
PARTNERSHIP FOR OBSERVATION OF THE GLOBAL OCEANS (POGO-5)

Yokohama Institute for Earth Science, Japan, 18 – 20 November, 2003
Meeting notes by Jean-Louis FELLOUS

Tuesday, November 18

Opening

Howard Roe opened the meeting at 09:10.

Welcome Address and Logistics

Takuya Hirano (JAMSTEC) offered words of welcome, recalling the early history of POGO and expressing their wish for a successful and productive meeting. Howard Roe added his own welcome, and warmly thanked JAMSTEC for hosting the meeting.

Introduction of Participants

About 50 participants registered to this 5th POGO meeting. All participants introduced themselves. Howard Roe particularly welcomed four new member institutions of POGO, of which three were present, and three more new participants (from Korea, Indonesia, GCOS).

Adoption of the Agenda

Howard Roe (SOC) invited comments on the agenda, which was slightly modified due to the absence or delayed arrival of some participants, and adopted as such.

Approval of Minutes of the Fourth Meeting of POGO

Howard Roe invited comments on the minutes of POGO-4. They were accepted without change.

Opening Remarks

Howard Roe (SOC) put forward the opinion that this meeting comes in the most important period in the existence of POGO, in view of the GEO meeting held in Washington in the summer. Subsequent to the Washington meeting, POGO was recognized as a representative organization in its own right in GEO. He also mentioned the *Mirai* cruise, the training on the cruise and fellowship programme, and concluded that this had been an active and productive year for POGO.

GCOS Second Adequacy Report and OOPC

Ed Harrison (PMEL) gave some background on the OOPC, cosponsored by WCRP, GOOS and GCOS. Its primary responsibility is to make recommendations for sustained observations, assist in development of standards. It works in close coordination with CLIVAR. The challenge is in the small magnitude of the ocean signals, of the order of fractions of a degree in the long run. Analyses are further hampered by the scarcity of COADS data in vast regions of the ocean. As an example, vast tracks of the Indian Ocean surface has practically not been sampled by conventional methods in the last 50 years. Satellites do not provide the whole story. The situation is even worse in depth, where there is NO historical data sets to document any global change. "*The ocean networks lack global coverage*", as was stated in the 1st GCOS adequacy report. The 2nd report has been prepared for UNFCCC, covering atmosphere, ocean, land domains, with participation by WCRP, IPCC, GCOS, GOOS and CEOS, reviewed in IPCC style. Crosscutting issues are satellites, data and climate analysis. Domain recommendations for the ocean are "*Next Steps*" toward the initial global ocean climate observing system. It benefits from IGOS Ocean Theme, St-Raphael's Ocean Obs Conference, and subsequent developments. The strategy is simple: continue what has been working; fill the gaps, using proven techniques; establish global reference networks; provide more focus on products and system. The need is to have a *composite* system, to get coverage and accuracy. Recommendations include to implement an initial global ocean surface network, and a global ocean subsurface network, to improve the ocean data system, to enhance ocean climate analysis, advocate for reanalysis, and establish strong linkage with climate research community for R&D, observations, evaluation, evolution and new science. Key satellites (precision altimetry, color, vector winds, microwave SST) should be continued. Global *in situ* observations should be completed (overall, 30-50% now): 1,250 drifters, 86 reference tide gauges, over 200 VOSCLIM ships, 29 moored reference sites, VOS pCO₂, 115 tropical moorings, 3,000 ARGO floats, repeat hydro and carbon surveys, 41 XBT lines are part of the essential system. The GOOS-SC recommended these Next Steps to the IOC member states. CLIVAR has characterized this suite of recommendations as "essential" for climate science, also endorsed by the JSC. They will also be carried by SBSTA to COP-9. An implementation plan is requested to be prepared within six months. Missing are consensus recommendations for sea ice, boundary currents and choke point flows, Arctic, Antarc-

tic, thermohaline circulation, and more importantly biogeochemistry is almost completely absent. A number of issues are identified with respect to evolution: sampling issues; quantifying uncertainty of products; support for sensor R&D, process experiment and pilot projects, etc.

POGO is requested to endorse the Next Steps, so as to reinforce the community consensus, seek national support to implement them, support efforts to continue ocean satellites, establish and maintain Web site of planned ship tracks, support global implementation, participate in ocean data system evolution.

Howard Roe thanks the speaker and mentions the draft document that has been prepared (referred to as the "Yokohama declaration" in the agenda), which is very much in resonance with the Next Steps.

Yves Desaubies (IFREMER) encouraged real-time reporting on data from research vessels, as a simple, no-cost improvement. **Stan Wilson** (NOAA) also expressed the wish to promote sharing hourly sea level data in near real-time. **Charlie Kennel** (SIO) insisted on the need to promote data integration at all levels. **Jan de Leeuw** (NIOZ) drew attention to the processes taking place in the water column. **Ed Harrison** answers that this issue is left in the hands of the specific communities.

Review of Elements of Ocean Observation Systems

The meeting reconvened after coffee break. The Session Chair was Hajimu Kinoshita (JAMSTEC).

Time Series Observations

Tommy Dickey (UCSB), on behalf of Uwe Send and Bob Weller, presented a progress report on the Global Eulerian Observatories (GEO) project. The GEO Science Team comprises 20 members, with a broad discipline regional and national representation. Three GEO workshops were held since 2001. The aim is to establish a global network of time series observatories, in other words, the continuity module of GOOS. GEO builds on the legacy of OCS (Ocean Weather Stations), and capitalizes on new technologies. Several time-series programs are underway (see draft GEO White Paper), covering air-sea interaction; mixed layer dynamics; rapid, episodic and extreme events; ecosystem dynamics; transport and current variability; ENSO, PDA and NAO – global tele-connections; water mass formation and changes; deep convection/salinity anomalies; variability of properties of ocean interior; carbon cycling and biogeochemistry; global climate change and feedback mechanisms; geophysics, including plate dynamics and seismology. A variety of platforms (many different forms of moorings, tripods, remote sensors, *in situ* non-stationary platforms) are used, with models for synthesis. A major GEO Science Team achievement is in the multidisciplinary site selection (over 65 sites), which helps promoting collaborative multidisciplinary studies while reducing costs. Several examples are shown of long time series revealing physical and/or biological variability in the ocean. Some of our most important knowledge about the functioning of oceans comes from such long times series. Scales of interest go from less than a day to decades. New technologies are emerging, e.g., spectral optics, primary productivity, pCO₂, pH, DO, NO₃, acoustics, video implemented altogether on moorings. High frequency, long-term time series observation can capture extreme events, resolve long-term changes and eliminate aliasing. Bio-fouling is a limiting factor in some cases, efforts are directed at making progress in this respect. AUVs, gliders, large spar buoys, are also being used with a variety of multidisciplinary sensors. GEO data policy approach is very similar to ARGO (public availability in near-real time, data quality by each operator). The GEO pilot system is really underway, for science, operational and technical applications and policy making. GEO is complementing other elements of the global ocean observing system.

POGO can help promoting, coordinating and implementing GEO, through advocating with governmental and intergovernmental organizations and helping establish useful linkages.

Jürgen Willebrand (IFM) inquires on GEO data integration and its utilization through modeling. **Charlie Kennel** asks about the amount of savings achieved through this multidisciplinary approach. There is no simple answer to it.

Overview of ARGO

John Gould (ARGO Director, SIO) presented an overview of ARGO, on behalf of the ARGO Science Team. ARGO contributes to the knowledge of temperature and salinity of the ocean, observation of which before ARGO were virtually ship-based. Each month ARGO profilers provide as many T and S observations as all historical ship measurements. ARGO float operations are described. 17 countries (plus EU) contribute to ARGO through float provision, deployment and/or EEZ access. Target array is 3,000 floats, and maintenance would require 825 floats per year. Since 1998, 951 floats have been deployed, mostly in the Northern Hemisphere. The geographic distribution is improving as time passes. All ARGO data are freely available, in real-time through two data centers (CORIOLIS in Brest, France; US GODAE in Monterey, Ca., USA). Delayed-mode data are becoming available. Such real-time subsurface data availability is changing the perspective: ARGO data now exceed XBT data collected. Float reliability is improving. ARGO Science Team met in Tokyo the week before POGO, with 210 attendees from 20 countries, 85 presentations and posters covering a wide range of topics. Examples are the global seasonal heat storage; decadal salinity change (compared to CTDs) in South Indian Ocean; response of Arabian Sea to summer monsoons in 2002 and 2003. ARGO is already a central element for GOOS and GCOS, CLIVAR and GODAE. It complements, but does not replace other *in situ* (sea level, hydrography, time series, XBT sections, surface drifters, air-sea flux sites, moored arrays in tropical region and boundary currents) and remote sensing (altimetry, scatterometry) observations. New coun-

tries (NL, Brazil, Chile) are joining ARGO programme. ARGO also helps develop partnerships (scientists, agencies, manufacturers). New sensors and technologies are developed and incorporated. ARGO needs sustained (over 10 years) funding to be fully implemented and evaluated.

Immediate needs are for funding (and hiring) of a (new) Director, clarification of roles between the director and the technical coordinator, implementation of a delayed-mode quality control, development of an Indian data system, improvement of visibility at national and international levels, all matters in which POGO can help.

Carbon Cycle

Maria Hood (IOC) starts by recalling the UNFCCC commitment relative to systematic observation and data archiving for climate, and the existing mechanisms for this commitment. GOOS helped assemble a strategy document (April 2002) outlining the rationale for ocean carbon observation. Key scientific questions were identified for an ocean carbon observation system to be designed. The IGOS established a Carbon Cycle Theme. More recently a Global Carbon Project (GCP) was jointly established by WCRP, IGBP and IHDP. An International Ocean Carbon Coordination Project (IOCCP) was put in place between GCP and the SCOR/IOC CO₂ Panel, in view of reducing duplication and providing a global view on a vital issue, presently disseminated across a large number of international programs. Three steps are considered: sharing and connecting what we already have; identifying gaps and weaknesses in present observations; recommending and planning. A number of workshops were held in 2003, together with publications and Web-based information. There are a variety of CO₂ observational platforms available. Process studies are still needed to complement monitoring stations.

Issues for POGO encompass: possible implementation of O₂ sensors on ARGO floats; VOS incentives for standard science compartments (through agreements between research institutions and shipping companies); technology development; publishing observations.

Jürgen Willebrand inquires whether the new ocean program of IGBP (IMBER) could help resolve the current dispersion. The answer is, unfortunately, no.

NEPTUNE and Ocean Observatories Initiative

Bruce Howe (APL) reported on the NSF ORION program (oriented to conducting long-term, sustained observation of the ocean environment) and one of its subset, NEPTUNE. Topics of interest include ocean and climate, fluids and life in ocean crust, dynamics of lithosphere, coastal ocean processes, turbulent mixing, ecosystem dynamics and biodiversity, etc. The Ocean Observatories Initiative was created, with three levels: global network of permanent and re-locatable deep-sea buoys, regional cabled observatories (pilot project off North California coast), coastal observatories. Three classes of instrumentation are considered: core instruments, community instruments, individual investigators. ORION complements other initiatives (ARENA in Japan, ESONET in Europe, etc.). Public education is one goal. Funding is expected from NSF for infrastructure, peer review for continuing science. \$208M is requested for the 5 year period starting in 2006 (probably insufficient). Operation and maintenance are estimate at \$50M/year. The project is comparable in size to ODP, to which its management structure is comparable. NEPTUNE, "a fiber-optic cable to inner space", is aimed at investigating processes taking place at the scale of a tectonic plate (Juan de Fuca). A NEPTUNE science planning workshop was held in April, to define the essential elements of the cabled regional observatory: power supply (100 kW), data rates, sensor networks, etc. Two test-beds are already funded MARS (Monterey MBARI) and VENUS (Vancouver). Canadian funding is now committed.

POGO can help international coordination and participation for this challenging experiment. A new science workshop is planned for January 4-8, 2004, in San Juan, Puerto Rico.

Howard Roe and **Jürgen Willebrand** inquire on the connection between ORION and other similar initiatives, and on its central scientific objective.

Review of Elements of Ocean Observation Systems (cont'd)

The meeting continued after group photo and lunch. The session Chair was Tony Haymet.

Marine Biodiversity

Jesse Ausubel (Sloan Foundation) presented a report on the Census of Marine Life objectives. CoML aims at assessing and explaining the diversity, distribution and abundance of marine life. It covers continental shelf, open ocean and microbial aspects. Shelves cover a wide area. The Canadian POST project is directed at designing an observing system for animals living in Pacific shelf region. The TOPP project (Tagging Of Pacific Pelagics) uses several hundred animals of six different species to probe ocean parameters as they move. Sharks, seals and tunas are used as bio-probes to measure temperature profiles as in ARGO. Microbes are present in all parts of ocean. Little is known on their geographical distribution, nor on gene transfer, reproduction rates, etc. New methods could revolutionize our knowledge of their behavior and role in biogeochemical cycles.

POGO has supported from the beginning the inclusion of biology into ocean observing systems, and is expected to continue to do so.

John Gould inquires on the transmission of data from tagged animals to ARGO data centers.

Phytoplankton and Primary Production

Shubha Sathyendranath (POGO) discussed the readiness of biological observations to go operational. The POGO Biology Report (2001) recommended a significant effort to complement ocean color data with *in situ* measurements. During the Beagle 2003 cruise of R/V Mirai many scientists were given the opportunity to perform a lot of measurements (phytoplankton concentration, optical properties) in the Southern Hemisphere. JAMSTEC has set an example through this modest, but significant effort. A training course also took place in Chile in 2002, with contributions from several Centers in USA and Southern American countries. This was followed by the establishment of a South American Network for long-term study of phytoplankton dynamics. This initiative is worthy of emulation elsewhere. India offers an example of short-term forecast for application to marine fisheries. Such applications require timeliness, more than accuracy. A last example relates to ecosystem variability (spring bloom) and fisheries (fish larvae survival). One current issue for ocean-color data is the planned withdrawal of NASA support to SeaWiFS.

SORCERER II Expedition

Karla Heidelberg (affiliated to J. Craig Venter Science Foundation) presented activities pertaining to "uncultured bacteria", whose role in environmental change is largely ignored. Application of new genomics technology has been pursued through a pilot study in the Sargasso Sea. Test genome sequencing was performed on DNA extracted from samples acquired in a Bermuda experiment. As results seemed so promising a global expedition, the Sorcerer II, is now envisioned, with sampling every 200 miles. The resulting genomic data base will be fully, freely accessible.

POGO could help enhance the development of international collaborations, identify points of contact in participating countries, and develop partnerships.

Jesse Ausubel mentions that the project also aims at sequencing the air (which is full of microbial life). **John Gould** wonders about the interpretation of the data from a global expedition, in view of the dominant (temporal and spatial) scales in most ocean phenomena. Several questions or comments are raised about the scientific design of the experiment.

PICES

Sei-ichi Saitoh (Hokkaido University) presented a report on North Pacific monitoring activities within PICES (North Pacific Marine Science Organization), an intergovernmental organization established in 1992, and involving Canada, China, Japan, Korea, Russia and the U.S.A. PICES has a program called CCCC (Climate Change and Carrying Capacity) which provides a mechanism to integrate national GLOBEC research programs in the region. Several annual workshops have been held.

Value of Ocean Observations (IACMST)

Trevor Guymer presented the results of a study commissioned by IACMST (UK Inter-Agency Committee on Marine Science and Technology) and conducted by EFTEC (Economics for the Environment Consultancy). Cost-benefit and multi-criteria analysis were used, with questionnaire to users. Benefit can here be economic, or environmental, or social. Focus is on economic benefits, in line with the UK Treasury guidance. Economic measures of benefits can be market price paid for marine measurements. Proxy to market price can be estimated from cost savings afforded by data, or value added or cost of obtaining alternative data. The study had several components: general marine measurements and two case studies (Jason-2, coastal monitoring). Jason-2 took urgent priority. 36 organizations were contacted, of which 23 responded. Responses pertaining to Jason-2 are publicly available and discussed in some detail. The value of Jason-2 to UK economy is found to be at least £610,000 and at most £18,000,000 (mostly one oil company) per year, to compare with the average annual cost to UK of £332,300 per year. Full report is to be published early 2004. Extended studies (complete analysis of coastal observation, economic benefits of improving access to existing data) are under consideration.

Yves Desaubies inquired on comparison with similar analyses conducted in the context of GMES.

Institutional Initiatives for Ocean Observations

This session started after the coffee break. The session Chair was .

BEAGLE 2003: Southern Hemisphere Research Cruise by R/V MIRAI

Masao Fukasawa (JAMSTEC) presented a status report on the on-going Southern Hemisphere expedition, approved in POGO-3 as a follow-up to the Sao Paulo Declaration. The cruise started at Brisbane in August. The R/V Mirai is now in the Southern Atlantic. Seven POGO trainees and six young scientists have been invited on-board, conducting surface water sampling and analyzing chlorophyll and primary production. Plots of intermediate results were presented and discussed. The cruise will come to an end in late February 2004 after a tour near Kerguelen, with a final report in February 2005.

Howard Roe expresses sincere thanks to JAMSTEC for this outstanding contribution to POGO efforts related to training and capacity building, and to enhancing observations in the Southern Hemisphere.

Building Oceanographic Data Utilization Capabilities: an experiment in the Equatorial Pacific

Misaki Ohashi (JAMSTEC Public Relations Division) reported on training and education activities in JAMSTEC for both the general public and professionals. A capacity building program has been established to promote an oceanographic observation network in Asia-Western Pacific Ocean region. The training program is aimed at providing participants capabilities to forecast marine conditions, carry out data processing, and the like. Three sessions of four to eight weeks were held in 2001-2002, involving participants from many countries in the region, either close to the ocean areas where JAMSTEC carries out cruises, or subject to impacts of severe climate events such as El Niño. Training focused on data handling and field measurement techniques.

South East Asia Center for Ocean Research and Monitoring

Aryo Hanggono (Indonesian Agency for Marine and Fisheries Research) gave a progress report on SEACORM. Indonesia created a Ministry of Fisheries and Marine Affairs in 1999. SEAGOOS (South East Asia GOOS) will be supported by SEACORM, a center of excellence for sustainable development of marine resources to be established. Illegal, unreported and unregulated fishing activities are a major problem in Indonesia. SEACORM will monitor and assess marine living resources, marine environment and its changes, and provide marine meteorological operational services. SEACORM will have several modules, and will be developed in gradual phases. Sixteen national institutions are associated in the preparation and support of SEACORM. A large list of programs is under consideration. The INSTANT project is on-going for ocean current observations through various straits. Two ARGO floats have been deployed in the Indian Ocean. Many international partnerships are being explored. SEACORM main center will be set up in Perançak, Bali.

AMT and CPR

Nick Owens (PML) presented a report on Atlantic Meridional Transect (AMT) and Continuous Plankton Recorder Survey (CPR) of SAHFOS, two data-rich projects of relevance to POGO at PML. AMT has been active since 1995 through 2000, using the track of the British Antarctic Survey research vessel back and forth twice a year, providing a very effective use of ship time (2-4 days extra on a 40-42 days cruise with a very limited funding). After twelve transects, a vast amount of optical and biogeochemical measurements were accumulated, providing scientific matter for over 70 peer-reviewed papers and 25 PhDs on such topics as distribution of pCO₂ and other gases, calibration and validation of SeaWiFS. Improvements are being made in AMT 2002-2006, with much more money and ship time, additional partner institutions and a more detailed biogeochemistry science plan, largely inspired by SOLAS. The CPR survey was introduced in 1931 by Sir Alistair Hardy, and continued using over 214 ships of opportunity, with a virtually unchanged instrument since then. A huge range of high-quality science has been produced with the data accumulated over the years.

POGO can be helpful in teaching the word "Repeat" to funding agencies, in developing linkages with international programs (e.g., the International Carbon Project). In return, the AMT vessel of opportunity can be used, and the CPR can be used as a vehicle for other sensors and instrumentation of ships.

Jürgen Willebrand asked on the availability of data (fully available: contact P. Chris Reid). **John Gould** suggested that AMT stations be made in the vicinity of ARGO floats.

The meeting adjourned at 17:30.

The meeting reconvened at 08:30. The session Chair was Charlie Kennel.

Main Theme: Group on Earth Observations (GEO)

Howard Roe introduced newly-arrived participants, and outlined the course of the discussions for the morning session. **Charlie Kennel** recalled the history of efforts to set up global observing systems, starting in 1984 with the creation of CEOS, the Committee on Earth Observation Satellites. The next step was the formation of the IGOS, the Integrated Global Observing Strategy, in 1998. The publication in 1994 of the Japanese Long-Term Plan for Earth Observation triggered the idea of the possibility of a larger integration at international level. The matter was debated at the next CEOS Plenary meeting, focusing on the issue of IGOS being a System or a Strategy. The process has been carried further on with the EO Summit in Washington, so that we are now on the verge of achieving the goal of integration of programs managed separately with aligned objectives and greater coherence. He invited Rick Spinrad and Stan Wilson to report on GEO.

Report on GEO-1

Rick Spinrad (NOAA) started his talk with insisting on the importance of Earth observations. The return on investment has been amply demonstrated in the last two decades, with the benefits to society from having 3-day weather forecasts to the 6-month forecast for El Niño, ranging to billion dollars. The EO Summit on July 31, 2003, in Washington DC, was an unprecedented event, with an international audience never assembled on such a topic, particularly with regard to high governmental level participation. The Declaration identifies four key areas: coordination of strategies and systems; capacity building; exchange of observations; preparation of a 10-year Implementation Plan. The ad-hoc Group (GEO) established, with the mandate to prepare the Implementation Plan, will be meeting on November 28-29 in Baveno, Italy, then in April 2004 in Tokyo. GEO subgroups and secretariat were formed. Five focal points are under consideration: user requirements; data utilization; system architecture; capacity building; international cooperation. Ocean observation is felt to be underrepresented in GEO. Post-Summit activities in the U.S. show a convergence of interests and capabilities, with a central role played by the Commission on Ocean Policy. A national Ocean Implementation Plan is being prepared, including structure and governance, initial system elements for the period 2003-2005, and expected enhancements for 2006 and beyond, with an evaluation of the additional budget needs to achieve this Plan. POGO is important for the overall process, as representing the world's major oceanographic organizations, with focus on capacity building and on *in situ* ocean observations, and as a communication mechanism between GEO and many of the IOC members. Again it is essential that the *in situ* component receives no less attention than the remote sensing elements.

Comments

Masato Chijiya, on behalf of **Takuya Hirano** (JAMSTEC), observed that POGO is the only organization which can stress the importance of *in situ* observations, in front of the many institutions advocating in favor of satellites represented in Washington. **Hajimu Kinoshita** (JAMSTEC), who attended the Summit, is convinced of the importance of coordination between satellite and *in situ* observations. Such coordination has started with JAXA, the Japan space agency. Data assimilation is essential for it.

Director's Forum Discussion: POGO Member's Views on Status and Action

A discussion takes place where Nick Owens, Jean-Louis Fellous, Howard Roe, Jürgen Willebrand, Ed Harrison, John Gould, Yves Desaubies, James Luyten (WHOI), Stan Wilson, Trevor Guymer, Tony Haymet and others express their views, mostly turning around the importance of users involvement, of filling user requirements, the interplay and transition between research and operation, and what POGO can do for GEO. **Charlie Kennel** briefly summarized the discussion, in stating that POGO has a unique role to play.

General Discussion

The meeting continued after the coffee break. The session Chair was Howard Roe.

Development of POGO Yokohama Declaration on Ocean Observations

Howard Roe introduced and commented on the draft Declaration that was distributed. Comments were offered by Trevor Guymer, Ed Harrison, Jürgen Willebrand, Jesse Ausubel, Jean-Louis Fellous, Victor Gallardo, Rick Spinrad, Charlie Kennel, James Luyten. Upon a suggestion by Shubha Sathyendranath, a subgroup is charged with rearranging the draft Declaration accordingly during the afternoon visit.

The meeting adjourned after lunch, for a tour of JAMSTEC Institutions. The day concluded with a dinner hosted by JAMSTEC.

Thursday, November 20

The meetings reconvened at 09:00. The session Chair was, who opened the session with warm thanks to JAMSTEC for the excellent dinner to which the participants were treated.

Continuation of Discussion: Yokohama Declaration

The meeting continued with Howard Roe as Chair. **Howard Roe** reported on the revised version of the Yokohama Declaration, which was prepared thanks to the help of mostly James Luyten, Charlie Kennel, Tony Haymet, Jan de Leeuw and himself. The text is now much shorter, starting with an executive summary, and comprises three sections on “the present”, “the way forward”, and a “summary” (or rather “concluding remarks”). The overall impression of the participants was that the text is now much improved. A discussion took place, where Yves Desaubies, Jürgen Willebrand, Jean-Louis Fellous, Charlie Kennel, Masato Chijiya, Rick Spinrad, Dunxin Hu, Jan de Leeuw, Trevor Guymer, Nick Owens intervened, through which a few amendments and corrections were further agreed upon.

After the coffee break **Howard Roe** presents the final version of the declaration, which receives a few minor corrections and full agreement from the audience. JAMSTEC generously offered to have the document immediately color-printed and mailed to GEO.

Venue and Dates of Next Meeting

On behalf of IFREMER, **Jean-Louis Fellous** presented the formerly-accepted offer to host POGO-6 in Brest in the fall of 2004. He gave some information on the venue and the facilities in Brest, and proposed a preliminary set of questions that could be discussed at the meeting. The dates for the meeting were agreed upon: POGO-6 will take place on 29 November-1 December 2004.

Capacity Building and Data Issues

The session continued after lunch, chaired by Kiyoshi Suyehiro.

Zooplankton Training Course

Victor Ariel Gallardo (COPAS) reported on POGO's capacity building efforts in Chile and Latin America through COPAS. He described oceanography activities at the University of Concepción. Training and research programs show large international participation in Southern America. The oceanographic fleet, though limited, comprises three vessels (64, 34 and 20 meters). Several moorings and time-series stations are operated along the coast of Chile. Chilean students and researchers took part to the BEAGLE 2003 cruise (Leg 2) of JAMSTEC. The Fourth Austral Summer Institute took place last January. A number of other initiatives and opportunities related to, e.g., ChEsS, Craig Venter's Genomics, were also mentioned, as open for participation.

Proposal to Nippon Foundation for Professorship

Shubha Sathyendranath (POGO) welcomed the presence of representatives of the Nippon Foundation, to which an application to establish a Visiting Professorship in Oceanography has been submitted. The general theme of the Visiting Professorship will be “Towards Operational Oceanography”. The grant would cover expenses of the Professor and students for a stay in a developing country over an extended period (up to six months), donation of books and software to students and Library, plus limited original research and purchase of equipment. The proposal has been well received, and is currently pending formal approval by their board in December, subject to a clearer visibility of it being a Japanese initiative with international participation, and to an improved long-term exchange between the Professor home institution and its host institution. If successful the Call for proposal would be released in early February 2004. A multi-year program is anticipated.

The audience expressed its high appreciation of this expected major support. **Shubha Sathyendranath** informed the participants on the selection process. She mentioned the secondment of Ms. Shino Takahashi from JAMSTEC to POGO for a period of 15 months notably to help coordinate these activities.

Fellowship Program, SEREAD, Mirai Scholarships

Shubha Sathyendranath (POGO) presented a progress report on the Scientific Educational Resources and Experience Associated with the Deployment of ARGO drifting floats in the South Pacific Ocean. Teacher workshops, lower and upper primary and secondary school activities have been developed. Seven sponsor institutions, including POGO, support SEREAD, now operated by NIWA. **Yves Desaubies** inquired on the language used for the teaching (probably English), and suggested that POGO make some effort in translating the material in other languages, e.g., French, Spanish.

Shubha Sathyendranath (POGO) also presented a report on the training program on-board the Mirai cruise. Trainees from a dozen countries took part in the legs so far. POG contributed US\$9,000 to this training program. IOC contributed another US\$10,000, plus additional support from IOCCG. The logistical and financial of JAMSTEC was essential to make this initiative feasible.

Shubha Sathyendranath completed her presentation about the fellowship program, which went well with eight fellows this year, with more detail in the written report.

Data Issues and the POGO Web site

Shubha Sathyendranath (POGO) reported on the addition of links to data sites as a result of the action items of POGO-4. Suggestions for additions and improvements are invited. **Howard Roe** pleaded in favor of active contributions from the members to make the POGO Web site a living resource, through providing appropriate links.

POGO Principles on Data Management

Ed Hill reported on an action from POGO-4 where data management was discussed, and an action item was adopted to develop guiding principles for POGO institutions. A POGO Working Group came out with a set of "13 commandements". He went through the principles, which concern policy and strategy (principles 1-5), practical measures in individual institutes (6-12) and education (principle 13). None of these principles is prescriptive. They are intended to be practical and "down-to-earth". POGO-5 is invited to adopt these guiding principles, noting their non-prescriptive nature, to disseminate and promote them, and to encourage individual members to translate it into concrete actions.

Jürgen Willebrand said that the principles appeared reasonable, and that their implementation in his own institution, among others, would represent a significant improvement. **Nick Owens** expressed its hope that beyond avoiding data loss, this set of principles helps progress toward more positive action in favour of exchange of data. **Yves Desaubies** appreciated the spirit of the principles. He had the view that institutions should enforce the requirement for a data management plan in any research proposal.

Charlie Kennel is confident that institutions may have a data policy and impose it through their programs, but this may be less easy at the level of individual researchers. **Shubha Sathyendranath** mentioned that data management was recognized as a priority in the fellowship program in 2003, with four students receiving fellowships on data management topics.

POGO Business

The session was chaired by Jan de Leeuw.

POGO Budget, Summary and Action Items report

Shubha Sathyendranath (POGO) presented a brief budget report, with US\$270,000 total expenditures in 2003, and expected US\$275,000 total income. In 2004, projected expenses amount to US\$220,000, while equal total income, with a carry over of US\$122,000. The audience congratulated and applauded Shubha for her excellent achievement.

Howard Roe closed the meeting with words of thanks to JAMSTEC for a splendid organization and welcome, to all participants for their active contribution, and to Shubha for her tireless work for POGO.

Takuya Hirano added his own thanks to Howard Roe, Shubha and all participants. **Shubha Sathyendranath** thanked the efforts behind the scene of a number of people who made the meeting possible. She informs the audience that a press release has been prepared.

With no more business the meeting closed at 15:15.

Minutes Prepared by: **Jean-Louis Fellous**