed Jan 2011
- East Australian current array (B.Sloyan) – planned deployment for 2012

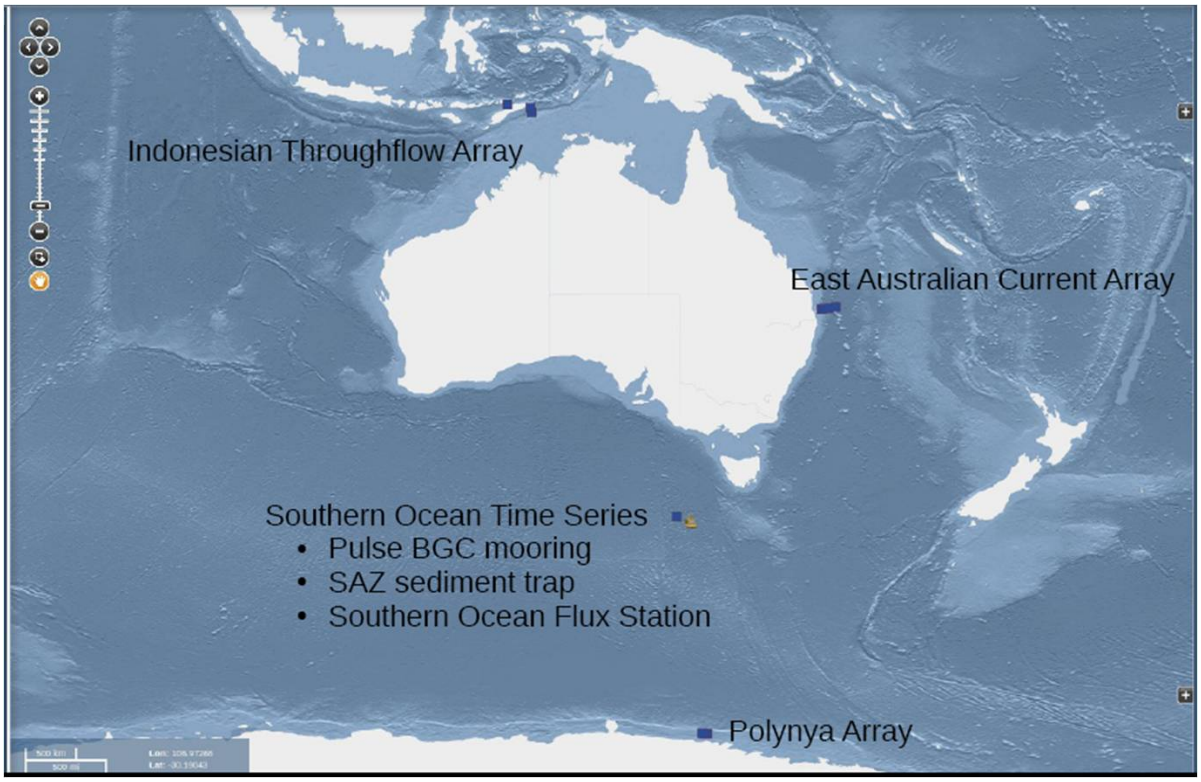

Figure – IMOS deepocean arrays

2.6.1.8 Alfred Wegener Institute Bremerhaven. (presenter: Ingo Schewe)

- Hausgarten site (just west of Spitzbergen)

  - 3 mooring sites and in-situ experimental site with 16 stations with ship sampling each year
  - Photo and video observations
  - Pelagic and benthic observations and timeseries
  - Working towards real-time data, but because of ice coverage cannot have surface mooring – are thinking about a cable array that would be shared with Norway and link also the Fram Strait array:
- Fram Strait Observatory
  - 16 deep ocean mornings between the Spitsbergen and Greenland Shelves maintained since 1997
  - Glider missions: since 2008 one 70-80day mission each summer/fall – in the future will also go under the ice
- Moorings and PIES in the Weddell Sea
    - Across Weddell Sea and along Greenwich meridian
    - CTD-transects and Moorings, usually with deep microcats, some since 1989
    - We discussed how to convert data and make it available through OS
- Virtual all data are already available via Pangea, available to OceanSITES and willing to work with OceanSITES to provide the data

2.6.1.9 EBC Moorings (presenter: Pedro Valez)

- EBC Mooring – in the Lanzarote Passage (between Canary Islands and Africa).
- Deployed since 1997
- Channel 1200 m deep
- 14 years in the same place with very minor gaps
- Acoustic meters and microcats
- Follow-up with Pedro on adding data to OceanSITES

2.6.1.10 New Zealand Open Ocean Time-Series (presenter: Marty Hidas for Scott Nodder)

- Ship-occupied time series and 2 bio-physical Moorings, one subtropical one subarctic (41S and 46.6S)
- Since October 2000
- Scott Nodder – scott.nodder@niwa.co.nz
- Working on publishing something now but after that he will be available to share
- Action - Follow up with NZ on obtaining data after publication

2.6.1.11 MITF: Monitoring the Indonesian ThroughFlow (presenter: Arnold Gordon, LDEO)

- Indonesian Throughflow: LDEO site is in Makassar Strait, continuous mooring since 2004
- Weddell Sea Bottom Water Time Series, 2 moorings, since 1999
- Would like to see for OceanSITES: Monitoring the key inter-ocean portals
- Make sure the observational data is in a common format. Indonesia data is very important for oil companies
- ACTION – (project office) Phil has requested platform codes from the project office. Follow up with Phil Mele

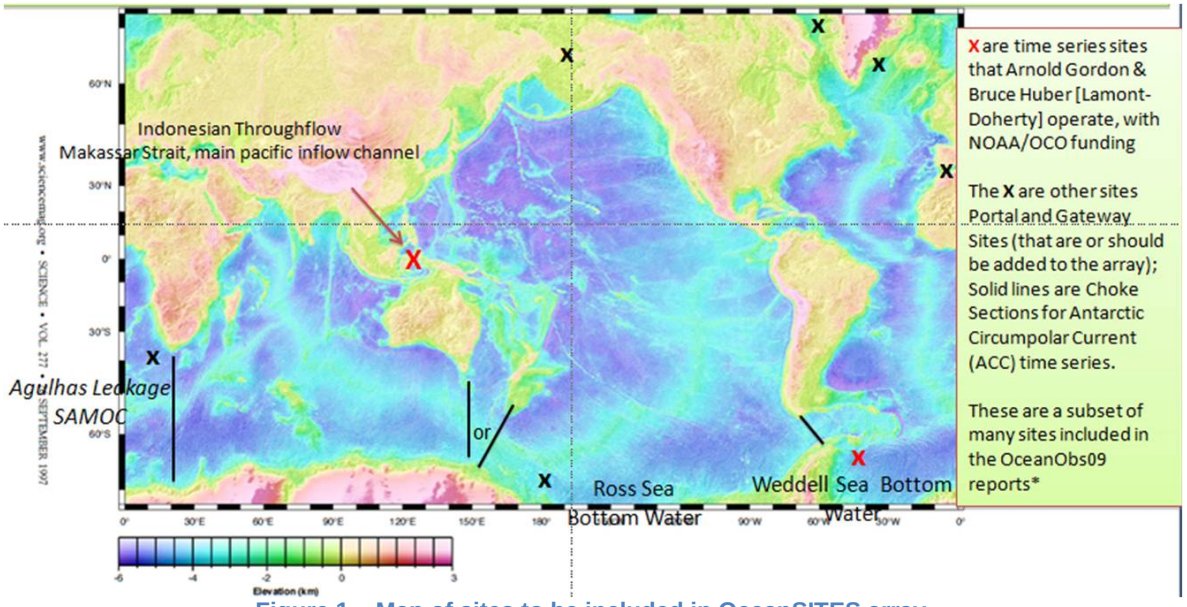

Figure 1 – Map of sites to be included in OceanSITES array

2.6.1.12 FixO3 (presenter: Richard Lampitt)

- Plans for FixO3. Fixed point open ocean observatory network
- EuroSITES ended in March 2011-12-02
- FixO3
  - Open ocean and Multidisciplinary
  - Existing at fixed locations
  - Building on Eurosites, esonet and carboocean
  - ESFRI
  - Freely available to all
  - Start (hopefully) Oct 2012
  - Contains new sites that are not part of OceanSITES. Sediment traps, etc
  - ACTION – project office. If funded, follow up on getting these sites into OceanSITES

2.6.1.13 Irminger Sea site by NIOZ (Netherlands)

NIOZ is continuing the Irminger Sea mooring, which also carries a deep microcat.

2.6.2 New sites (to be approved or to be invited or recommended)

- Chagos Archipelago would be a good site for a possible observatory
  - US base on Diego Garcia (one of the islands) but it is very pristine
  - Largest marine protected area in the world
  - Good location for setting up an observatory (6S)
  - British Indian Ocean Territory, R.Lampitt's colleague is chair of the scientific advisory panel
- C-Drake stations (Chereskin, Donohue)

  - PIES with pressured and tethered current meters (30-45 stations across Drake Passage)
- Korean site EC1 – approved.
- Additional sites from spreadsheet provided by B. Burnett that have come in via email over the past year (still need formal approval for some of them):
  - POSEIDON-Pylos
  - CalCOFI
  - CCE-1
  - Wyville Thomson Ridge Overflow
  - South China Indonesian Seas Transport Exchange (SITE)
  - Sundra Strait Dynamics
  - Faroe Bank Channel Overflow
  - HAUSGARTEN
  - Agulhas Return Current Reference Station

2.6.3 New site endorsement procedures

- Site Approval Process – This site approval process is not currently listed on the OceanSITES webpage. This document needs to be reviewed and finalized by the Executive Committee and members of the Steering Committee and Data Management Team. A current version of this document is available on: ftp://ftp.jcommops.org/OceanSITES/documents/OceanSITES_Approval_Process.doc(ACTION - EC)
- How to be an OceanSITE' document requires further review and finalization ftp://ftp.jcommops.org/OceanSITES/documents/howToBeAnOceanSITES-Site.doc (ACTION - EC)

2.7 Network Presentation

2.7.1 Maps, Google earth, new interfaces to data

The team discussed the maps and interfaces into the data and metadata. For the past year, the lack of project office support has slowed down progress and due to that there have not been updated maps on the OceanSITES website. Need to update the maps and create maps by disciplines and by data status (web team will work on this).

Several points were made by the group as ideas to move forward.

- It is important to show the maps and give them higher visibility on the website.
- Tools were discussed on new ways to search for and download station data and information. A couple of tools were discussed that need further investigation:
- Giovanni portal – gdata1.sci.gsfc.nasa.gov
  - ERDDAP – install an erddap server on your site to allow others to extract data http://coastwatch.pfeg.noaa.gov/erddap/download/setup.html

The general consensus was that we need to have a better web presence. Google Earth is good and almost necessary, but we need to allow users to search for data in a particular region or by a particular parameter.

We need to distinguish between the more static maps which are generated from the catalogue with sites that have officially agreed to be part of OceanSITES, and monthly maps that JCOMM generates. The former should show all sites in the system, but the data status on the GDAC

should be visible/coded somehow. The latter are meant to show stations that have collected data in the past month, and since many are not delivering in real-time we need to show those sites which we BELIEVE have collected data that month, even if not in real-time or not in hand yet. Need to start generating both updated types of maps.
The project office and Executive Committee also need to be more proactive about removing those stations that are not submitting data, or at least changing their color to black.

The text file that is currently on the GDAC ftp site could be used to show views against the data. How much data is there vs. how much is expected? These topics were also discussed at the Data Management Committee Meeting and reported on in that report (Appendix B).

2.7.2 Relation with the NOAA Observing System Monitoring Center (OSMC)

The question was brought up to discuss the role of the NOAA Observing System Monitoring Center (OSMC) and how this relates to JCOMMOPS and the image of OceanSITES. Several points were raised to discuss the history of the OSMC and the status:

- OSMC was designed to be a real-time look at all observing systems with data on the GTS
- This picture is not complete for OceanSITES as over 60% of the stations are not submitting data on the GTS, and this gives a very biased view of OceanSITES. We need a way for the OSMC to either retrieve or at least link to the JCOMM monthly maps since they show data that we believe was collected.
- OSMC was designed to be a portal to the metadata that is available

2.7.3 Representation of tropical NDBC sites, of PMEL tropical sites, RAMA, PIRATA, etc

It has been a challenge to determine how best to represent the tropical arrays. OceanSITES has not drawn a dot for each tropical mooring in the overview maps, as the numbers of these mooring far exceeds those at extra-tropical locations. Instead, boxes have been drawn to enclose the TAO, RAMA, and PIRATA regions in some cases. At the same time, because a subset of the tropical moorings had additional observing capabilities, certain sites have been plotted. The group identified the need to improve the representation and summaries of the tropical moorings.

- How should we present this in a clear and non-confusing fashion
- Naming conventions for TAO, RAMA, PIRATA is pretty clear
- We need to be able to sort by type
- Start the clarification by populating the spreadsheet better
- Then ask EC to make suggestions. But first need to make sure that these data are in the OceanSITES system (there was an issue with PMEL to resolve).

2.7.4 Naming confusion within NOAA

Within the National Oceanic and Atmospheric Administration (NOAA), the OceanSITES are called ‘reference stations’. OceanSITES are useful as reference stations but we need a better branding for OceanSITES. The unifying theme is high-resolution and climate-record length time-series. Work with NOAA to show OceanSITES brand better.

2.7.5 NetCDF Data Format

The current OceanSITES format is NetCDF. It was brought up that some scientists do not use NetCDF format. What can OceanSITES do to help them?

- We at least can provide the unidata information page for NetCDF: http://www.unidata.ucar.edu/software/netcdf/#netcdf_faq
- Historical discussion of why is it NetCDF? At the time it was the only thing available that was self-describing
- It is very important that the PIs use the data that they put out there from the OceanSITES website so that they/we know about errors.
- The group is not making use of the system. The decision makers are not using NetCDF and cannot make assessments on the usefulness and quality of the data
- ACTION – look at options for data download and conversion. E.g. an ERDDAP type of solution. Charge for the data management team. Item to be discussed at the next data management team

2.8 Definition of an OceanSITES site

The definition of an OceanSITE is unclear and should be stated clearly on the website. Should the OceanSITES array broaden to include such as:

2.8.1 Coastal Carbon/Ocean Acidification sites –

- Discussions had been held in the past with members of the carbon community. It had been explained that coastal timeseries sites generally were already part of a national network that had a home and we (OceanSITES) did not want to duplicate that. However, the carbon sites do not have a home and are not part of a national network. They are willing to work with and adopt OceanSITES format
- PMEL Carbon – 31 Coastal systems mostly pacific focused. 14 are open ocean, 12 are coastal sites, 5 coral reef. NOAA Ocean Acidification program that started and PMEL has been adding these sensors to existing platforms.
- The overwhelming consensus of the Steering Committee was that OceanSITES should not be broadened/opened to include coastal carbon/OA sites. One reason was that OceanSITES needs to tighten/re-focus, rather than broaden, in order to have a clear and convincing mission and purpose. Secondly, a home for these sites was considered to be CDIAC and the new OA program, and OceanSITES would then duplicate efforts.

2.8.2 Arrays of ship hydrography timeseries sites

- Originally OceanSITES was not going to include repeat hydrography lines. But some of these sites collect important time series at fixed points. E.g. CalCOFI and Line P, and the Iceland repeat hydrography grid
- In the past a compromise had been offered to pick 1-3 fixed sites from such repeat hydrography programs and construct ship-occupied timeseries there
- We need to be more clear about the goals and requirements (scientific, societal), and about instructions for building the system. These are not connected to the type of platform.
- Our often stated rationale and power of timeseries is that they go from very short to very long time scales, so this has to be at the heart of the requirements.

- Agreement by the group to have requirements of high-frequency (resolve diurnal processes) and of long climate-relevant records. Ideally merge long historical ship hydrography with high-resolution sampling (moorings, or e.g. 3-hourly sampling while occupying station such as HOT).
- Those sites that do not yet fulfill all requirements are expected to make an effort to work towards that goal.
- CalCOFI has CCE moorings now, and HOT also has moorings. These merge the historical record with new fast observations (these can put each other in perspective).

This will help OceanSITES to observe the pulse of the ocean, and others will want to join OceanSITES because it has a very clear goal and is a shining light and doing it well!

2.8.3 Boundary current timeseries/glider observations or products

The discussion of whether to add these types of data centered around a few points:

- boundary current transports with mooring vs boundary current measurements with XBTs.
- Cable data?
- The Lagrangian or Eulerian nature of the data

It was decided that a smaller group would look into the requirements and implications of this (e.g. can gliders provide the required resolution?) and report back to the team. The group appointed was: Uwe Send, Roger Lukas, Ruth Curry, Chris Meinen, Johannes Karstensen.

2.8.4 DART moorings

- Second generation electronics can support met sensors
- Can these platforms be used to carry out OceanSITES science? Resources are being spent to keep them out there and we want to make use of time and real estate.
- Research community has grown the OceanSITES system. Can the DART buoys be modified to fit this system?
- NDBC will look into options and see if it is possible to add sensors to the array. However, we need to identify the need for such additions in the system before going out and updating all the sites.
- Steve Cucullu is prepared to propose internally to add deep microcats but needs to have back-up and needs reasons for where to add those.
- ACTION – do the requirements for the design of a complete system and see where DART moorings can help to fulfill requirements, S.Cucullu can use that to justify adding sensors.

2.8.5 Hosting non-OceanSITES timeseries

The groups decided that we should not host non-OceanSITES data, since again that would weaken our focus and strength, and we should not become a “catch-all” for data that have no home. Shorter timeseries can go to NODC for example.

OceanSITES discussed a ‘products’ directory in agenda item 2.4.5. As outlined there it was decided that PIs could submit additional products to be made freely available. The additional products would have to be documented properly to be included. ACTION – add to ‘How to

become an OceanSITE document' a statement about maintaining products and up to date information for the website.

2.9 Data System Status

2.9.1 Data holdings

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 (December 12, 2011) there are over 75 site folders and 1200 files in each of the GDAC directories.

2.9.2 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.

2.9.3 Funding of data management activities

Each proposal should include information and funding for data management.

2.10 Question/needs from Data Management Team meeting

2.10.1 Aggregation of files

The topic of aggregating files was discussed also in the products section in 2.4.5. This would be offering aggregated files that were created by the PIs or scientists using the data. The discussion was broadened in the data management meeting prior to this to discuss aggregating data on the fly for scientists. This will be investigated as part of the website redesign but likely will be difficult to implement based on different sampling depths, locations, etc. See also, data management team meeting

2.10.2 Delayed-mode data from EuroSITES

The funding for EuroSITES ended in March, 2011. The EuroSITES occupied 12 sites in the deep ocean of depths greater than 1000 meters. The EuroSITES team will work on providing this data but a funding gap has caused delays and problems.

2.10.3 RAPID Data

Can the RAPID data are at BODC be reformat and send to OceanSITES ? Stuart Cunningham will need to give his ok for the programmer to spend some time on the format of data into OceanSITES

2.10.4 Prioritized list of variables

This came out of HOT ship occupied data which has 200 variables. We cannot deal with that many. How do we choose which are priority?

It was decided that for now the individual PIs will come up with the list of priority variables and send this to the DMT to see if the variables are already supported or what needs to be done to include those variables.

2.10.5 Strategy for future face-to-face meetings

This meeting was organized in conjunction with the Data Management Team Meeting. There were a couple of proposals for future meetings:

1. Separate DMT and SC Meetings separated by 6 months
2. Combined DMT and SC Meetings held in conjunction with another large science meeting
3. Combined DMT and SC Meeting held together but not necessarily around another large scientific meeting

The general consensus was that this format (option 3) worked, it brought Data and Steering Committee together, and there was no distraction/competition by another conference. So we will try to continue with approximately annual meetings of both teams together. However, with the one-year gap, the SC needs to meet virtually more throughout the year so that it might be possible to cover some of the detailed discussions quicker (the DMT already is meeting virtually on a regular basis).

Korea graciously offered to host the OceanSITES meeting in one of the coming years and Uwe reminded operators that the OceanSITES team would be grateful for any hosts. Likely next meeting is in Seoul in early 2013. Tokyo and Seoul are the two places that offer non-stop flights from virtually all capitals and major cities in all OceanSITES continents and such ease travel most.

2.11 Relationships to users and other communities

OceanSITES needs to develop, foster, and document users – of the data, the infrastructure, the logistics, the organizational structure, and the sites (for process experiments).

2.11.1 Developing modelling communities as users

- NWP especially the SURFA connection
- Ocean Modeling is ramping up and will be an important data user base.

2.11.2 Foster and document other users

It is important to develop metrics on how the data is being used. In the past we have discussed working with the following groups.

- SCOR
- CPPS
- IMBER/SOLAS
- Biodiversity framework being established

These communities need to continue to be engaged.

2.11.3 Meetings at which OceanSITES should be represented:

- IPCC (March, 2012)
- SOLAS (?)
- POGO (January, 2012)
- JCOMM (May, 2012)

- DBCP (September, 2012)

2.12 OceanSITES Website

The oceansites.org website has been transferred to the project office and will be maintained at JCOMMOPS. There was a lot of discussion about the redesign of the site and what improvements can be made (see also agenda item 2.7.1 and data management report in addition to this topic.

A web team has been established and will work together to improve the website. The team currently consists of Roger Lukas, Ruth Curry, Matthias Lankhorst, Kelly Stroker, and Meghan Cronin.

The team will investigate other websites that provide ease of access to data and metadata and bring suggestions to the table. A few initial examples were: Argo and Imonet.

How can this website be improved?

- Eric Lindstrom discussed an example of the OOPC state of the ocean. He mentioned that people want to know the relationship of the data and their local water problems. For this, long-term monitoring of sites is necessary and relating data from OceanSITES would be an idea. We should also be creating synergies with other observing systems that are also very powerful.
- Each OceanSITES operator has a website that they maintain and products that they display. What the OceanSITES project needs to do is bring this all together and answer some specific questions, such as:
  - Why is being part of a network better than being a lot of disparate sites?
  - Why are we funded to do this and what is the need?
  - How are we serving the user that wants to do 10 year inter decadal trends
  - Who are the critical users
  - We need to highlight some of the amazing work that has been done by OceanSITES operators. This involves adding images to the site of interesting or unexpected results. Provide an image that is an anomaly – not just a real-time updated image. This would be each sites' own characteristic image and would allow us to look at them all together and how each thing might affect the other. These images could rotate through and have a new 'featured' item on the home page each month. (ACTION – project office. Obtain images from OceanSITES operators.
    - Each of these images should have the OceanSITES logo embedded in it if obtained from the OceanSITES web portal
    - It was strongly suggested that these be made uniform in some way
- We really need a few key pieces of examples that show that these data are providing useful products
- Implement website statistics for views (oceansites.org) and downloads (GDACs)
- Investigation of other websites that provide ease of access to data and metadata.

Several highlights need to be made immediately:

- A clear OceanSITES mission
- Develop a data citation standard for using OceanSITES data. We should investigate the path that Pangea has taken by obtaining data DOIs. This would allow a bibliography of

OceanSITES papers to be presented on the website. (Action – begin a list of OceanSITES publications)
- Providing instrument examples on website. Instrument descriptions and photos. (Johannes would contribute to this)

Investigate the site oceanmotion.org. If the team likes this site, there may be resources behind it that we could utilize (Eric Lindstrom).

As mentioned in section 2.7.1, we will investigate the Giovanni portal and the ERDDAP possibilities.

2.13 Feedback to POGO and input for JCOMM meeting at Ocean Expo Korea

The OceanSITES Executive Committee will prepare a 1 page meeting report for JCOMM and POGO and will begin preparations for the POGO sustained observatory coordination workshop

2.14 Funding, outreach, capacity building

- Raising national contributions to support project office, status and plans to do so (Ifremer, POGO, Eurosites, institutions, …)
- Funding from Climate Program Office 30K$ with matching from OceanSITES
- POGO 5K$ (1 time)
- Ifremer 5KEu
- Australia 5K$ (on going)
- SIO will give 5K$ if someone else will match the 5K$

Real issue is longer term sustained funding.

What is the plan for sustained funding for the OceanSITES sites. Programs like Argo are funded by countries. Could OceanSITES obtain this same funding?
In order to go out and request funds, there should be a plan for the future ("this is what we are about, and this is where we would like to go"…).

The group was polled for continued support to keep the project office role in place.

Follow up with Svein Osterhus. He may go through the research council. CLS
End-of-year money at e.g. NOC could be invoiced through CLS. Follow up with Richard L on this.
Doug has some ideas.
Program Office – IOC letter to the India Ministry
Brazil – Minister of Science and Technology
Eric – thinks he can come up with programmatic reasons to justify funding OceanSITES efforts from NASA.

Promoting activities on training for deploying and monitoring ocean data. OceanSITES – should be more proactive in coordination those and could potentially offer its services.

2.15 Wrap up and Actions

- An action list is available in Appendix C.

Appendix A

Meeting Attendees

Thierry CARVAL
Global Data Manager
French Institute for the Exploitation of the Sea, IFREMER Centre de Brest
IFREMER (French Institute for Sea Research and Exploitation) Centre de Brest, BP70 29280 Plouzané, France
France
Email: Thierry.Carval@ifremer.fr

Dr. Francisco CHAVEZ
Associate Scientist Upper Water Column Group
Coord. Institution: MONTEREY BAY A
Monterey Bay Aquarium Research Institute
7700 Sandholdt Road
Moss Landing California CA 95039
United States
Tel: (408) 775-1700
Fax: (408) 775-1620
Email: chfr@mbari.org

Dr Meghan CRONIN
NOAA Pacific Marine Environmental Laboratory
7600 Sand Point Way NE
Seattle WA 98115
United States
Email: Meghan.F.Cronin@noaa.gov

Ruth CURRY
Senior Research Specialist, Physical Oceangraphy
Woods Hole Oceanographic Institution
MS #21
Woods Hole MA 02543
United States
Email: rcurry@whoi.edu

Mr Taco DE BRUIN
Scientific Data Manager
Royal Netherlands Institute for Sea Research
NIOZ Royal Netherlands Institute for Sea Research
Landsdiep 4 t'Horntje Postbus 59
1790 AB Den Burg, Texel
Noord Holland
Netherlands
Tel: +31 (0)222-369479
Fax: +31 (0)222-319674
Email: taco.de.bruin@nioz.nl

Laura DE STEUR
researcher
Royal Netherlands Institute for Sea Research
P.O. box 59
1790 AB Den Burg
Netherlands
Tel: +31 (0) 222 369 411
Email: Laura.de.Steur@nioz.nl

Prof. Andrew DICKSON
Professor of Marine Chemistry
University of California, San Diego
9500 Gilman Drive
Mail Code 0244
La Jolla CA 92093-0244
United States
Tel: (1)[858]822 2990
Fax: (1)[858]822 2919
Email: adickson@ucsd.edu

Stephen DIGGS
Data Manager, CLIVAR Hydrography
University of San Diego, Scripps Institution of Oceanography
UCSD/SIO 9500 Gilman Drive MailCode 0214
La Jolla CA 92093-0214
United States
Tel: +1-858-534-1108
Fax: +1-801-650-8623
Email: sdiggs@ucsd.edu

Dr. Ralf GOERICKE
Assistant Research Oceanographer (MLRG)
University of San Diego, Scripps Institution of Oceanography
United States
Tel: [8] (858) 534-2230
Fax: [8] (858) 534-2230
Email: rgoericke@ucsd.edu

Dr Melchor GONZALEZ DAVILA
Universidad de Las Palmas de Gran Canaria, Departamento de Biología
Edificio de Ciencias Básicas
Campus Universitario de Tafira
35017 Las Palmas de Gran Canaria
Spain
Tel: +928 452914
Email: mgonzalez@dqui.ulpgc.es

Dr Marton HIDAS
Project Officer / Data Scientist
Integrated Marine Observing System, eMarine Information Infrastructure
University of Tasmania
Private Bag 21
Hobart Tasmania 7001
Australia
Tel: +61 (03) 6226 2904
Email: Marty.Hidas@utas.edu.au

Rod JOHNSON
United States
Email: rod.johnson@bios.edu

Kuh KIM
Korea Rep
Email: kuhkim@gmail.com

Mr. Alex KOZYR
Oceanographic Data Analyst
Oak Rigde National Laboratory, cdiac
Oak Rigde National Laboratory, CDIAC
Building 1509, Mail Stop 6335
Oak Ridge Tennessee 37831-6335
United States
Tel: +1-865-576-8449
Fax: +1-865-574-2232
Email: kozyra@ornl.gov

Dr. Matthias LANKHORST
University of San Diego, Scripps Institution of Oceanography
Scripps Institution of Oceanography
9500 Gilman Drive
Mail Code 0230
La Jolla CA 92093-0230
United States
Tel: +1 858 822 5013
Email: mlankhorst@ucsd.edu

Prof. Roger LUKAS
University of Hawaii at Manoa, Department of Oceanography
United States
Tel: (1 808) 956 7896
Fax: (1 808) 956 9222
Email: rlukas@soest.hawaii.edu

Dr. Vsn MURTY
Scientist-in-Charge
National Institute of Oceanography, Goa
National Institute of Oceanography Regional Centre,
176, Lawsons Bay Colony
Visakhapatnam
VISAKHAPATNAM 530017
ANDHARA PRADESH
India
Tel: +91-891-2784570
Fax: +91-891-2543595
Email: vsnmurty@nio.org

David NEUFELD
Associate Scientist
National Geophysical Data Center, National Oceanic and Atmospheric Administration, U. S. Department of Commerce
E/GC 325 Broadway
Boulder Colorado 80305-3328
United States
Tel: 303-497-6507
Email: david.neufeld@noaa.gov

Svein OSTERHUS
prof
Bjerknes Centre for Climate Research
Bjerknes Centre for Climate Research
Alegata 70
5007 Bergen
Norway
Email: svein.osterhus@uni.no

Maureen PAGNANI
Data Manager
National Oceanography Centre
Southampton
Hampshire
SO14 3ZH
United Kingdom
Tel: +44 (0)2380 596255
Email: m.pagnani@bodc.ac.uk

Mr. E. RAMA RAO
Scientist 'E' & Head
Ocean Valley,
Pragathi Nagar (BO), Nizampet (SO)
HYDERABAD 500090
Andhra Pradesh
India
Tel: +91-40-23895008
Fax: +91-40-23892001
Email: pattabhi@incois.gov.in

Dr. Ingo SCHEWE
Alfred Wegener Institute for Polar and Marine Research, Bremerhaven
Am Handelshafen 12
P.O. Box 12 01 61
27515 Bremerhaven
Germany
Tel: +49 (0)471 4831 1737
Fax: -1776
Email: ingo.schewe@awi.de

Prof Uwe SEND (Co-Chair)
Professor
University of San Diego, Scripps Institution of Oceanography
Scripps Institution of Oceanography, Mail Code 0230 University of California, San Diego
La Jolla CA 92093-0230
United States
Tel: +1 858 822-6710
Fax: +1 858 534-9820
Email: usend@ucsd.edu

Diane STANITSKI
Physical Scientist
National Oceanic & Atmospheric Administration, Silver Spring
NOAA Climate Observation Division
1100 Wayne Ave, Suite 1202
Silver Spring MD 20910
United States
Email: diane.stanitski@noaa.gov

Kelly STROKER
Technical Coordinator, DBCP & OceanSITEs
JCOMM in situ Observing Platform Support Centre, JCOMMOPS
8-10 rue Hermès
Parc Technologique du Canal
31520 Ramonville St Agne
France
Tel: +33 5 61 39 47 82
Fax: +33 5 61 75 10 14
Email: kstroker@jcommops.org

Dr. Domingos URBANO
Researcher
Instituto Nacional de Pesquisas Espaciais (National Institute for Space Research)
Av dos Astronautas,
1.758 Jd. Granja
São José dos Campos
CEP: 12227-010
São Paulo
Brazil
Email: domingos.urbano@cptec.inpe.br

Dr. Robert WELLER (Co-Chair)
Senior Scientist
Woods Hole Oceanographic Institution
WHOI
Clark 204a MS 29
Woods Hole MA 02543
United States
Tel: +1 508 289-2508
Fax: +1 508 457-2163
Email: rweller@whoi.edu

Emma WESTON
United States
Email: emma.weston@noaa.gov

James WILKINSON
Programmer/Analyst CalCOFI Technical Group
SIO
9500 Gilman Dr, Dept 0218
La Jolla CA 92093-0218
United States
jwilkinson@ucsd.edu

Jing ZHOU
Developer
NOAA National Data Buoy Center
Building 3203 Room 309
Stennis Space Center MS 39529
United States
Tel: 1-985-710-2009
Email: Jing.Zhou@noaa.gov

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:

- **Global Data Assembly Center (GDAC) Status**
- **Carbon Parameter Names – Andrew Dickson (Facilitator)**
- **Documentation Supporting Discovery and Use – David Neufeld (Facilitator)**
- **UDDC Current Adoption and Examples – Jing Zhou (Facilitator)**
- **Website Responsibility and modifications**
- **Data Submission**
- **OceanSITES User's Manual**

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	Deep-Ocean Observations		OceanSITES needs to participate in/contribute to/offer infrastructure to the Deep Ocean Observing Strategy			
2	Biodiversity		Connect with the Operational Biodiversity Observations group and try to participate.			
3	Ecosystem		Compile an initial list of ecosystem variables from HOT and will work with Steve Diggs. Encourage BATS and CalCOFI to do the same	Roger Lukas, Steve Diggs		
4	Network Completion		Develop a series of white papers to define the target criteria or statistics of completion for each network.	Exec Committee		
5	IPCC		IPCC Meeting in March 2012. Approach them with a request to incorporate their needs for timeseries into the meeting			
6	Data usage		Compile metrics that measure data delivery, data holdings, etc.			
7	Products		Create a product directory on the OceanSITES GDACs			
8	EOVs		Define the core backbone of the network based on Essential Ocean Variables (EOV) and discuss at the SOLAS workshop	Doug Wallace		
9	Microcats		Follow up with operators on adding deep-ocean microcats to their stations	Send, Weller, Project Office		
10	Microcats		Create a map showing the existing and promised microcats	Project Office		
11	NOAA/AOML		NOAA/AOML to format data into OceanSITES NetCDF format	C. Meinen		
12	NOAA/AOML		Follow up with NOAA/AOML on how to get the PIRATA data onto the OceanSITES GDAC	Project Office, C. Meinen		
13	EIO		Follow up with VSN Murty on data. Is data flowing to GDAC?	Project Office, VSN Murty		
14	NDBP		Follow up with Pattabhi on data flow. Is data going to GDAC?	Project Office, Pattabhi		
15	Med Sea		Real-time data flow to GDACs. There are real-time transmission existing or planned for Dyfamed and Lions. Check data flow	Project Office, L. Coppola		
16	AWI		Follow up on data flow to OceanSITES	I. Schewe, Project Office		
17	EBC Mooring		Follow up on data flow to OceanSITES	P. Valez, Project Office		
18	NZ Time Series		S. Nodder indicated that NZ will be publishing a few papers with their data. After the data is published, it could be placed on OceanSITES GDAC. Follow up in 1 year.	Project Office		

19	MITF		Provide platform codes to P. Mele for Indonesian ThroughFlow sites	Project Office		01-03-12
20	FixO3		Follow up with R. Lampitt on FixO3. If project is funded, the FixO3 sites will be part of OceanSITES	Project Office, Lampitt		
21	Documents		Review and finalize the OceanSITES Approval Document and the How to Be an OceanSITES-Site document	Exec Committee		
22	Data download		Investigate options for data download and conversion. E.g. look at what ERDDAP is doing	DMT		
23	Boundary Current Obs		Should OceanSITES add these data? A group will look at the requirements and implications.	Send, Lukas, Curry, Meinen, Karstensen		
24	DART		Can the Deep-Ocean Assessment and Reporting of Tsunami (DART) stations be incorporated into OceanSITES	NOAA/NDBC		
25	Images		Obtain eye-catching images from OceanSITES operators	Project Office		
26	Publications		Compile a list of OceanSITES publications. Where OceanSITES data was used and referenced	All		