SEAS-XBT-TSG AOML Meeting on Coordination of Operations

Miami, FL

March 8 and 9, 2011

Logistics:

- The meeting will be held in the first floor conference room at AOML.
- Coffee breaks will be served at AOML on Tuesday and Wednesday. Lunch at RSMAS across the street from AOML (not provided by AOML).
- The agenda is flexible and can be modified at any time.
- Presentations are 5-10 slides, 5-10 minutes. Please email FB one paragraph (~10 lines) with the summary of your talk, not later than **February 28**.
- Gustavo Goni's cell phone: 305-450-5518, office: 305-361-4339.

DAY 1 (SEAS / XBT)

Tuesday, March 8 (9:00am - 12:00 noon, 1:30pm - 6:00pm, coffee breaks: 10:30 - 10:45am, 3:30pm - 3:45pm) ****** 8:30am if you need to upload your presentation in the laptop.**

Tuesday, March 8 (12:15pm – 1:15pm): Lunch at RSMAS across the street from AOML (not provided by AOML) ****** 10:30am: group picture outside AOML.**

Tuesday, March 8 at 6:30pm: Diner at Scotty's Landing in Coconut Grove.

REPORTS AND DISCUSSIONS ON SEAS AND XBT OPERATIONS
5-10 minutes (5-10 slides) for each report.
Moderator: am: Francis Bringas / pm: Pedro DiNezio

1. (GG): Status, plans, and goals of FR XBT transects

2. (MB): Status, plans, and goals of HD XBT transects

3. (JF): Current status of ATL/PAC FR transects AX08, AX10, PX08, and PX50. Status of FR equipment removal and storage

4. (GG): Status and recruiting of International HD/FR collaborations

5. (RR, DA): Status of ATL HD transects: AX07, AX08, AX10, AX18. For each of these transects:
   a) Recruitment status
   b) Equipment set up
   c) Delayed-time data downloading
   d) HD riders
   e) Cruise plans
   f) Cruise check list
   g) Reports

In order to successfully construct and complete a transect, several logistic steps have to take place for a comprehensive data set to go from a ship to a usable data product. Such logistics include: High density (HD) transect preparations and monitoring, equipment tracking and maintenance, vessel recruitment, educational outreach tools and make these publicly available. For the XBT/TSG operations meeting we will address the current updates on the logistics mentioned. HD successful transects for 2010 reached the desired 4 transects per year for AX07, AX08, AX10. For AX18 3 out of 4, and for AX25 1 out of 2 transects were completed. We are working on the recruitment of vessels for AX07 and AX18. As we review the success of the operations and take ongoing goals of improvement, we look forward working together to create new ideas and progress in the operations logistics in SOOP.

6. (RR): AX25 logistics, contracts, etc

7. (DS): XBT operations on Oleander (AX32) and Reykjafoss (AX02)

- Oleander

Gustavo Goni and I presented the Oleander's owners and crew with the NOAA Environmental Hero of the year Award in July of 2010 at a reception aboard the ship in port in Bermuda, hosted by the Bermuda Container Line. The award was for the ship hosting NOAA scientists onboard for 29 years for monthly XBT operations and Plankton recorder tows. The ship also reports weather and has installed TSG, pCO2 and ADCP systems for underway recording.

The SEAS XBT and TSG equipment was removed from the Oleander prior to the ships Dry Dock extensive refit in the Netherlands. The ship will return in mid April when a reinstallation of the SEAS equipment will be conducted.

The WHOI Autonomous Systems Lab will install an AXIS (Automatic Expendable Instrument System) in dry dock. It has 2 6 (XBT/XCTD) probe magazines. XBTs will be dropped hourly on the way to Bermuda 4 XCTDs will be dropped, 1 each in Shelf, Slope Gulf Stream and Sargasso water masses. Fisheries staff will continue XBT ops with a hand launcher for side by side comparisons until we can verify that the data will be usable in NOAAs database.

- Reykjafoss

During August the SEAS 4 system was replaced with a SEAS 6 system on a laptop with a MK21. On 25-26 Feb. A GPS, Iridium, pCO2 and SBE45 TSG were installed with wireless input of GPS data to the SEAS laptop and wireless transmit of XBT files from the SEAS laptop to the Iridium.

8. (GP): SIO XBT operations

A brief summary of Scripps' XBT network operations - 7 Pacific HD transects (P05, P06, P09, P37/10/44, S37, P38, P50), 1 Indian (I15/I21), and A22 across the Drake Passage in the Southern Ocean - present and future status of these 9 lines, will be discussed. The Scripps XBT Manual & Cheatsheet will be available to anyone interested.

9. (GP): Current status of Pacific FR transects PX09, PX10, PX37, and PX13. For each of these transects: recruitment status, equipment set up, greeters, reports, and delayed-time data downloading

On behalf of Carrie Wolfe, recruitment status, equipment set up, greeters, reports, and delayed-time data downloading for FR transects P13 & P44/10/37 will be presented.

10. (DA): XBT equipment inventory

11. (UR): Equipment and budget recommendations for FY11

12. (RS): SEAS XBT Auto-QC Operational System

13. (QY): QC status of HD transect AX18. HD QC issues

14. (YHD): QC status of HD transects AX07, AX08, AX10, AX25, and AX97
    a) HD QC issues
    b) New QC procedures: status and recommendations

Status of HD transects: AX7 transect collected a total number of 821 profiles from 4 cruises in year 2010. AX8 transect collected a total number of 1082 profiles from 4 cruises in year 2010. AX10 transect collected a total number of 377 profiles from 4 cruises in year 2010. AX25 transect collected total number of 153 profiles from a single cruise in year 2010. AX97 transect collected total number of 110 profiles from 3 cruises in year 2010 and 41 profiles from 1 cruise in 2011.

QC issues:

1) The AX07 was the only cruise that showed unusual high incidents of premature launch profiles in 2010; however it would be very interesting to find out the source, cause and how to prevent this in the future.
2) In the past 3 months or so I have been noticing the extra data reported below 800m in the profiles.
3) Is there any relationship between bad tube and bad profile?
4) There is more than one format for "HistoryProfiles.txt"
5) Each rider has his own format for "cruise report"
6) Accurate and helpful comments on NOAA/AOML/PHOD XBT Log Sheet are wanted.

15. (FB): XBT Visual QC at AOML

AOML has implemented a visual quality control (VQC) procedure for near real-time XBT data. The software used for this purpose is a MATLAB based GUI and has been under development for several years, with several new features added recently. To determine whether the profile is good or not, the operator compares the XBT profile with climatology mean values and standard deviation. Other information available while analyzing each XBT profile includes bathymetry, data from instrument measuring similar parameters, maps of deployment locations and duplicate profiles checks. Recently the program received several updates for added efficiency and usability. Another improvement implemented was the creation of a MATLAB script that would easily port the software from one PC to another.

16. (JR): SEAS 2000 and status of its transition to AOML/Miami

17. (IG): Status of SEAS 2000 MET and XBT development, maintenance and upgrades at AOML/Miami

As part of a normal software life cycle, AOML decided to replace AMVERSEAS with a newer version to improve functionality and add features to the existing product. The system upgrade includes development in the Integrated Development Environment (IDE) from Microsoft Visual Studio C++ 2008 Standard Edition under Windows XP to improve portability, using advanced programming techniques such as Document-View architecture, Object Oriented Programming, smart pointers, and regular expressions. This activity involves the following modules: SEAS Console, SEAS Transceiver Interface, SEAS TSG Data Recorder, SEAS XBT Data Recorder, SEAS Met Observations Logger, SEAS AutoIMET Data Logger, and SEAS PC-Watchdog.

The SEAS Met Observations Loggers (automatic and manual) operate on Voluntary Observing Ship (VOS) program vessels to produce high quality marine weather observations. This software is one of the three world wide used electronic logbooks by WMO for the acquisition and transmission of meteorological observations.

In order to efficiently support the VOS program, SEAS has grown in extension and complexity. With the aim to bring the system up to date and to improve its characteristics, AOML decided to upgrade the software, which consists in the replacement of the current product with a newer version capable to work under more recent hardware and software requirements.

Some of the features included in the new version (9.0) are the integration, in only one application, of the function of reception and transmission of meteorological data, the administration of meta-data, the ability of automatic computer clock update and setting to UTC (replacing the previous manual only option), the

implementation of WMO recommendations regarding VOS observations and swell in particular. Additionally the new version includes the implementation of IMMT formatted messages in support of the VOSClim program, as well as improved local html 'Help' documentation.

18. (JR, IG): Manuals and troubleshooting on SEAS 2000 and equipment set-up for HD and FR mode

19. (GP): MK21 'calibration' and best practice guide for SOOP community

Procedures to obtain optimum quality XBT data with an emphasis on the importance of MK21 "calibration" and how to do this within AMVERSEAS will be presented. Alternate sources for cable and XBT heads will be discussed as an alternative to rectify deficient Sippican equipment, to improve overall reliability and ease of use. The importance of adding a climatology data-base to our sea-going tools, using buddy profiles to determine bad drops will be highlighted as well. A detailed "Best Practices Guide for the SOOP Community", including step by step instructions, will be made available to anyone who is interested.

20. (PC): RT XBT data transmission into GTS

21. (PC, PP) Report on Iridium costs

22. (JT): DT data transmission into GTS

23. (FB, GS): Data tracking

The aim of the data tracking activity is the verification of data flows from the source (observation platform) to the processing centers, where the data is analyzed, quality controlled, and sent to the Telecommunication Gateway at the National Weather Service (NWS) from where the data is inserted into the Global Telecommunication System (GTS). The tracking of these data ensure that the information obtained by different observation platforms are received and that they are generated with the correct format so that it can be successfully disseminated through the GTS. Otherwise the data cannot be used or, if communication problems are not detected, lost. The flow of different kinds of oceanographic data, including XBT, TSG, buoys, drifters and TAO/PIRATA arrays is verified. When a problem is found (in data format or transmission) the source is determined and the person responsible is contacted. This is a daily process.

24. (DA): Monitoring of XBT HD transects and SOOP goals

25. (JT): SEAS XBT QC reports and SEAS monthly and annual reports

26. (JT): XBT data drops

27. (JT): SEAS and non-SEAS reports

28. (UR, PC): Plans and status for AOML XBT database

29. (GS): Contracts: current state of each contract

30. (JT): Status on the migration into BUFR format

31. (YHD): XBT HD web site. Status of the new AX01 transect page

Two new transects, AX01 and AX20, were added to the HD XBT transect map, but no data for AX20 is available at the moment. Available data from AX01 covers from Dec. 2000 to Dec. 2010 and are currently being qc'ed.

32. (IG): New SEAS 2000 web site

33. (JT): Google Earth and Google Maps applications

34. (DA): SOOP documents: Brochures and XBT Bibliography, Cruise plans updates

Adjustments and changes have been made to our existing AX cruise plans. Finally the current SOOP brochure has been updated and a one page version is in its draft version. Most of these updates can be found online in the AOML/SOOP website.

35. (GR): XBT fall rate equation experiments at AOML

36. (MG): Plans for XBT technical improvements

Biases in the depth estimation of XBT measurements account for a high source of errors for temperature measurements in climate studies. Economically sound improvements can be performed on the probe to make it less susceptible to depth biases. NOAA-AOML is studying the idea of adding pressure switches to the probe in order to minimize errors in the XBT depth estimates. The efficiency of this method has being analyzed for different regions of the ocean and for the number and position of these pressure measurements.

37. (MB): Scientific projects

38. (GG): Future of XBTs, transects, and XBT SOOP operation

DAY 2 (SEAS / TSG)

Wednesday, March 9 (9:00am - 12:00 noon, 1:30pm - 6:00pm, coffee breaks: 10:30 - 10:45am, 3:30 - 3:45pm) ****** 8:30am if you need to upload your presentation in the laptop.**

CONTINUTATION OF XBT DISCUSSIONS

REPORTS AND DISCUSSIONS ON SEAS AND TSG OPERATIONS

5-10 minutes (5-10 slides) for each report

Moderator: Francis Bringas

1. (GG): TSG Operations, plans and goals

2. (DS): Status and plans of TSG operations on Oleander
   a) Water sampling
   b) Data downloading
   c) Equipment calibration

   a) Water Sampling: TSG calibration samples have been collected monthly by the NOAA ship rider. Sampling has been 4 sets of 6 samples collected 1 minute apart. 3 sets from the high salinity Sargasso Sea and one low salinity set from the shelf water. There is a period of no sampling while the ship is in dry dock, January 5 to mid April. We are open to recommendations from salinity experts to modify our water sampling when operations resume in April.

   b) Data downloading: Data is downloaded at the end of each ship rider's cruise. It will also be transmitted daily to AOML when the iridium is reinstalled in April.

   c) Equipment calibration: TSGs are calibrated every 12 months

3. (DP): Status and plans of TSG operations on Reykjafoss
   a) water sampling

4. (FB): Status of TSG operation in Semester at Sea

   The MV Explorer of the Semester at Sea program is one of the ships participating in the AOML/SOOP TSG operation. This ship transmit data in real-time from locations around the globe with almost half a million of TSG records transmitted during 2010, from which 65.1% were approved after quality control, thus providing a very important contribution to the TSG program.

5. (LW, SC): Status and plans of TSG operations on Explorer of the Seas
   a) Equipment
   b) Water sampling
   c) Data downloading

   Over the past year, the Explorer of the Seas oceanographic and meteorological data collection have been fully automated to collect surface marine temperature, salinity, wind speed and direction, barometric pressure and ocean currents along the cruise ship track. Instruments, such as the ADCPs (acoustic Doppler current

profilers), and the pumped sea water system are programmed to turn on and off under autonomous control based upon the ship's location and speed. The seawater automation is controlled by a National Instruments c-RIO that controls the pump, computer-controlled valves and the in-port fresh water flushing and soak. The c-RIO also aggregates the marine seawater surface data, time stamps it and adds ancillary data, such as GPS, broadcast over the LAN (Local Area Network) by serial port servers. The meteorological data are acquired using a separate c-RIO and all data are transferred from the c-RIOs to a data server on the ship which is connected to the ship's network. The transfer of data to shore is accomplished via a permanent VPN (Virtual Private Network) tunnel between the University of Miami Rosenstiel campus (RSMAS) and Royal Caribbean Cruises, Ltd (RCCL). This link provides administrator remote control and access to all computers and instruments on the ship's network. Royal Caribbean Cruises, Ltd. also provides a separate web VPN interface that allows participating scientists to access and control their IP addressable equipment and computers over the RCCL provided satellite broadband link.

6. (PP): Status of TSG operations in Barcelona Express: equipment, problems with data acquisition and transmission

7. (UR): Status of TSG installation on MV Bernardo Houssay

8. (GP, CW): TSG status and plans of operation in the Pacific

   On behalf of Carrie Wolfe, a very brief summary of TSG operations aboard the Natalie Schulte (P13/09, PMEL) and OOCL Tokyo (P10/37, UW) will be presented.

9. (DD): The VOS program

10. (PR): The use of SEAS/AutoIMET in the VOS operation

    An overview of the successful implementation of the SEAS/SEAS AutoIMET on our NOAA Fleet. How this AWS will be compared to other existing AWS's during the 6th session of the JCOMM Ship Observation Team in Hobart Australia. This high visibility makes it very evident that it is imperative for SEAS/SEAS AutoIMET to stay competitively pro-active in complying with WMO standardization by upgrading and correcting any discrepancies in a timely fashion. I will show the benefits of this automated system by spotlighting one NOAA Research Vessel in comparison with life prior to the automation which is representative of the fleet. In addition, I will reiterate how this AWS is the only one with the capability of augmentation and the ability to toggle on/off sensors at will.

11. (TK): The Port Meteorological Office in Charleston, South Carolina

12. (PR, DD, TK, IG): Recommendations of AMVERSEAS upgrades for MET observations

13. (SD): SOOP and Drifter Program synergy

14. (RR, SG): SOOP and Argo Program synergy

15. (JR): SOOP and Coast Guard / Amver synergy

16. (MF): Opportunities of expansion of the TSG operation in Argentina

17. (DA, PP): TSG equipment and inventory. Test of equipment at AOML and calibration

18. (IG): Status of AMVERSEAS TSG development, maintenance and upgrades at AOML/Miami. Iridium transmission logs

Continuing with AMVERSEAS upgrade process, AOML decided to implement a new version of the TSG Data Recorder component using the Integrated Development Environment (IDE) from Microsoft Visual Studio C++ 2008 Standard Edition under Windows XP. The most significant new features are: automatic reading of calibration coefficients, automatic communications test between instruments, automatic detection of the baud rate configuration, and automatic setting of the instruments' default configuration.

19. (PC): Transmission of data in real-time from SOOP ships. Iridium costs

20. (FB): TSG data flow:
    a) Status of RT transmissions from ships of the SOOP and NOAA fleet
    b) QC in real-time
    c) QC in delayed-time and visual QC

TSG data received in real-time from ships of the SOOP and the NOAA fleet is downloaded and quality controlled (QC) through several procedures based on the ten GOSUD (Global Ocean Surface Underway Data Pilot Project) real-time control test. Among other parameters, the QC procedures check the data for errors in date, location, platform identification, ship speed, global and regional temperature and salinity ranges compatibility, gradient and the presence of spikes. The TSG data is also compared with a monthly climatology (Levitus 2005) and against the NCEP (National Center for Environmental Prediction) weekly analysis fields.

Currently a QC system is under development for the analysis of TSG data in delayed-time mode. This system may include a visual quality control using the TSG-QC software by Yves Gouriou, Gael Alory, Jacques Grelet and Loic Petit de la Villeon from IRD, Brest. This software have several important features such as:

- plot TSG data as well as data location
- assign quality control flags to each data record
- compare TSG data with external data (buddies) and climatology values (monthly, seasonal and annual climatology)
- temperature, salinity longitude and latitude interpolation
- data correction and "calibration"

21. (JT): Status on the migration into BUFR format

22. (FB): Web pages

Web pages created at AOML display several products from TSG data with the objective of:

- Dissemination and visualization of TSG data (time series and space-time diagrams of temperature and salinity)
- Monitoring of the TSG operation (maps of ship tracks and TSG observations locations)
- We have plans to create additional tools for TSG operations monitoring (tables with data statistics, TSG reports for ships of the SOOP and the NOAA fleet)

The TSG web pages can be reached from http://www.aoml.noaa.gov/phod/tsg/ and include figures, tables and other products from ships of the SOOP (Oleander, Explorer of the Seas, MV Explorer), and the NOAA fleet.

23. (GG): Future of TSG operation

List of Participants

AS	Andrew Stefanick, UM/CIMAS, Miami	Andrew.Stefanick@noaa.gov
CM	Chris Melrose, NOAA Fisheries, Rhode Island	Chris.Melrose@noaa.gov
DS	Daniel Smith, NOAA Fisheries, Rhode Island	Daniel.E.Smith@noaa.gov
DD	David Dellinger, NOAA/NWS, Ft. Lauderdale	David.Dellinger@noaa.gov
DP	Denis Pierrot, UM/CIMAS, Miami	Denis.Pierrot@noaa.gov
DA	Diana Aranda, UM/CIMAS, Miami	Diana.Aranda@noaa.gov
FB	Francis Bringas, UM/CIMAS, Miami	Francis.Bringas@noaa.gov
GS	Gary Soneira, NOAA/AOML, Silver Spring	Gary.Soneira@noaa.gov
GP	Glenn Pezzoli, UCSD/SIO, La Jolla	GPezzoli@ucsd.edu
GG	Gustavo Goni, NOAA/AOML, Miami	Gustavo.Goni@noaa.gov
GR	Grant Rawson, UM/CIMAS, Miami	Grant.Rawson@noaa.gov
IG	Ibis Gonzalez, UM/CIMAS, Miami	Caridad.I.Gonzalez@noaa.gov
JF	James Farrington, NOAA/AOML, Norfolk	James.W.Farrington@noaa.gov
JR	Janet Roselli, NOAA/AOML, Silver Spring	Janet.Brockett@noaa.gov
JT	Joaquin Trinanes, UM/CIMAS, Miami	Joaquin.Trinanes@noaa.gov
KS	Kyle Seaton, UM/CIMAS, Miami	Kyle.Seaton@noaa.gov
LW	Liz Williams, UM/RSMAS, Miami	EWilliams@rsmas.miami.edu
MB	Molly Baringer, NOAA/AOML, Miami	Molly.Baringer@noaa.gov
MF	Mariana Framinan, UM/RSMAS, Miami	MFraminan@rsmas.miami.edu
MG	Marlos Goes, UM/CIMAS, Miami	Marlos.Goes@noaa.gov
PC	Paul Chinn, NOAA/AOML, Silver Spring	Paul.Chinn@noaa.gov
PR	Paula Rychtar, NOAA/NWS, Pascagoula	Paula.Rychtar@noaa.gov
PDN	Pedro DiNezio, UM/CIMAS, Miami	Pedro.Dinezio@noaa.gov
PP	Pedro Pena, NOAA/AOML, Miami	Pedro.Pena@noaa.gov
QY	Qi Yao, UM/CIMAS, Miami	Qi.Yao@noaa.goc
RS	Reyna Sabina, NOAA/AOML, Miami	Reyna.Sabina@noaa.gov
RW	Rik Wanninkhof, NOAA/AOML, Miami	Rik.Wanninkhof@noaa.gov
RR	Robert Roddy, NOAA/AOML, Miami	Robert.J.Roddy@noaa.gov
SC	Shailer Cummings, NOAA/AOML, Miami	Shailer.Cummings@noaa.gov
SD	Shaun Dolk, UM/CIMAS, Miami	Shaun.Dolk@noaa.gov
SG	Silvia Garzoli, NOAA/AOML, Miami	Silvia.Garzoli@noaa.gov
TK	Tim Kenefick, NOAA/NWS, Charleston	Timothy.Kenefick@noaa.gov
UR	Ulises Rivero, NOAA/AOML, Miami	Ulises.Rivero@noaa.gov
YHD	Yeun-Ho Daneshzadeh, NOAA/AOML, Miami	Yeun-ho.Chong@noaa.gov