History of the International Ocean Network

Barbara Romanowicz*, Kiyoshi Suyehiro**

barbara@seismo.berkeley.edu,suyehiro@jamstec.go.jp

***Berkeley Seismological Laboratory, Berkeley, CA, USA. **Deep Sea Research Department, JAMSTEC, Tokyo,Japan.**

(1) Foundation

During the Fifth IRIS (Incorporated Research Institutions for Seismology) Hawaii meeting, an OSN (Ocean Seismic Network) Technical Workshop was held with international participation. At this time, not only future plans were reported, but also experiences of ocean downhole seismic experiments by the Japanese (Japan Sea borehole) and French (Atlantic Ocean borehole and buried) among other seafloor experiments. Quickly, the need was recognized among the participants to form an international group that would help accelerate and coordinate each interested country's efforts to expand the global seismic network into the oceans, which seemed feasible and realistic. Thus, the ION Committee was established in June 1993 and was granted commission status by the IASPEI executive committee.

In January 1995, during the first International ION workshop in Marseille (France), ION's participation was extended to other solid earth disciplines, and in January 2001, during the OHP/ION Symposium in MtFuji (Japan), participation in ION was extended to oceanographic disciplines.

(2) Activities 1993-2001

1993 June - Formation of ION committee, adoption of charter

Founding Steering committee members (in alphabetical order)
Kiyoshi Suyehiro, Ocean Research Institute, Univ of Tokyo, Japan (Chair) (93-98)
Adam Dziewonski, Dept of Earth and Planetary Sciences, Harvard Univ, U. S. A. (93-)
Jean-Paul Montagner, Institut de Physique du Globe, France (93-)
Barbara Romanowicz, Seismological Lab., U. C. Berkeley, U. S. A. (Secretary, 93-97; Chair, 98-)

1993 August - ION joined with JOI (Joint Oceanographic Institutions, Inc., U. S. A.)/IRIS OSN (Ocean Seismic Network) group produced an OSN/ION Planning Document for distribution among the JOIDES (Joint Oceanographic Institutions for Deep Earth Sampling) community. A sub-committe (R. Stephen, WHOI, chair) was formed to report on the technological merits and demerits of borehole seismological observations and to seek international technical coordination of future borehole experiments.

1994 December - ION committee meeting was held during the Fall AGU together with OSN (Ocean Seismic Network)-US group, to discuss and plan the ION workshop in 1995.

1995 January. - ION workshop sponsored by French, U.S. and, Japanese institutions was held in Marseilles (Jan. 11-13) with more than 80 attendants from 8 countries discussing scientific targets and technical considerations. Wide inter-disciplinary discussions were held. The proceedings of the workshop is available for distribution from national representaives' offices as well as from JOI. During this workshop, the charter of the ION was expanded and also the number of committee members were increased to cover the wide spectrum of scientific disciplines.

The following members were added to the ION steering committee:
Giuseppe Smriglio, Instituto Nazionale Geofisica, Italy (95-)
Pascal Tarits, Univ de Bretagne Occidentale, France (95-)
Keir Becker, RSMAS, Unv of Miami, U. S.A. (95-)
Adam Schultz, U.K. (95-)
John Delaney, School of Oceanography, Washington Univ, U.S.A. (95-)

1995 July. - ION held a one-day session (July 5) as an IASPEI led inter-association symposium together with IASPEI, IAGA and IAG on Long-term seafloor observatories and networks. After the session, ION committee met and discussed the future plans relating to borehole observatories, where ocean drilling is required. In view of the fact that the major ION activities currently involve seismology, geomagnetism, and geodesy, it was discussed that ION would seek linkages to IAGA and IAG as well.

1995-1999. - ION has been proactive in promoting the establishment of deep sea floor observatories. Under its umbrella, several pilot experiments have been performed, among them the OSN1, which collected data from seafloor and downhole seismometers at a site 200 km southwest of Hawaii during a 5 months period (02-06/98), and the MOISE experiment, which collected 3 months of data in the summer of 1997, from an ROV deployed site in Monterey Bay (California). In Italy, the

GEOSTAR group is developing a multiparameter ocean bottom station currently under testing in the Mediterranean sea, and groups in other european countries, in particular France and the U.K. are also putting efforts into seeking funding to support ocean bottom observatory programs.

1996 May. - European Geophysical Society meeting: ION met on May 8 17:00-19:00. ION session: SE25.

1996 June. - The ION Committee together with R. Stephen and J. Orcutt submitted an ODP proposal titled "Global Siting Plan of Borehole Geophysical Observatories by ION". This proposal included all the ION related ODP proposals and letters of intent and described the ION plans in a global perspective for the benefit of the ODP community.

1997. - As part of an ODP panel structure, Long-Term Observatories Program Planning Group was formed cochaired by K Becker and K Suyehiro. This PPG liaised with ION and has been an important voice for realizing ION proposals.

1997 Nov. - ION co-sponsored the first OHP international symposium held in Chiba, Japan.

1998 June. - A special issue of Physics of the Earth and Planetary Interiors (vol. 108-2) on "Seafloor Observatories and Geophysical Networks: The present and the future", guest ed. K. Suyehiro and J. P. Montagner, was published as proceedings of 1995 IUGG meeting session.

1998 Nov. NERO site drilled (Leg 179) and awaits instrumentation.

1998 Dec. Fall AGU ION Symposium (U32B) " Deep Ocean Observations from the Seafloor"

1999 July. IUGG'99 Birmingham. ION Symposium (JWA34):" Long term ocean bottom observatories"

1999. - Two Japan Trench sites drilled during ODP leg 186 and instrumented during leg 191, each with strainmeter, tiltmeter and 2 broadband seismometers.These sites were established as the first ocean downhole crustal deformation observatories. Cabled seafloor broadband seismometer station installed at H20 site, half way between Hawaii and California.

2001 April. - Leg 195 successfully emplaced 2 broadband sensors in the center of the Philippine Sea.

There are plans for drilling 2 additional "ION holes":

H20, East Pacific: a cabled sea floor seismic observatory was installed in Spring 99 and a borehole is scheduled to be drilled as part of Leg 200 (Dec 01-Jan 02).

OSN-2/ION, Pacific Equatorial site, planned for Sep-Nov 02 (Leg 205).

Thus, except for the Center of Nazca Plate site, all the prototype sites will have become ION sites before the end of the present ODP in 2003. Future borehole sites would be drilled by the new IODP (Integrated Ocean Drilling Program).

(3) OHP/ION Symposium, Mt Fuji, January 2001

ION has held a second international workshop in Japan, in January 2001, in conjunction with the OHP (Ocean Hemisphere Project) Symposium.

The goal of this workshop was to:

1) enlarge participation to the oceanographic research community interested in long term ocean observatories

2) following the recommendations outlined during the NRC Workshop held at Cheeca Lodge, Florida 01/09-01/12/00, start developing technical standards and international management organization for the global long-term ocean observatory network.

During this meeting, the ION charter and recommendations were updated to include the larger oceanographic community (see this volume) and two new members were added to the steering committee:

Richard Lampitt (UK, biology)

Christopher Mooers (USA, physical oceanography *(4)*

ION participation

ION welcomes the participation of all individuals interested in promoting international cooperation on long term ocean observatories. Further information can be found on the ION webpage at:

http://perry.geo.berkeley.edu/seismo/ion

ION existing and planned sites

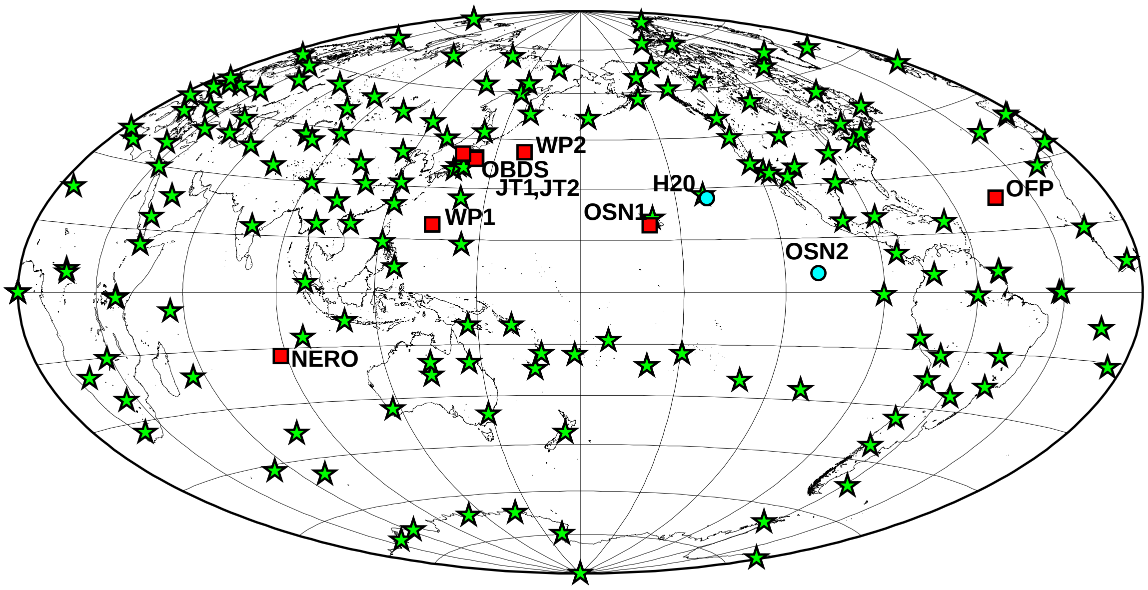

Figure 1: Stars: location of designated land stations of the Federation of Digital Seismic Networksm (a subset of existing global digital broadband stations). Squares: location of ION/ODP boreholes. OSN1 and OFP have been discontinued. NERO awaits instrumentation. Circles: sites of scheduled ION/ODP holes. H20 is currently recording data from seafloor broadband sensors.