

18th POGO Annual Meeting (POGO-18)

Minutes

24-26 January 2017

Plymouth Marine Laboratory, Plymouth, UK

Tuesday 24th January

Inauguration (Chair: Karen Wiltshire)

Steve de Mora, Chief Executive of Plymouth Marine Laboratory (PML), welcomed the participants and provided the meeting logistics.

The minutes of POGO-17 were approved and the agenda for POGO-18 was adopted without modifications.

The composition of the Finance Committee (FC) was introduced by the FC Chair (Nick Owens) and approved. The FC members were: Jean-Marie Flaud (apologies), Erlend Moksness, Ranadhir Mukhopadhyay (apologies) and Gongke Tan (apologies).

Nick Owens then gave a heart-felt tribute to Graham Shimmiel, who had sadly passed away the previous month, and had been a valued member of POGO, initially as director of the Sottish Association for Marine Science (SAMS) in Oban, UK, and subsequently of Bigelow Laboratory for Ocean Sciences, USA. A few moments of silence were then held in Graham's memory.

The participants then introduced themselves.

Session 1. Showcase of oceanography and observing technology in Plymouth

Presentations¹ were given by PML and SAHFOS scientists as follows:

The Western Channel Observatory: *Tim Smyth (PML, UK)*

The Atlantic Meridional Transect: *Andy Rees (PML, UK)*

The Penlee Point Atmospheric Observatory: *Ming-xi Yang (PML, UK)*

Remote Sensing Capabilities: *Bob Brewin (PML, UK)*

Modelling capabilities: *Pierre Cazenave (PML, UK)*

Continuous Plankton Recorder Survey: *Willie Wilson (SAHFOS, UK)*

Session 2. Updates on POGO activities (Chair: Margaret Leinen)

Presentations were provided on the following topics related to POGO's activities:

¹ All presentations have been shared with the delegates via a Dropbox folder, rather than made public via the POGO website.

Highlights: *Karen Wiltshire (Chair)*

The Nippon Foundation-POGO programme: *Kentaro Ogiue (Nippon Foundation, Japan)*

Progress Report: *Sophie Seeyave (POGO Secretariat)*

Update on OASIIS Working Group: *Richard Coleman (IMAS, Australia)*

Session 3. Flash Presentations by new/selected members (Chair: Ed Hill)

Short presentations were given by some members on the following topics:

Oceanology Division of The Center for Scientific Research and Higher Education at Ensenada (CICESE): *Edgar Pavia (CICESE, Mexico)*

Royal Netherlands Institute of Sea Research: *Jan de Leeuw (NIOZ, Netherlands)*

Blue Growth School run by OGS & Partners: *Alessandro Crise (OGS, Italy)*

Marine Biological Association: *Colin Brownlee (MBA, UK)*

Sea Change project: *Fiona Crouch (MBA, UK)*

R/V "ISABU" Project, KIOST: *Jong-Kuk Choi (KIOST, Republic of Korea)*

Observation in the deep sea, FIO & overview of IOCAS: *Fan Wang (IOCAS, China, on behalf of Zexun Wei)*

Update on OceanSITES: *Uwe Send (SIO, USA)*

Session 4. NANO Flash Presentations (Global Project Proposals)

Short presentations were given by members of the NF-POGO Alumni Network for Oceans (NANO), whose proposals for a global NANO project had been short-listed :

Target-focused citizen science for coastal ocean temperature profiles collection: *Kirill Kivva*

Insight into factors affecting Harmful Algal Blooms Dynamics: *Hoa Nguyen*

A global a study of coastal productivity, deoxygenation and ocean acidification at selected sites: *Grant Pitcher (on behalf of Jesus Ledesma).*

Session 5. Partners' Meeting (POGO members only)

The Plenary Meeting was adjourned for the day, and the POGO members met to discuss POGO business (see separate minutes, available to POGO members only).

Wednesday 25th January

Session 1. Partner organisations and projects (Chair: Stephen de Mora)

The following presentations were given by representatives of POGO's partner organisations:

Scientific Committee on Oceanic Research (SCOR): *Ed Urban*

Intergovernmental Oceanographic Commission (IOC): *Vladimir Ryabinin/ Steve Hall*

The World Ocean Assessment 2nd Cycle: *Alan Simcock*

SMART Cable Initiative: *Vladimir Ryabinin*

International Quiet Oceans Experiment (IQOE): *Jesse Ausubel*

Session 2. Keynote presentations introducing workshops (Chair: Yoshihisa Shirayama)

Workshop 1: Science-Industry Interaction for Ocean Sustainable Development: POGO-World Ocean Council Leadership in Collaboration: *Paul Holthus (WOC)*

Workshop 2: Arctic Observations: *Doug Wallace (Dalhousie University/MEOPAR, Canada)*

Workshop 3: Innovative biological sampling (including eDNA): *Margaret Leinen (SIO, USA, on behalf of Chris Scholin)*

Workshop 1. POGO Industry Liaison Council

Steve de Mora summarised the outcomes from the previous workshops that had been held during POGO-16 and POGO-17 (see presentation). These included, *inter alia*, Intellectual Property Right (IPR) issues, and the need to attend industry meetings as industry groups generally don't attend scientific meetings. Subsequent to those workshops, a small Committee had been formed (the POGO Industry Liaison Council, POGO ILC), co-chaired by Steve de Mora and Ralph Rayner. The POGO ILC met in Berlin in June 2016 and held a series of telecons. The members had attended various industry meetings representing POGO.

Steve summarised that the ILC had considered the many pathways that could be followed, but needed a clear steer from the POGO members as to which direction they wanted to pursue. It was hoped that this would be an outcome of the present Workshop.

Ralph Rayner then gave a presentation. He introduced his involvement with industry, which included being an Industry Liaison for NOAA/IOOS, the IMAREST Operational Oceanography Special Interest Group Chair, and a member of the Boards of various ocean science/technology businesses.

He stated the need to articulate the benefits of ocean observations, both societal and commercial, and many of which are indirect.

These can be categorised as:

- Public good benefits (improved scientific understanding, informing policy, etc).
- Public good/commercial (safety an emergency response, protection of coastal communities)
- Commercial benefits

Ocean-based industries are set to double from 2010 to 2030. Ralph presented a figure showing the different ocean-based industries and their dependence on ocean observations/information.

Each industry has its own trade bodies, professional bodies and learned societies, which can provide an entry point for collective engagement.

Suggestions:

- Collate best practices
- Demonstrate how POGO contributes to delivering end-user benefits
- Seek POGO involvement in major ocean industry events (e.g. Oceanology International, the US one in San Diego has sponsorship for non-US participants)
- Engage end-user industry sectors as collective advocates of POGO's mission, supporting sustained funding
- Demonstrate how POGO contributes to fostering successful provider/intermediary businesses delivering economic/employment benefits.

Discussion:

Tony Knap commented on the work force development aspect: industry supports us primarily because we provide potential new employees. The educational aspect is therefore a good touch point for engagement with these industries. Doug Wallace responded that science/academia also provides a “buffer zone” for employment during dips in economy.

Eduardo Balguerías commented that there are industrial PhDs in Spain, set up as collaborations between industry and universities. In many cases the graduates then go on to work for the company once they have completed their PhD.

Margaret Leinen added that Scripps provides a shared infrastructure between academia and industry, which allows/encourages industry representatives to attend the seminars and connect with the scientific community, which is mutually beneficial. Steve de Mora commented that this helps in building a rapport with industry.

Ed Hill stated that the National Oceanography Centre (NOC) has a new Marine Robotics Innovation Centre, where “provider” businesses are co-located; this also provides associate membership for end-users (e.g. oil and gas) and provides a hub for dialogue between providers and those interested in using the technology (feedback on user needs).

Vikki Cheung reported that at Oceanology International, where she had manned a POGO stand in March 2016, manufacturers of instruments were very open to talking to POGO to get feedback on what the scientific community needs.

Ralph Rayner brought the discussion back to what POGO members want the ILC to do collectively on POGO's behalf.

Steve de Mora suggested that Margaret/Ed could provide specific input on their experiences with shared infrastructure, as part of the package that ILC could offer to industry.

Willie Wilson said that SAHFOS will be coming up with a strategy for dealing with industry engagement. There are unique selling points within each organisation, but the question is how to market the benefits they can derive. These might not just been considered as monetary value, but could also be corporate social responsibility. The Marine Business Technology Centre led by Plymouth City Council aims to create opportunities for businesses to approach academia.

Paul Holthus mentioned that the World Ocean Council (WOC) has industry-specific sector representation through associate membership and collaborations; e.g. International Chamber of Shipping.

Tony Knap asked whether there was currently enough intelligence about end-user needs that could be shared, i.e. whether a gap analysis had been done. Ralph Rayner responded that a lot of work was being done in specific industry sectors. For example the Oceans of Knowledge event in London was being organised this year to address that question.

Ed Hill reiterated that there were many individual relationships with industry within POGO but how could POGO collectively engage? Looking back at the Strategy it seemed that the most fitting objective would be to increase advocacy for ocean observing systems so that industry could see the benefits to both end-users and providers. Ralph agreed that this would be a tractable area that would not require huge resources and would be a collective endeavour.

Tony Knap stated that individual institutions have been liaising with individual industries; but for many industries (e.g. oil and gas, shipping) the focus on social licence is very dependent on the price of oil. Their second highest priority, after profit, is risk assessment/ health & safety. Collective advocacy by POGO could help with this issue. Ralph added that in US, under the new presidency, they are currently very keen on science-industry advocacy.

Doug Wallace mentioned that some industries are interested in running ocean observing systems themselves, and asked whether there had been a discussion about the pros and cons of outsourcing ocean observations to industry. Ralph responded that this is very variable between national jurisdictions. Steve de Mora added that willingness to share data is also variable between countries. Doug responded that he was thinking particularly about the aerospace industry.

Vladimir Ryabinin said that governance will change in the context of the 2030 Agenda for Sustainable Development, and we need to look at how to move in this direction.

Karen Wiltshire stated that we all have very different cultures but we need to reduce it down to what POGO wants/needs to do. We need to focus on observations rather than data and keep the message from POGO simple. For example, 3 points to focus on could be (1) how to deal with ships of opportunity (2) new bio-sensors (3) pinning down big observational issues. Steve de Mora agreed that we need to focus on one sector of industry, as it is impossible to identify/focus on all end-users. Margaret Leinen suggested a cross-walk between sectors (shipping, oil and gas, fisheries, instrument manufacturers etc) and the areas Karen had identified and assign priorities. The POGO ILC could do this and propose a set of priorities to the members.

Ralph Rayner specified that the primary advocacy groups are end-users. Margaret agreed on the need to focus on a couple of end-users. Tony Knap added that, according to Jesse Ausubel's presentation, every end-user cares about sound in the ocean, so it would be good to focus on that since POGO is already involved.

Paul Holthus offered for WOC to serve as a partner organisation in POGO's ambitions to engage with industry. For example, WOC brought 5 industry representatives to the Arctic Council, which subsequently led to the development of Arctic Economic Council. WOC could be a portal to the shipping industry community, whereby ships could be used as platforms of opportunity.

Margaret Leinen agreed that it is important to engage with ship operators, but advocacy should probably focus on weather prediction (which is a huge industry), i.e. Argo. Ralph agreed that a focus on Argo would be tractable.

Jan de Leeuw brought the discussion back to platforms of opportunity (ships, cables) which are providers but also end-users. Specific Actions could be for POGO to engage collectively with the cable industry and/or participate in the “Smart Cables Initiative” Joint Task Force (which includes those industries interested in ocean observations).

Tony Knap thought we needed to be realistic and define a specific target for the next year, e.g. advocacy for weather forecasting systems.

Vladimir Ryabinin added that we need to think as collectives. There is currently good communication between IOC and WOC; it could be the same between POGO and WOC. Paul Holthus said he was regularly raising awareness of the importance of Argo and other GOOS programmes, and wanted to know if/how to connect with those with infrastructure on the water.

Ralph Rayner concluded that the next step would be for the POGO ILC to meet tomorrow to discuss how to take this forward.

Workshop 2. Arctic observations

Introductory presentations were given by Nick Owens, Doug Wallace and Jan de Leeuw.

Nick Owens introduced the workshop by setting the “exam question”: What does POGO want to do in relation to Arctic observations? Following on from the POGO-17 Workshop, Nick had written to the Arctic Council to propose that POGO attend one of its meetings to present what POGO member institutions are doing in Arctic observations. No response had been received (need to follow up?).

Discussions on where to set up observatories have been very political and not focussed on the science or the requirements. No POGO-like (research institutions) body seems to be involved in those discussions. There may be a need to network all the devices that POGO members have developed and deployed. Is someone else currently doing that?

As shown in his presentation, Doug Wallace mentioned that in the Labrador Sea, Memorial University, GEOMAR, Scripps Institution of Oceanography and Dalhousie University are collaborating on the deployment of a “SeaCycler” mooring for measuring air-sea CO₂ uptake, biological carbon uptake and productivity over an annual cycle, as part of OceanSITES. In general, however, the monitoring situation is very compartmentalised. Mike Meredith mentioned that the Southern Ocean currently has a need for this type of technology. Doug responded that it is a very expensive piece of kit, but could be used as a reference for more mobile/cheaper devices.

Vladimir Ryabinin said there had been huge attempts to make Arctic observing systems, such as:

- International Polar Year (huge set of experiments)
- International Arctic Science Board
- Year of Polar Prediction (related to weather prediction)
- European Centre for Medium Range Weather Forecasting
- MOSAIC project
- Arctic buoy programme

He added that there was no support for an Arctic GOOS, but there may be a new political regime to make Arctic observations legally binding in future.

It was agreed that there was a “quagmire” of different interests due to geopolitics and the presence of human communities in the Arctic. POGO needs to invite some of the groups responsible for setting agendas to POGO-19.

Groups that could/should be approached include:

- EU: Working Group on Arctic
- Arctic Science Summit Week
- Arctic Monitoring and Assessment Programme (AMAP)
- Arctic Observing Summit

Erlend Moksness said there were annual Science Expert Meetings on Fish Stocks in the Central Ocean, which he co-chairs, and which make science plans for future activities.

Jesse Ausubel suggested that POGO’s commitment to enhanced observations in the Arctic could be announced at a future GEO Meeting.

The question was posed as to what an Arctic observing network should look like, and whether SOOS was a good model to follow. Mike Meredith added that in the Southern Ocean, they started with societal drivers and then identified platforms and Essential Variable (EVs); POGO had been instrumental in creating SOOS.

Ed Hill stated that POGO needs to stay focussed. He suggested that POGO’s role could be to focus on how the changes are propagating out from the Arctic (i.e. focus on the sub-Arctic).

Emily Smail informed the delegates that the next GEO Meeting will take place in Washington DC in October 2017, and suggested that POGO could work with the rest of the Blue Planet network on Arctic observation issues, and raise their visibility at the next GEO Plenary.

Workshop 3. Innovative biological sampling

Introductory presentations were given by Jesse Ausubel (Rockefeller University), Jules Jaffe (Scripps Institution of Oceanography) and Tetsu Fujiki (JAMSTEC).

Jesse Ausubel introduced the idea that citizen science can be used to access samples that would not otherwise be easily accessible to scientists. Doug Wallace said that we are on the cusp of a technological revolution and that we need to match new technology data to historical data. This could be a big issue for POGO. Also, the funding pressure is very high to adopt new technologies and stop “old” methods. However, Margaret Leinen intervened that there is a reason we are still doing bucket sampling. Jesse Ausubel added that biological observations still depend on taxonomy.

In terms of how to move forward, it was agreed that a sub-group would be formed, led by Margaret Leinen and composed of Jesse Ausubel, Jules Jaffe and Yoshihisa Shirayama, to meet inter-sessionally to address these questions. It was suggested that the sub-group should look at which technologies POGO could facilitate the networking of, and what are the management “pulls” that can be addressed by biological sampling.

Karen Wiltshire presented the example of Airbus planes, which are manufactured through international collaboration. Could POGO design a “biological buoy” with contributions from POGO institutions? It seems that many institutes are developing their own eDNA device and it could be productive to design one collaboratively, for use by many institutions.

Tony Knap suggested using OceanSITES to connect new technologies to places where there are long-term time-series. Both Karen Wiltshire and Steve de Mora agreed that coastal time-series stations should be used in addition to the OceanSITES moorings.

Yoshihisa Shirayama suggested that it would be useful to conduct an intercomparison of the same and different techniques/technologies measuring the same parameter, as is being done by JAMSTEC for example for $p\text{CO}_2$.

Tony Knap suggested looking at gliders, which have been oversold and have many flaws that tend not to get mentioned. They are currently not operational instruments, as they require teams of engineers to operate, but are sold as such and are very expensive. It was agreed that POGO should set up a Task Force or workshop to discuss these issues among member institutions with the relevant expertise.

Thursday 26th January

Session 1. Reports from workshops (Chair: Erlend Moksness)

POGO Industry Liaison Council

Steve de Mora gave a summary of the Workshop discussions and stated that the ILC activities should bear in mind the POGO Strategy.

Nick Owens added that we cannot assume that we know what industry needs, and there needs to be a two-way communication and relationship building. Yoshihisa Shirayama added that one should not forget sediment-related technology (e.g. seismology) as an industry. Steve de Mora responded that there is indeed a huge number of areas of industry, but that POGO should focus on one to begin with (weather). Paul Holthus said that, on a practical level, the WOC is getting drawn into EU Horizon 2020 proposals. It also has a Young Ocean Professionals Network, in which many companies are interested.

Arctic observations

Nick Owens reported back on the outcomes of the Workshop. He suggested that, in terms of ocean observations, the Arctic becoming ice-free in summer might not be such a bad thing (but that is probably not for scientists to decide!). POGO needs to engage with wider stakeholders who will be impacted by change in the Arctic and consider all stakeholders' needs. The point made in one of the presentations that “What happens in the Arctic doesn't stay in the Arctic” is very valid, and that the Sub-Arctic (and beyond) should stay in our minds.

There are currently many organisations involved and meetings taking place. The Action that came out of the discussions was that POGO needs to engage formally with some of these organisations, and that POGO should attend these meetings in “listening mode”. Our message should be that POGO can mobilise a lot of the global marine science capacity to partner with those organisations.

Doug Wallace added that most organisations working in the Arctic do not look at the connections with other areas, therefore POGO's role could be to connect the Arctic to the sub-polar region and beyond. Ed Hill strongly endorsed that notion. POGO institutions are active in the Arctic and the focus of POGO as a collective could be in connecting the Arctic with the global ocean.

Biological sampling

Margaret Leinen reported back on the Workshop outcomes. She said there was a clear path forward for POGO. A sub-group from POGO needs to develop a "Task Force" to operate between now and the next meeting and report back at POGO-19. Initial membership of the sub-group includes Margaret Leinen, Yoshihisa Shirayama, Jesse Ausubel, Jules Jaffe, Chris Scholin and Willie Wilson.

The important questions to address are:

- 1) What are the management pulls for biological observations (eg SDG-14, fisheries, conservation)?
- 2) Some initiatives are already very well connected, sponsoring meetings etc, whereas others could benefit from POGO's assistance, e.g. supporting side meetings at international events.
- 3) Intercalibration, putting multiple techniques together (tows, deployment at same location eg long-term monitoring sites), leveraging new techniques into longer-term measurements.
- 4) Establishment of new "POGO-site" to deploy new biological sensors (for a specific biological reason).

Jan de Leeuw added that viruses play a very important role; there are new possibilities with molecular techniques to look into the prokaryotic world. eDNA techniques can also be used for prokaryotes, and these are no longer expensive. These can now be carried out as systematic observations. Willie Wilson added that microbial ecologists have been doing this work for 25 years, and this is now being rebranded as "eDNA". There are plans to modernise observing platforms, and the challenges will be to deal with the huge amounts of data generated. Paul Holthus commented that biological sampling is required to inform environmental impact assessments (e.g. for seabed mining).

Margaret Leinen concluded that we are now at a point with biological sampling where we were with Argo at the beginning of POGO. There is a strong pull for biological sampling that we can use to leverage resources to support biological observations.

Presentations from Sponsors (Chair: Stephen de Mora)

Presentations were given by the following sponsors of POGO-18:

Sonardyne: *Geraint West*

Valeport: *Jim Gardiner*

A brief update on the POGO-IQOE Working Group was provided by Peter Tyack.

Karen Wiltshire commented that different jurisdictions have very different foci and ways of regulating, so it is very important to have an international, coordinated effort and an International Project Office (IPO) is required to manage this. POGO could put out a statement (as a neutral body) to our governments on what the situation is. This is an area that has impacted oceanography as well as economy and other areas. Peter responded that an important part of IQOE (around one third of the

Work Plan) is stakeholder outreach. The Science Committee Meeting over the next 2 days will involve navy, shipping representatives and other stakeholders.

Karen Wiltshire then thanked the participants and meeting organisers. The Plenary Meeting was adjourned and the Members met to discuss POGO business.

Action Items from POGO-18

Secretariat staffing:

1. Increase contribution from membership towards Secretariat salaries to cover 2.6 FTE as “core” Secretariat staff. Action: Secretariat.
2. Hire additional part-time communications officer (0.6 FTE). Action: Secretariat and Steve de Mora.
3. Third party funding (Nippon Foundation project) to cover the additional 0.6 FTE. Action: Secretariat.
4. When POGO registered as Charitable Incorporated Organisation (CIO), discuss options for Secretariat staff (e.g. secondment) with PML. Action: Executive Committee, Secretariat, PML.

Charity registration:

5. Complete registration of CIO after discussions with Executive Committee on rewording of charitable objects. Action: Secretariat and Executive Committee.
6. Wind down Canadian not-for-profit Society and transfer assets from Canada to UK. Action: Secretariat.
7. Send Operating Procedures (version ratified by the Members during POGO-18) to all members. Action: Secretariat.
8. Modify Operating Procedures document for submission to Charity Commission. Action: Secretariat to work with solicitor, then send final version to members for ratification. Executive Committee to finalise (based on feedback) if necessary.
9. Write letter to member institution administrators to inform them that POGO will change its legal status. Action: Secretariat to send to the member directors to pass on as required.

Finances:

10. Implement 2017 budget as agreed during Partners’ Meeting and fine-tuned during Executive Committee Meeting (see Appendix 1). Action: Secretariat.
11. Implement dues structure as agreed during Partners’ Meeting (see Appendix 2). Action: Secretariat.

12. Implement funding/reporting guidelines produced by POGO sub-group (Karen, Nick, Steve) and approved by the members during Partners' Meeting, and incorporate these into an updated version of the "Procedure for applying for POGO funding" document. Action: Secretariat.

13. Explore possible modifications to dues structure to propose at POGO-19 to reduce or waive dues for very low-income countries. Action: Executive Committee and Secretariat.

Annual Meetings:

14. POGO-19 to be held in San Diego, CA, USA, from 23 to 25 January 2018, with FC and ExCom Meetings on 22 January and ExCom Meeting on 26 January 2018. Action: Margaret Leinen, Edgar Pavia, Secretariat, Executive Committee.

15. Offers from Germany (in Cape Verde), Italy and Belgium to host POGO-20. Executive Committee to explore these options and, in particular, the possibility for recruiting African members if the meeting is held in Cape Verde. If necessary, members to vote on these options. Action: Executive Committee, Eduardo Balguerías, Alessandro Crise, Peter Herzig, Jan Mees, Karen Wiltshire.

POGO Priorities:

16. POGO-18 Workshop outcomes:

a) Industry liaison: group to meet after POGO-18 on 26th Jan to agree next steps. Action: Steve de Mora, Ralph Rayner.

b) Arctic: continue to try to engage with existing groups working in the Arctic, and invite representative(s) of these to the next POGO Meeting. Action: Nick Owens, Doug Wallace.

c) Biological sampling: Form sub-group (Margaret Leinen, Jesse Ausubel, Jules Jaffe, Yoshihisa Shirayama, Willie Wilson) to meet inter-sessionally to determine and address priorities. Action: Margaret Leinen.

17. Implement members' decision on how to spend some of the accrued residual funds (total available ~100K GBP) and 50K USD funding from Richard Lounsbery Foundation.

a) Solicit members involved in specific priority topics identified during POGO-18 (Arctic, biological observations, research vessels, glider reliability, facilitating sensor concepts/designs) to submit proposals in February 2017.

b) Prepare template and put out call to members for proposals and budget for a POGO "project" to be funded by the Richard Lounsbery Foundation, with match funding from POGO reserves.

Actions: Executive Committee and Secretariat.

18. Allocate 20K GBP to development of POGO communication materials (e.g. website, publications, tools). Action: Executive Committee, Secretariat and Members.

19. Initiate a dialogue with XPrize to make recommendations on new sensors to be developed. Action: Executive Committee.

20. Continue the dialogue with WOA and apply for ECOSOC accreditation. Action: Secretariat and Executive Committee.

21. Draft document and tailored covering letter on funding issues for World Ocean Assessment and the importance of WOA and GOOS for the goals of the G7 initiative on the future of seas and oceans, and for SDGs. Action: Executive Committee and Secretariat. Liaise with Vladimir Ryabinin and Steve de Mora about the relevant UN groups/contacts to engage (FAO, IMO, UNEP, UNDP, IAEA) and UN Scientific Advisory Board.

22. Members to put forward nominations for POGO representatives for Blue Planet Advisory Board and Steering Committee. Action: Members.

Nature Partner Journal on oceans

23. Define the title and scope of journal. Action: Executive Committee, Yoshihisa Shirayama.

24. Write thank you letter and questions to NPJ to start negotiations. Action: Executive Committee, Yoshihisa Shirayama.

25. Contact existing NPJ Partners to find out if they have any recommendations. Action: Secretariat.

Professional training:

26. Announce opportunity for funding of members' professional training initiatives by POGO. Action: Secretariat.

27. Continue joint POGO-SCOR Visiting Fellowship programme. Action: Secretariat.

28. Finalise and submit article on evaluation of POGO training programmes. Action: Secretariat.

29. Announce opportunity for hosting of Phase III of the NF-POGO Centre of Excellence. Action: Secretariat.

30. Select NANO project to be funded by NF-POGO. Action: Executive Committee.