

**International Ocean Networks (ION)**  
**Quadrennial Report (2007-2011)**

Ralph A. Stephen, Chairman

8 June, 2011

The past four years have seen dramatic progress in the development of ocean bottom observatories for academic research. Canada, Europe, Japan and the United States have seafloor observatory programs in various stages of development. Each program has its own extensive web site and all of them address a variety of multi-disciplinary scientific problems. ION's objectives "to facilitate international cooperation in the development of ocean-bottom observatories" has been tremendously successful. As the observatory infrastructure becomes installed the onus transitions to data exchange and the dissemination of scientific results. For example, the ION-sponsored interagency symposium at the 2011 IUGG meeting will be the first international, multi-disciplinary session to address the "Scientific Results from Seafloor Networks".

Detailed activities over 2007, 2008 and 2009 are summarized in the minutes available from the ION web site: <http://msg.whoi.edu/ION>. Draft minutes from the 2010 meeting in San Francisco, without the Appendices, are attached. The Appendices are included in the full (37 page) minutes available from the WHOI ftp site, <ftp.whoi.edu>, in the folder, [pub/users/ralph](ftp://pub/users/ralph). At the Melbourne ION meeting the Chairmanship of ION will transition to a representative from Japan.

**ION Minutes**  
AGU Breakfast Meeting  
December 15, 2010, 7:00-8:00AM,  
Walnut Room, San Francisco Marriott

DRAFT

**Attendees:**

Stephen (Chairman)  
Best  
Cannat  
Heeseman  
Howe  
Kaneda-san  
Montagner  
Romanowicz  
Schultz  
Tsuboi-san

- 1) The minutes of the 2009 AGU Breakfast Meeting were accepted.
- 2) Review of ION activities in 2010 - Stephen
  - a) A special session was held at the 2010 Spring EGU (in Vienna), "Towards establishing permanent infrastructures for ocean observations: instrumentation, measurement strategies and methods for ocean observatories". Convener: Chris Waldmann, Co-conveners: I. Puillat-Felix, L. Beranzoli, R.A. Stephen
- 3) Reports from Members
  - a) Best/Heesemann - Neptune Canada (Appendix A)
  - b) Kaneda-san/Tsuboi-san - JAMSTEC/IFREE (Appendix B)
  - c) Montagner/Cannat - EMSO/ESONET

Status of the ESONET-EMSO project.

ESONET NoE is a European project (Network of Excellence) that has been funded for 4 years (finishing in February 2011) to organize the deep sea observatory community in Europe and prepare a workable science and technology plan for a network of European deep sea observatories. It is coordinated by IFREMER and is currently holding its last meeting in Marseille. EMSO PP is another European funded project (Preparatory Phase project), aimed at defining the implementation-business plan for the European deep sea observatories network. EMSO has national membership. For France, this membership is represented by IFREMER, and national EMSO-related activities are coordinated by a joined IFREMER-CNRS committee. EMSO PP will still run for 2 years and it is

expected that by that time a critical number of countries will have committed to funding of the project so that the actual ESONET-EMSO infrastructure and legal managing entity will have been created.

Update on some current ESONET-EMSO monitoring activities.

Real time (cabled), near real time ("standalone" buoyed systems, or autonomous monitoring is currently going on at many of the 11 ESONET-EMSO nodes. Not having attended the Marseille meeting I am up to date on only 2 of the recent real time or near real time experiments: one at the Azores node, with acoustic connection to a light buoy and a set of sensors including short period seismometer and pressure gauge (Figure 1), video camera, and environmental parameters sensors; and the other at the Ligurian node, with cabled connection via the ANTARES cable (ANTARES is a cabled neutrino detector), with a broadband seismometer and pressure gauge (Figure 2), and physical oceanography and biology sensor packages.

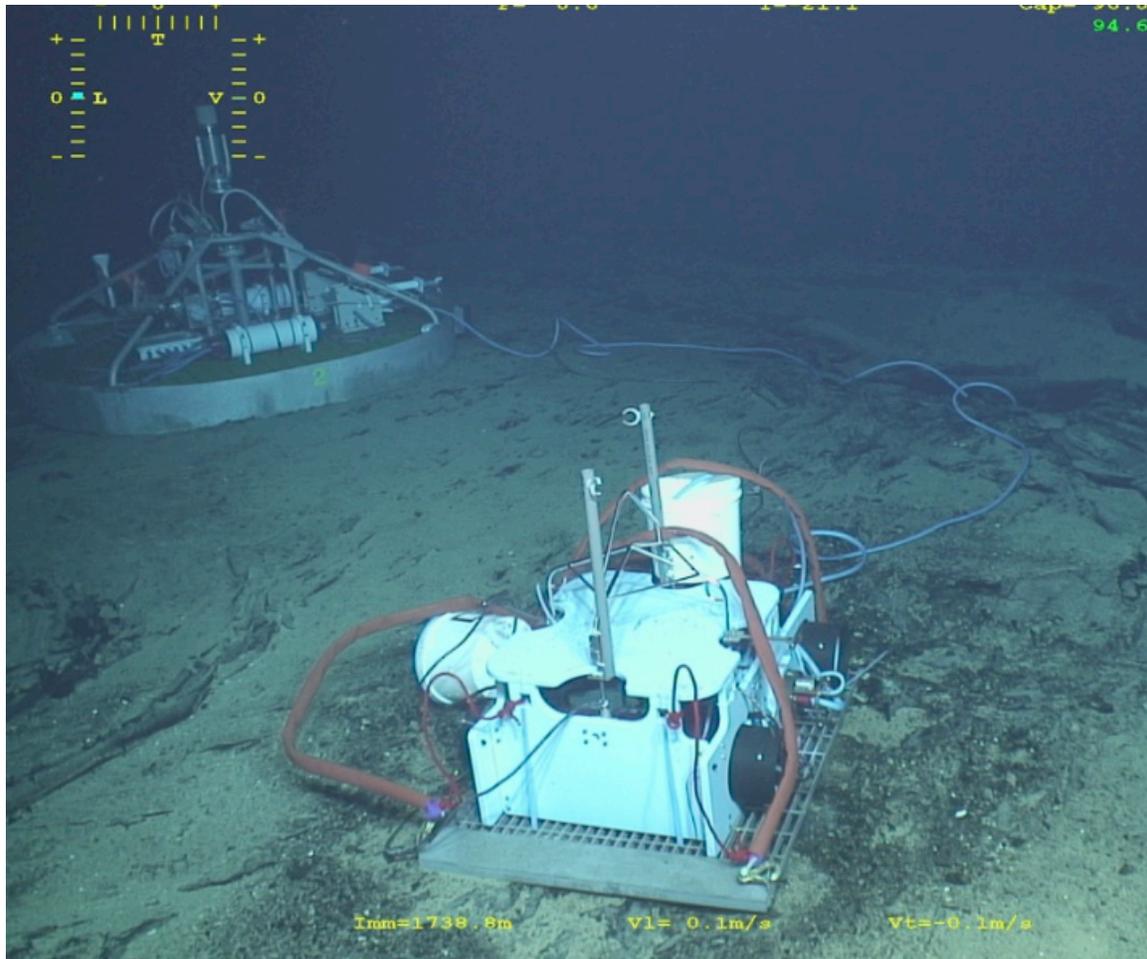


Figure 1: Short period seismometer and pressure gauge at the Azores ESONET-EMSO node. In the background you can see the junction box that provides acoustic connection to the buoy that then connects to shore via satellite.

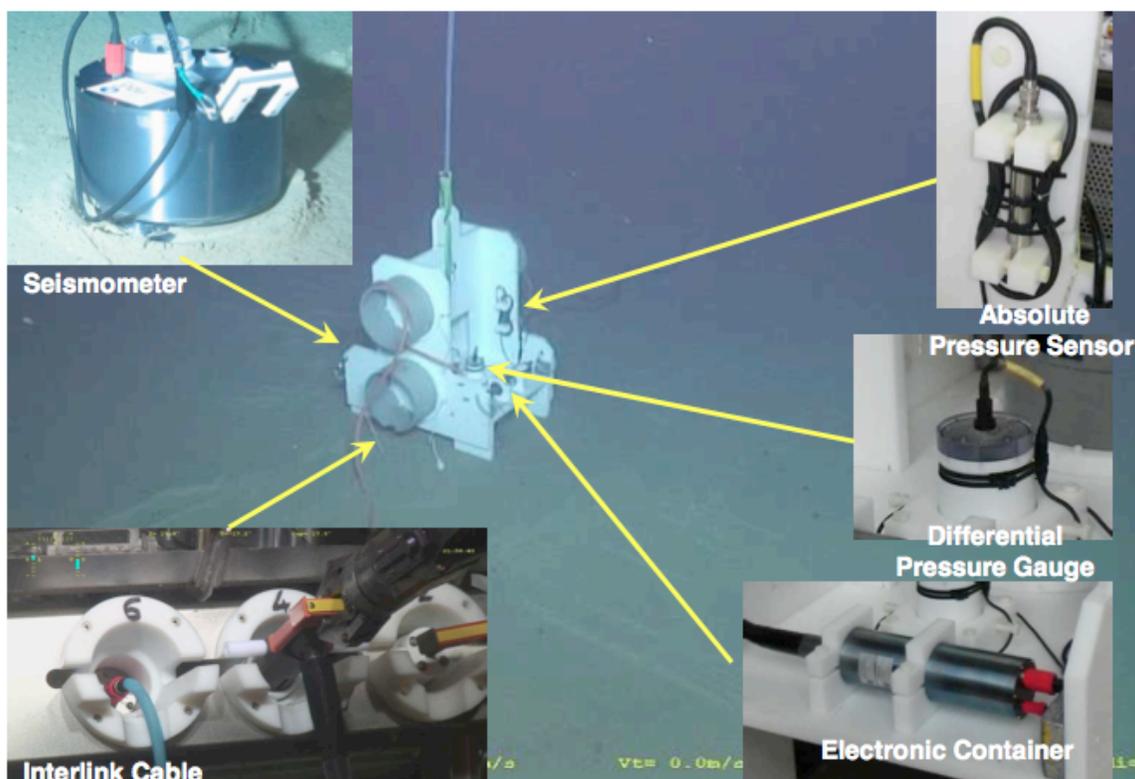


Figure 2: Cabled broadband seismometer and pressure gauge at the Ligurian ESONET-EMSO node.

d) Romanowicz - MARS/MOBB

MARS (Monterey Accelerated Research System) is a cabled observatory in Monterey Bay. The MOBB (Monterey Ocean-bottom Broadband) seismometer has been acquiring data autonomously since April 2002 and via cable since February 2009. In February 2010 the system suffered damage from trawlers and is under repair. More detail is available on the MBARI web site.

e) Schultz - US Cascadia Initiative

The Cascadia Initiative is a \$10M ARRA project to build an onshore/offshore network of seismic and geodetic stations from Cape Mendocino in California to Cape Flattery in Washington. The network, which will run for several years, is targeted at understanding the structure and processes of this subduction margin, which has a history of large earthquakes every 300-500 years. The Cascadia Initiative is a community experiment: the data will be made freely available as quickly as possible.

Half of the funds were allocated to build 60 ocean-bottom seismometers. These instruments, which are being built by the three OBSIP IICs (SIO, WHOI and LDEO),

will have Trillium Compact seismometers and pressure gauges. A subset of the instruments will be trawl-resistant and will be deployed on the continental shelf. The first OBS deployments are being scheduled for early summer 2011.

Also a workshop on "Experiments with Portable Ocean Bottom Seismographs (EPOBS)" was held in September 2010 at Snowbird, Utah. The goals included identifying scientific opportunities, requirements, new technologies, and strategies for experiments that use autonomously recording OBSs.

f) Howe - ALOHA Cabled Observatory

g) US Ocean Observatory Initiative (OOI)

The Final Network Design was completed in April 2010. The program consists of two coastal scale observatories (Endurance and Pioneer), one regional scale observatory (off Cascadia) and four global scale observatories (Figure 3). Many more details are available on their web site.

#### 4) Future ION Activities

a) ION is sponsoring and Inter-agency Symposium (joint with IASPEI, IAPSO and IAGA) at the 2011 General Assembly of the IUGG in Melbourne Australia (June 28 to July 8), "Scientific Results from Seafloor Networks", Conveners: M. Best, P. Favali, Y. Kaneda, P. Grenard, Howe, D. Tarits, P. and R. Stephen, ION members were encouraged to submit abstracts and to encourage their colleagues to attend as well. The status of invited speakers at the ION meeting was: Tsuboi-san - accepted, Andrew Forbes - accepted, Barbara Romanowicz - maybe, Fred Duennebier - declined, Michel-Andre - no response. [The final list of invited speakers, resolved in February 2011, is Tsuboi-san, Forbes, Howe (for Duennebier), and Best (for Michel-Andre and Barnes). ]

5) In July 2011 (the Melbourne IUGG) Ralph Stephen's term as ION Chair will expire. We decided that the Chairmanship should transfer to a Japanese representative and that the new chair would be announced at the ION meeting at the Melbourne IUGG.

6) Membership: This past year we added Patrick Grenard, CTBTO Vienna, to our membership list and Bob Detrick (now at NSF) and John Orcutt (inactive for many years) have been removed. We welcome suggestions for new members. See our charter for criteria.



Figure 3: Location map of the six seafloor observatories in the US OOI.