

GEOTRACES INTERNATIONAL SSC MEETING
TOULOUSE, FRANCE
14– 16 SEPTEMBER 2016

List of attendees

SSC Members:

Ed Boyle (co-chair)

Reiner Schlitzer (co-chair)

Eric Achterberg

Adrian Burd

Zanna Chase

Ludmila Demina

Jordi Garcia-Orellana

Vanessa Hatje

Tung-Yuan Ho

Phoebe Lam

Maeve Lohan

Maite Maldonado

Hajime Obata

Katharina Pahnke

Alakendra N. Roychoudhury

Geraldine Sarthou

David Turner

Liping Zhou

Other participants:

Bob Anderson (Past SSC co-chair)

Hein de Baar (Past SSC member)

Abby Bull (GEOTRACES data manager)

Greg Cutter (Standards and Intercalibration Committee past co-chair)

Walter Geibert (Standards and Intercalibration Committee co-chair)

Gideon Henderson (Past SSC co-chair)

Catherine Jeandel (IPO science director)

Bill Landing (Data Management Committee member)

Elena Masferrer (IPO executive officer)

Sunil Kumar Singh (Data Management Committee member)

Alessandro Tagliabue (Data Management Committee co-chair)

Ed Urban (SCOR)

Jing Zhang (Data Management Committee member)

WEDNESDAY 14 SEPTEMBER 2016

Introduction

Reiner Schlitzer and Ed Boyle, co-chairs of the SSC, welcomed all participants, especially the new members: Eric Achterberg, Adrian Burd and Zanna Chase.

National Reports

Australia – Zanna Chase

Zanna Chase reviewed main activities over the past year: 3 GEOTRACES Process Studies have been completed (HEOBI, K-Axis and SOTS+CAPRICORN+Eddy); 11 papers have been published and 2 PhD completed. In terms of funding, 4 new projects have been awarded.

She ended her presentation by introducing two science highlights: first one about the sources of soluble atmospheric iron in the Australian sector of the Southern Hemisphere and, second one about dissolved iron concentrations on and around the Kerguelen plateau, close to the volcanic Heard and McDonald Islands.

New Zealand – Zanna Chase (on behalf of Rob Middag)

Zanna Chase presented through Rob Middag's report. PhD student Rebecca Zitoun participated in the German led FS Meteor 121 (Atlantic Ocean). New Zealand's colleagues are currently obtaining Fe and Cd isotope datasets for water samples collected during the Mediterranean legs of the GA04N expedition. The chemical preparation and isotopic analysis of surface samples is being led by Dr Nadya Teutsch from the Geological Survey of Israel, who is undertaking sabbatical research at the University of Otago.

In terms of funding, Rob Middag was awarded funding under the Marsden Fast-Start scheme for a project entitled "The ice is melting: How do trace metals in the ocean influence the Antarctic marine ecosystem and global climate?".

Brazil – Vanessa Hatje

Brazil is currently under an important political crisis. Consequently, the Ministry of Science is overturned and it is not processing any grants. All the cruises have been cancelled.

Vanessa Hatje participated in the South-South Workshop on Tropical and South Atlantic Research Collaboration. They are proposing an international South Atlantic Ocean Initiative (mainly physical oceanography, but some geochemistry is also included). Brazilian physical oceanographers visited PIRATA moorings. Geochemists will start collecting samples for REE, as well.

In terms of capacity building, Bill Burnet was SCOR's visiting scholar in Brazil. He held a course for 25 students on uses of radioisotopes in environmental sciences.

15 abstracts have been submitted under the GEOTRACES session at the Brazilian Oceanography Congress Session (4-9 November 2016). In addition, a 1-day workshop on Ocean Data View will also be held organised by Leticia C. da Cunha.

Finally, next year Brazil is hosting the IUPAC 2017 Conference. Catherine Jeandel, Peter Croot, Antonio Cobelo, Tristan Rousseau and Juliana Leonel will be making speaks.

Canada – Maite Maldonado

Maite Maldonado reviewed main activities in Canada in the past year. Canada participated in the particulate intercalibration effort led by Phoebe Lam, as well as in the stable silicon isotope intercalibration effort led by Mark Brzezinski. They are also members of the SCOR WG 145 and WG 139. They have organised two meetings in the past year: Ad-hoc GEOTRACES Data Management: BioGEOTRACES (Fall 2015) and the Canadian Arctic-GEOTRACES Project Meeting (7 December 2015).

In terms of cruises, in addition to continue the Line-P cruises (this year in September 2016), Canada completed the Arctic programme with 2 cruises undertaken in summer 2015. Maldonado reviewed the cruise objectives and presented science highlights of these cruises. She explained that for the first leg there was a Canadian-France intercalibration. For leg 2 they took duplicated samples.

A cruise data synthesis workshop is planned for summer 2017 at the Peter Wall Institute (UBC, Vancouver) where they plan to invite international participants. Maldonado is pessimistic about future funding for cruises.

Action: Maite Maldonado to send the information about the Arctic cruise data synthesis workshop to the IPO as soon as available.

China – Liping Zhou

The new research vessel *RV Tan Kah Kee* (Univ. Xiamen) was launched in May 2016. It will be the first ship in China designed with capabilities to do GEOTRACES work. Funding for research is not secured yet and Minhan Dai is working hard to secure it.

The first GEOTRACES GP06-CN cruise was organised by Ocean University of China and Xiamen University on board *R/V Dongfanghong 2* from 19 October - 2 November 2015.

There are two new groups working in trace metal clean sampling and analytical methods in Qingdao. Liping showed current and past work of this group.

On 8-10 June 2016, a training course on Marine Radiochemistry was held in Xiamen. Also, the 3rd Xiamen Symposium on Marine Environmental Sciences will be held on 8-11 January 2017. In this symposium there will be a special session on "Biogeochemical

cycling of trace elements in the ocean: GEOTRACES and beyond” convened by Zhimian Cao, Martin Frank and Jing Zhang.

China is willing to run the GP08 section. Current work includes: preparing methodology and intercalibration; working on REE and trace metals in sediment-water in coastal China and open ocean and work on methods for REE and trace metals in porewater.

France – Geraldine Sarthou

Geraldine Sarthou started presenting selected science highlights including: Th-234 distribution along the GEOVIDE section (Lemaitre, Planchon, Planquette, et al.); ²³¹Pa/²³⁰Th distribution during the MedSeA cruise (Gdaniec, Roy Barman et al.); TRANSARC II Cruise: particulate TM and sediments, sea-ice and dirty ice samples and Cu organic speciation (H. Planquette, A. Gonzalez-Gonzalez, G. Sarthou et al.); Mn global oceanic cycle in the NEMO/PISCES model (van Hulst, Dutay et al., 2016) along the GA02 GEOTRACES Atlantic transects

She then also reviewed the activities held over the past year: 24 publications published in 9 different journals; 13 conferences held with 42 presentations and 1 PhD defended. In addition, they have co-chaired 6 special sessions in 4 conferences. The LAFARA underground laboratory will increase the capacity of Ra analyses using low-background gamma spectrometry. Also, they are planning the 1st GEOTRACES Summer School in Brest (to be detailed later in the agenda).

Finally, one cruise, HERMINE, is being planned. A proposal has been submitted for this cruise to be endorsed as a GEOTRACES process study.

Germany – Katharina Pahnke

Katharina Pahnke started the presentation reporting about the Workshop on biogeochemical studies in Siberian Shelf Seas held in GEOMAR, Kiel on 27-28 January 2016. The workshop was organised by M. Rutgers v.d. Loeff, M. Frank, S. Gdaniec and A. Novikhin. It counted 35 attendees from 10 countries.

Germany got 2 new proposals funded in the past year: one for evaluation of the South-East Atlantic cruise GA08 and a second one to undertake the cruise along GI05 (*R/V Sonne*).

In terms of cruises, they have completed four cruises including 2 cruises in the Arctic, the GA08 in the SE Atlantic and the UltraPac process study cruise in the Pacific Ocean.

She then presented other activities including: participating on the ⁷Be intercalibration comparison study for GEOTRACES (Geibert); GEOTRACES dissolved Si isotope intercalibration (Ehlert); The new trace metal clean rosette and winch of GEOMAR, Kiel, were successfully used for trace metal sampling on the SE Atlantic GEOTRACES cruise (GA-08); two new GEOTRACES reference samples for surface waters (SAG) and for deep waters near 2200 m (CAB) were collected in the South-East Atlantic; small dissolved REE intercomparison study published (initiated by M. Behrens, ICBM) using new seaFAST method and deep water from SAFe (3000 m). Reiner Schlitzer did

a presentation during GEOTRACES Town Hall at Ocean Sciences Meeting in February 2016.

Pahnke then, showed new data from the GEOVIDE cruise in the North Atlantic and the UltraPac process study.

She finalised by showing the list of new publications (12) and conference contributions (9).

India – Sunil Kumar Singh

Sunil Kumar Singh showed a map of all the Indian cruises completed (5): SK-304 (March-April, 2013, GI03), SK-311 (March-April, 2014), SK-312 (April-May, 2014), SK-324 (September-October 2015), SK-325 (November 2015). He then presented some results from these cruises.

They have developed a system for Zn FIA. The method is being tested against standard seawater.

Indian future plans involve a cruise along the old GI02 line to be held in February-April 2017. They plan to collect water, particulates and aerosol sampling.

Questions:

Reiner – He asked which data will be included in the IDP2017. Sunil responded that all the Fe, REE and Nd data will be included. Zn data may also be included if ready (still working on this).

Alessandro Tagliabue - He urged Sunil to send data which is already available.

Gideon Henderson – He invited Sunil to submit the cruise planned for 2017 to be endorsed as section cruise.

Japan – Hajime Obata

Hajime Obata reviewed the activities at Goldschmidt 2017 conference (3750 participants) where several GEOTRACES sessions were held. During this meeting the workshop on “Exploring GEOTRACES data with Ocean Data View” was also held.

Japan has completed the cruise KH-15-3 (GP06, 14 Oct- 2 Nov, 2015). Jing Zhang was the PI of this cruise.

Next year they will do a transit cruise, KH-17-1, along the GP02. The cruise is currently scheduled for June to August 2017. He showed the cruise track for this cruise. It will crossover with US and Canadian cruises.

In terms of publications, they have published 21 papers in the past year. Japan has submitted Fe and Zn data from GP02 to IDP2017.

Hajime finalised his presentation reporting that a new grant has been awarded for GEOTRACES studies and travel fees for the period 2016-2020. In addition individual researchers got individual grants.

The Netherlands – Hein de Baar

Micha Rijkenberg, former SSC member, accepted a position in education so he left NIOZ. However, he remains involved. Rob Middag has accepted a position at NIOZ from December 2016.

In September 2016, a NIOZ Pristine Ultraclean Sampling System was delivered to the Korean Institute of Ocean Science and Technology (KIOST). NIOZ itself now owns and operates 2 Pristine systems and it will acquire a MC-ICP-MS for isotope work.

He then presented science highlights from dissolved trace metals in the Mediterranean Sea (Pelagia cruise in 2013) such as for example, Pb in the Mediterranean: Western Med Sea has very high Pb concentrations.

Question:

Maeve Lohan – She noted that a lot of Netherlands data have been submitted to GDAC but Standards and Intercalibration Committee (S&I) hasn't received intercalibration reports. Hein de Baar indicated that S&I should contact Loes Garringa, Micha Rijkenberg and Rob Middag about it.

Russia – Ludmila Demina

Ludmila Demina presented Russian interests which includes: biogeochemical processes in major rivers estuaries and adjacent shelf with special emphasise on particles fluxes and bottom sediments; sedimentary and chemical fluxes from atmosphere to the Arctic Seas; in 2015 a new stage of the modern sedimentation processes' research and the high-resolution reconstruction of the climate change has started.

Russia has completed 5 cruises over the past year and got 2 new projects approved from the Russian Science Foundation (supervision of the Alexander Lisitzyn) for around 20 million Rubles/year.

Ludmila then showed a list of meetings attended by Russian scientists and a list of selected new publications published (11) or in press (5). The research results of the GEOTRACES Program were many times cited in the book: "Trace Metal Biogeochemistry and Ecology of Deep-Sea Hydrothermal Vent Systems" (Eds. Demina L.L. and Galkin S.V.). Handbook of Environmental Chemistry. Founded by Otto Hutzinger. Eds. in Chief Damia Barcelo, Andrey G. Kostianoy. SPRINGER- Nature. 2016. V. 50. 210 pp. DOI: 10.1007/978-3-319-41340-2.

South Africa – Alakendra Roychoudhury

Alakendra Roychoudhury (Roy) noted that he will report on work done by him and Suzanne Fitz. They have completed two cruises: SANAE 54 (Austral summer 2014/2015) and SOSCEX III (Austral Winter 2015).

They are in the process of buying a dust sampler. Sarah Fawcett has joined the Department Oceanography of the University of Cape Town. Her interests include ocean biogeochemistry (particularly nitrogen and carbon), productivity, and climate. They got 5 new projects funded and 5 new papers published. They have participated in 4 international meetings.

Roy announced that they are currently planning a cruise along the Bonus Good Hope (GIPY4) cruise track. It could be a GEOTRACES section cruise.

Questions:

Maeve Lohan – She noted that the S&I has not received the intercalibration report from the data just presented by Roy.

Action: Roy to send to S&I the intercalibration report from data of their recent cruises.

Spain – Jordi Garcia-Orellana

Jordi Garcia-Orellana started his presentation by announcing that the research context in Spain has improved in the past year. Some new research posts have been opened and Jordi got a permanent position. Also, most of the researchers got funded projects so GEOTRACES research will start to be done.

Jordi's research group participated in: the GEOVIDE cruise and data from this cruise is now being processed; the German cruise P594 (GN04) in August 2015; and the process study Eddies. His group also hosted the VI International Ra-Rn meeting (18-21 July) in Girona. During the meeting, participants suggested ^{228}Ra be included as key parameter on all sections as a tracer of margin fluxes.

He showed the list of new projects funded (7) and new theses defended (2, from Giada Trezzi in Barcelona, and Clara Almcéja-Pereda in Vigo). Also, 16 papers have been published and 13 presentations were held in international meetings.

Finally, he presented selected highlights from recent work, such as, comparison of submarine groundwater discharge-driven, riverine and atmospheric dissolved metal fluxes to the Mediterranean Sea.

Question:

Gideon – He explained that in past meetings it was decided not to change the list of key parameters as otherwise new parameters could not be measured in cruises already completed.

Sweden – David Turner

Sandra Gdaniec's is working on TRANSARC-II Pa/Th samples (*R/V Polarstern* 2015). They have participated in 4 international meetings. Per Andersson is involved in the Si intercalibration effort. They have submitted 2 new proposals for funding.

As long as outreach activities, Sandra Gdaniec's participation on *R/V Polarstern* 2015 will be part of an exhibition at the Swedish Museum of Natural History showing different types of research expeditions both modern and in the past. The GEOTRACES expedition will be an example of a modern expedition to the Polar Sea. The exhibition is planned to be opened in November 2016.

Taiwan – Tung-Yuan Ho

Tung-Yuan Ho reported that following the loss of the research vessel two years ago, the Taiwan government decided to buy a research vessel from Singapore (expected to be delivered in August 2017) and construct a second one.

Tung Yuan got a project funded to study the seasonal variation for aerosol trace metals in the Western Philippine Sea.

He then presented oceanography research stations in the South China Sea (SCS) – SEATS (Taiwan Time Series Station in the SCS, established in 1999); Dongsha Atoll (funded in 2012); Taiping Island (planned in 2016) international science research station (have aerosol collector).

Taiwan is collaborating closely with Japan GEOTRACES: they are doing intercalibration exercises; they have submitted Japan 2011 GEOTRACES cruise dissolved trace metal data to 2017 IDP; they have also joined Japan 2015 GEOTRACES cruise led by Jing Zhang; Dr. S. Takano will visit Tung-Yuan's research group and they are also involved in the preparation of 2017 East Asia GEOTRACES workshop (led by H. Obata).

Chia-Ying (Anderin) Chuang joined Ho's group. His research interests include marine organic biogeochemistry and trace metal adsorption with biomolecules.

They plan to submit SCS particulate TEI data and Western Philippine Sea dissolved and particulate TEI data by December 2016.

UK – Maeve Lohan

UK organised the coupled Royal Society workshop and meeting in December 2015. Also they have participated in several international conferences (5) such as for example, Ocean Sciences 2016 (with 13 presentations given and the Tutorial given by Alessandro Tagliabue) and Goldschmidt 2016 (with 9 presentations given).

They have published 24 publications, coordinated 2 special issues and 3 PhD theses have been completed. They got 4 proposals funded.

Maeve presented some highlights including results of the "Iron model Intercomparison Study (FeMIP)" which involves comparison of 13 global ocean biogeochemistry

models and it concludes poor agreement. Alessandro Tagliabue proposed a new SCOR working group on FeMIP.

A paper is accepted in *Nature Communications* based in GA02 and GA06 data on naturally sourced lead to the Atlantic Surface waters.

Finally, Maeve reported that the new polar ice strengthen ship “Sir David Attenborough” should be operational in 2019 by NERC’s British Antarctic Survey. It will support 60 scientists and support staff. The ship will be built for 2017 but it will undertake one year of trials. They are currently designing the lab layout.

US – Bob Anderson

Bob Anderson reported major US activities by Ocean basin:

- Atlantic: GA03 papers continue to be published. New data will be included in IDP2017.
- Arctic: the cruise along GN01, was completed in October 2015 and they are in the process of setting a workshop in Miami for 22-25 October 2017 (tentative). A remarkable effort was invested in outreach for the US Arctic Programme.
- Pacific: GP16 data workshop was held in November 2015 with 65 participants. Marine Chemistry has opened a window for submissions for a special volume about this cruise (window 1 October 2016 - 1 December 2016).

A management proposal (ship, sampling systems and hydrography) to undertake GP15 was submitted to US NSF in August 2016 by Greg Cutter, Karen Casciotti and Phoebe Lam. A planning workshop is organised on 5 – 7 October 2016. Individual proposals need to be submitted to US NSF by 15 Feb 2017. The cruise is planned for summer 2018. It will crossover GP02 and GP16.

Bob finalised his presentation reporting about US long-range plans. The US GEOTRACES approved a cruise from Tahiti to Antarctica (GP17) for 2021 contingent on funding. The US-SSC is still debating the precise cruise track of this cruise.

Questions:

Andy Bowie – He noted that GP15 could crossover with Australian GP13 if extended to 30°S.

International Partnerships

Report on progress of SCOR WG 145 on Modelling Chemical Speciation in Seawater to Meet 21st Century Needs (MARCHEMSPEC) – David Turner

David Turner started by reviewed the working group terms of reference. He then reviewed activities over the past year including the completion of two meetings: (1) a meeting in Šibenik (Croatia) on 12-13 April 2015 to draft the scope of the model and the communication plan; (2) meeting in New Orleans on 21 February 2016 to review

the draft manuscript describing the model scope. They also had a Town Hall meeting at Ocean Sciences 2016 organised together with WG139.

The group set up a “Survey Monkey” web questionnaire which received 106 replies. They have a publication forthcoming in *Frontiers in Marine Science* “Towards a quality-controlled and accessible Pitzer model seawater and related systems”.

Report on progress of SCOR WG 146 on Radioactivity in the Ocean, 5 Decades Later (RiO5) – Reiner Schlitzer

This group was approved two years ago and it is lead by Ken Buessler and Minhan Dai. They have a large international representation. It has been developed in response to the Fukushima nuclear disaster, and the need to communicate information to the public about radioactivity in the ocean.

A synthesis paper has been published on *Reviews of Marine Science*. They have recently completed a workshop on marine radiochemistry (June 8-10, 2015) in Xiamen. There were a lot of applicants (more than 100) but only 28 were selected. Also, there was a public panel lecture coordinated by COSEE China with 250 participants.

New SCOR working groups – Ed Urban

Ed Urban reported that SCOR received 11 proposals this year. Two of them were selected: (1) Iron Model Intercomparison Project (FeMIP) from Alessandro Tagliabue which is very relevant to GEOTRACES research and (2) Measuring the Essential Climate Variables in Sea Ice (ECVice) which is a follow up of an existing SCOR group.

Discussion around international partnerships (EXPORTS, SOLAS)

EXport Processes in the Ocean from Remote Sensing (EXPORTS) – Bob Anderson

This is a U.S. programme whose goal is to quantify the state of the biological pump from satellite observations. The science plan was public for comment a year ago and the implementation plan was recently opened for comments. In the implementation plan there is no mention of iron micronutrients. Bob does not see much opportunity to work with EXPORTS.

Surface Ocean - Lower Atmosphere Study (SOLAS) project – David Turner

David attended the SOLAS Open Science Meeting. There was quite a bit of trace metal work (micronutrients) including trace metals models. SOLAS is trying to redesign itself based in Future Earth. For this SOLAS has to incorporate social science on it.

Ed Urban – He explained that SOLAS and IMBER are both going through preparation of science plans for their second phases and have added Future Earth in place of the International Geosphere-Biosphere Programme (IGBP). Future Earth emphasises

natural science-social science interactions and science for more near-term application to societal problems.

Gideon – He asked whether the new SCOR programme “International Quiet Ocean Experiment” includes any chemistry. Ed Urban said that there is no chemistry included because the acousticians do not think that changes in pH will have a major impact on ocean acoustics.

BioGEOTRACES – Maite Maldonado

Maite Maldonado reviewed the history of BioGEOTRACES. She then reviewed the activities in the past year.

A workshop was held in November 2015 hosted by Mak Saito at WHOI. The workshop identified cruises and sections to be prioritised for IDP2017 as well as PI leaders for intercalibration efforts and gathering of data. Calibration efforts were classified into 2 categories: (1) parameters with published, well established protocols and (2) those protocols which are not well standardised. For intercalibration efforts, splitting whole filter samples was recommended. They created a google drive that includes a table summarizing the status bioGEOTRACES data submission.

She then presented the status of work after the meeting:

- Chisholm lab (*Prochlorococcus/Synechococcus*) has submitted intercalibration protocols and a cruise and methods manual. They are working with JGI/IMG to create an "Alcove" in the IMG system to enable analysis of metagenomic data. They expect to submit data for: Flow cytometry GA02; Prochl. ecotype distributions GA02, GA03, GA10, GP13.
- LaRoche lab (*16s, 18s diversity and abundance, gene abundance*) plans to submit data for: nif gene GA03, GP13, FeCycle III, GA06; 16s GeoVIDE, CA Arctic; 18s GeoVIDE, CA Arctic, Metzyme.
- Mak Saito (*prokaryotic proteomics*) has submitted intercalibration protocol for targeted metalloproteomics and data from Metzyme cruise. They are working on an Ocean Protein Portal proposal funded by NSF EarthCube programme that will allow non-experts issues to interrogate large and complex ocean protein datasets. Also, the CLIO vehicle for bioGEOTRACES sampling is being constructed at WHOI.

All groups have suggested naming and units for BioGEOTRACES parameters.

A special issue in *Biogeosciences* to highlight BioGeotraces findings is planned (to be published in the fall 2017, led by Phil Boyd).

The group would like to create a stand alone BioGEOTRACES Programme. For this, they plan first to submit a SCOR WG proposal in 2017.

Maite has a completed the list of BioGEOTRACES national representatives.

Questions:

Phoebe – She asked whether the intercalibration protocols will be published. Maite responded that they plan to include the protocols in the cookbook when approved. They will also be available on the GEOTRACES website.

Discussion: *Is it better to call a SCOR WG proposal BioGEOTRACES or a new name?*

Bob - He suggested it might help the community to evolve if a different name is selected. For example, the initial name for GEOTRACES was GEOSECS II, but they were advised to use a completely different name. Hein suggested using bioGEOTRACES as a proof of concept.

Ed Urban – He said that SCOR does not support programme planning. SCOR could support a focused effort on an ocean research problem related to BioGEOTRACES.

Funding for IPO, GDAC, SSC, and other meetings

Budget – Ed Urban

Ed Urban reviewed the GEOTRACES budget. There was a considerable carryover from a previous grant. He has now extended it and GEOTRACES has now 3 years to use this. The total income for 2016 is 438.305 USD. For 2017, this is 395.935 USD. SCOR contributed 21,5k\$ to OCB Workshop. There is 127k\$ positive balance at the end of 2016. So Ed Urban encouraged planning more scientific workshops.

GEOTRACES funding for lab/cruise training– Ed Urban

SCOR has money available to fund scientists in developing nations to participate on a scientific cruise. This year SCOR will pay for a Russian scientist to participate on a GEOTRACES cruise. It also offers 2,5k\$ to visiting scholars to teach in developing nations.

SCOR can consider supporting developing nation's scientists to visit a lab for training. The issue is that in this case living expenses must be included and SCOR has very limited funding.

GEOTRACES International Project Office (IPO) – Catherine Jeandel and Elena Masferrer

Catherine Jeandel reviewed IPO missions and presented all the existing products including the website, mailing list, brochures, posters, roll-up banner, eNewsletter, Facebook and Twitter, resources library and databases (researchers analytical expertise, peer-reviewed papers, PhD and Master dissertations and IDP2014 references). A new product this year is the release of postcards using eGEOTRACES scenes.

She then presented some statistics from the GEOTRACES media.

The intercalibration forum available on the GEOTRACES website is not being used by the community. Elena Masferrer would like to replace the forum by a menu containing information about the intercalibration activities.

Action: Elena to remove the forum from the website and replace it for a new intercalibration menu.

In November 2015, the IPO released an eNewsletter Special Issue dedicated to outreach. IPO would really like to receive more feedback about it.

Alessandro and Maeve – They informed that they got funding for a filmmaker to produce outreach materials. They will be in touch with the IPO to produce and publicise these materials.

There is a library containing GEOTRACES lectures on the GEOTRACES website intranet. Should these materials be posted on the public website? The problem is that the presentations use copyrighted figures.

Bob – He noted that OCB is posting all the lectures on the public website. He will approach OCB to see how they deal with the issue of copyrighted figures. He advocated for publishing the materials on the public website independently of the copyright issues.

**During the meeting Bob had an e-mail exchange with OCB. OCB has been posting on-line for 10 years now the lectures including figures from copyrighted publications and they have never had any legal problem, so far.

Eric Achterberg – He recommended viewing MOOC website (<http://www.oceanmooc.org/en/index.php>) as an example on what can be done for educational materials.

Greg Cutter – He suggested the IPO to check ASLO's Educational Resources website (<http://www.aslo.org/education/resources.html#impacts>).

Action: IPO to check ASLO and MOOC websites as examples for educational resources portals.

Finally, Catherine strongly encouraged SSC members to submit science highlights about their papers.

GEOTRACES Regional Activities

Latin American coordination – Vanessa Hatje

Vanessa is not finding any interests in TEIs in other Latin American countries.

Report on the Future Earth Network meeting – David Turner

The meeting was arranged by SOLAS. They invited projects working on marine research that are not participating in Future Earth (F-E). Discussion was on how to include marine science in Future Earth.

F-E has a management problem as they have 5 organization offices around the world and also it has absorbed 23 projects all coming with their own agendas, so they are finding difficulty to manage all. F-E has created 8 knowledge-action networks; one organised by the Belmont Forum works on the Ocean.

Ed Urban was involved in the first meeting. He recommended waiting for the Belmont Forum to issue the call to see if there are opportunities relevant for GEOTRACES. A possible topic where GEOTRACES can be involved is on deep sea mining. David Turner did present a topic on deep sea mining at the meeting organised by SOLAS.

East Asia GEOTRACES Workshop – Hajime Obata

Hajime Obata presented a proposal to organise an East Asia GEOTRACES Workshop on TEIs study in the Northwestern Pacific and its marginal seas. Conveners are Hajime Obata, Tung-Yuan Ho, Liping Zhou, Masik Choi, Jing Zhang and Jun Nishioka. The plan is to celebrate it in Hokkaido University, Sapporo (Japan) on 16-17 January 2017. Young career scientists are expected, including from developing countries. They expect 32 participants. Limited funding is available but most participants will have to pay for their own travel.

Hajime is encouraged to take it as an opportunity to start involving South Korean researchers.

GEOTRACES Publications

Status of GEOTRACES special issues in preparation

Biogeotraces special issue in Biogeosciences – Maite Maldonado

Maite reported that during the meeting at WHOI the scientists decided to focus on data submission first and revisit the special volume question in fall 2017. Phil Boyd is leading the initiative.

Royal Society Philosophical Transactions A issue – Gideon Henderson

This volume summarises the main science highlights of the GEOTRACES Royal Society Meeting. It is edited by Gideon Henderson, Ed Boyle, Maeve Lohan, Micha Rijkenberg and Geraldine Sarthou.

He showed the table of contents. The volume is dedicated to the life and work of Harry Elderfield who participated in the first GEOTRACES planning meeting, which was held in Toulouse in 2003.

The volume will be published online on 17 October 2016 and it is expected the print copies to be published on 28 November 2016. Editors will get 3 copies each, IPO will get 5 copies and first authors will get 1 copy each.

Gideon asked SSC members to help in responding the following marketing questions:

- 1- List key societies to be targeted. Answer: PAGES, OCB and SOLAS (also through the GEOTRACES mailing list)
- 2- Relevant conferences where the issue should be promoted. Answer: ASLO, Goldschmidt, Ocean Sciences and EGU.
- 3- Complementary print copies. Answer : SSC members to propose programme managers to Gideon Henderson.

Action: SSC members to send to Gideon names of relevant stakeholders (programme managers) who should receive a printed copy of the GEOTRACES Royal Society volume.

Discussion about paying open access for synthesis papers:

There are 4 open access papers in the volume (2 synthesis papers from Baker and Homoky and the papers from Schlitzer and from van de Flierdt). If GEOTRACES wants to pay for other papers should pay £1,700 per paper.

Ed Urban proposed to pay for open access for the other 2 remaining synthesis papers (Charette and German). SSC members agreed.

Decision: SSC agreed to use GEOTRACES funds to buy open access for the two Royal Society synthesis papers (German and Charette) that are not open access.

US GEOTRACES EPZT (GP16) special volume in Marine Chemistry – Bob Anderson

Marine Chemistry has opened a window for submissions for a special volume about this cruise (deadline 1 October 2016). James Moffet is leading the effort.

GEOVIDE (GA01) special issue – Geraldine Sarthou

Geraldine Sarthou informed that they are working on putting together a special issue about the GEOVIDE cruise to be published in 2017 with around 20 papers.

Themes for an Elements issue – Bob Anderson

Bob reported that GEOTRACES has been approached by Friedhelm von Blanckenburg one the editors of *Elements* asking for GEOTRACES topics to be included in a special issue. The volume should include 5 papers with an introduction overview. The advantage is that *Elements* has a readership of 5000 people. Editors are from EGU and other scientific societies supporting geochemistry. There is a need for a volunteer to coordinate this volume.

The topics need to be very broad. He showed a list of possible topics including: Supply and removal of trace elements; internal cycling of trace elements; modern analytical techniques; Future directions/applications; societal relevance of the work; relationship to predecessor programs (e.g. GEOSECS, WOCE).

A proposal should be sent by the end of 2016 for a 2019 issue (or maybe 2018?). Is there a team to promote the issue and write general-interest articles?

Volunteers: Gideon Henderson, Catherine Jeandel, Zanna Chase and Vanessa Hatje.

Action: Gideon Henderson, Catherine Jeandel, Zanna Chase, Vanessa Hatje to write the proposal for a GEOTRACES *Elements* issue.

Invitation for Annual Reviews of Marine Sciences – Bob Anderson

Bob Anderson was invited to write a paper on “Global ocean distribution of trace elements”. In the invitation it is stated that the invitation is for Bob Anderson. Bob invited SSC members willing to be co-authors to contact him. For a January 2018 publication the paper needs to be sent in March 2016, so they are now looking toward January 2019.

Bob encouraged SSC members to think on highlights that could be included in the paper.

Action: SSC members to think on highlights to be included in a paper on *Annual Reviews of Marine Sciences*. SSC members willing to be co-authors should contact Bob Anderson.

Status of Action item from 2015 SSC: Bill Landing to approach *Chemical and Engineering news* to see if they are interested in writing a follow-up article about GEOTRACES - Bill Landing

Bill Landing explained that *Chemical and Engineering news* is a weekly journal with 150k readers. In 2008, the journal published the article “GEOTRACES get’s going”. Bill Landing contacted a senior writer proposing a follow-up of the already published article. She answered asking for names to be contacted.

Action: Bill Landing to lead communication with *Chemical and Engineering news’s* writer to prepare a follow up article in this journal.

Status of Action item from 2015 SSC: Gideon Henderson to contact the person that was involved with *New Scientist* to see if he can help in approaching the journal – Gideon Henderson

Gideon approached his contact at *New Scientist*. The writer asked for a quite sexy history and not academic history. Proposals for topics suggested were: deep mining, hydrothermal vents, contaminants such as mercury or lead (legislation makes an effect, oceans are getting clean...), aluminium (Al is increasing, so GEOTRACES is monitoring it before it goes worst).

Phoebe Lam - She met Elizabeth Kolbert, a writer for the *New Yorker*. She might be interested in writing about GEOTRACES. The *New Yorker* has a great impact.

Gideon and Phoebe were tasked to brainstorm during the meeting about a high profile article and where to submit it - *New Scientist* or *New Yorker*. They will report about it on Friday.

THURSDAY 15 SEPTEMBER 2016

Reiner Schlitzer welcomed the participants and reviewed the agenda for the day.

Standards and Intercalibration – Maeve Lohan and Walter Geibert

Maeve reported on the activities of the Standards and Intercalibration Committee (S&I) over the past year.

She started presenting the members of the Committee along with the parameters covered by each member. A new member is H el ene Planquette. New co-chair is Walter Geibert. Maeve thanked Greg Cutter on behalf of the S&I for all the work done during his mandate as co-chair. Greg continues as observer in the Committee.

A new e-mail for the S&I Committee is now set up sic@geotraces.org.

S&I had 3 meetings over the past year: one meeting in April 2016 hosted by Karen Casciotti in Stanford and two virtual meetings using GoToMeeting (on 14 June and on 2 September). Maeve thanked Ed Urban for providing licences to use GoToMeeting.

S&I have received 79 intercalibration reports. These reports are from multiple elements (e.g. aerosols) to a single element. She showed the list of new parameters since IDP2014: dissolved trace metal isotopes (Fe, Cd Zn); aerosols, trace metals speciation (e.g. FeL, CuL and different ligand classes), Hg and more radionuclides ($^{210}\text{Po}/^{210}\text{Pb}$).

She presented a table showing all the data intercalibrated by basin and by cruise. So far, there is no data available for the Indian Ocean sections.

Sunil – He will provide data as soon as possible.

Walter Geibert went through the flowchart to submit data insisting on that there are two simultaneous paths: to send the data to GDAC (or national data centre for French, North American or Dutch researchers) and to send the intercalibration report to the S&I. Maeve added that there is no need to submit the data to the S&I.

Walter noted that S&I does not receive the metadata submitted to GDAC, thus the PI need to submit their methods.

Reiner – He urged all SSC members to make sure national colleagues provide the intercalibration report to the S&I.

Walter noticed that sending the report is just initiating the process. If any issues, the S&I provides help and ask for further information.

Reiner – He reminded that data sent to GDAC or S&I remain protected. An e-mail will be sent from the DMC co-chairs asking permission to be included in the IDP2017, only if PI agrees then the data can be included.

Maeve – She encouraged PI to send the intercalibration report even if they do not want to put the data in IDP since the data will be already validated for the future.

Reiner – He pointed that German researchers should be informed that they have to send their data to GDAC and (if their project requires this) also to PANGAEA.

S&I Committee plans to update the GEOTRACES website.

Action: SSC members to encourage national colleagues to submit the intercalibration report before the December deadline.

Tier-2 data

In IDP2014, Tier-2 was data that could not be intercalibrated. A decision was taken last year that all data included in the IDP2017 should be intercalibrated. Any data included in IDP2014's Tier-2 will only be included if it is intercalibrated. Thus, S&I have been contacting groups whose data was in Tier-2 but they are missing answers.

Walter encouraged SSC members whose data is included in Tier-2 to send the intercalibration report. Also SSC should inform and follow-up that national colleagues are aware of the change in the procedure.

Action: SSC members to make sure the national colleagues are aware of the change in the procedure for Tier-2 data.

Bob – He recommended the S&I to send very clear and direct messages. Such as “your data will be out of the IDP if you do not act”.

The S&I has a new list of elemental coordinators. Walter thanked all past elemental coordinators for the huge job undertaken. This list along with the new values will be reported on the website.

Bob – He noted that “elemental coordinators” are called “intercalibration coordinators” on the GEOTRACES website.

Action: Elena to change “intercalibration coordinators” to “elemental coordinators” on the GEOTRACES website.

Reporting of consensus values

James Moffet is now collecting new values for consensus seawater samples.

Action: SSC members to report results on the consensus values to Jim Moffet.

Update from on-going Intercalibration efforts

Completed

The trace element particles intercalibration led by Phoebe Lam and Andy Bowie has been completed. Thanks to Phoebe Lam for the job.

Reiner – He wanted to know where statistical results (e.g., inter-laboratory offsets and variability) from the intercalibration of dissolved and particulate TEI concentrations

will be reported. It is very important for modelers to know the error in determining particulate TEI distributions for model-data comparisons. Maeve answered that they will be included in papers and also they will be available on the GEOTRACES website.

Action: S&I to make sure that statistical information, such as inter-laboratory offsets and variability, for dissolved and particulate TEI concentrations are readily available to data users. This could be on the GEOTRACES website or in the publication that accompanies IDP2017 or both. Clarify that particulate TEI concentration uncertainty includes both natural variability and analytical uncertainty.

On-going intercalibration activities

Hg: A cruise is planned by Lars-Eric Heimburger to intercalibrate gaseous dimethyl-Hg. Good intercalibration now for total methyl-Hg and dissolved Hg.

Si isotopes: Intercalibration is almost finished. It should be intercalibrated for the forthcoming IDP.

Radionuclides: Walter prepared a report on acceptability criteria for radionuclide intercalibration. He had preliminary talks with Paul Morris for a possible use of materials from IEAE.

New intercalibration efforts

⁷Be: They need to face the problem that it has a 53 day half-life and that it requires a large volume of water. This makes it impossible to maintain seawater reference samples. In order to solve this they took snow, melted and distributed to four labs for analysis.

Sea Ice: Ana Aguilar-Islas is leading the effort. She wants to do this in April-June 2017.

BioGEOTRACES: They have received 4 requests for standard intercalibration procedures (HPLC pigments/Metagenomics/Targeted metaproteomic datasets/single cell). S&I thanked Maite and the groups for leading this effort. The single cell request was endorsed by the S&I so they would like for the SSC to approve.

Reiner – He pointed that SSC has no expertise to independently evaluate this protocol and thus the SSC should trust to the S&I decision. SSC members agreed.

Decision: SSC decided to accept S&I assessment for the single cells protocol and the other BioGEOTRACES protocols.

Cookbook updates

The cookbook will be updated to include BioGEOTRACES sampling procedures; update sampling-bases experiences from all sections completed; include aerosol section; update on particulate section; and provide new methodologies.

International initiatives for reference waters

Using funding from the EU ATLANTOS project, Eric Achterberg and Christian Schlosser collected water from 2500m and homogenised in Ken Bruland's tanks and

then bottled in 660x0.5l of water. Schlosser has checked every bottle and sent to 12 different laboratories to gain consensus values. In new year, they will be available to whole community.

In addition a surface sample will be taken in SE Pacific (offshore Peru) in February to provide surface-water reference samples.

Eric Achterberg - He asked whether GEOTRACES could provide funds for the initial shipment to reduce the paperwork of asking for FedEx numbers to the labs.

Some SSC members considered that GEOTRACES funds should not be used for this. Others suggested that SCOR could pay for shipping to developing countries, but they are developing the methods so this will not contribute in getting consensus values reported.

Decision: SSC decided to allocate 1.500\$ to be used to start shipping the first samples. Labs will be told that the values have to be reported back for a specified date.

Relationship with GDAC

Abby and the S&I have developed a Google doc where Abby reports on data submitted and the S&I reports on the intercalibration reports received. The S&I also update it once the data is approved.

Future meetings

S&I plans to meet virtually in November. They also plan to hold a meeting in January in London to approve data from December 1st deadline. After January, they propose to hold also other virtual meetings to keep updated on the progress of the IDP2017 (e.g. DMC and S&I co-chairs have already agreed to hold meetings to keep updated on the progress).

They would like to have a new member from the BioGEOTRACES community in the Committee. Three names have been suggested: Dreux Chappell, Adrian Marchetti and Alyson Santoro.

Reiner - On behalf of all SSC members he thanked S&I Committee members for the enormous work done.

Data Management

Report from GDAC – Abby Bull

Abby Bull started her presentation by reviewing her duties. She then reported the changes made on the webpage.

A new version of the IDP2014 (version 3) is available with a document detailing revisions made. CTD sensor data remains as version 2.

A new metadata template is available and accessible on the GDAC website. GDAC would prefer this one to be used. The template is presented. This template needs to be sent along with the data in addition to the post and pre-cruise metadata form since this form is more comprehensive than the other two forms. However, US researchers can continue using the BCO-DMO template since it includes all the information that Abby needs.

Reiner – He recommended Abby to make sure that the template includes the information of both the responsible researcher and the analyst as the analyst information was incomplete in IDP2014.

Action: Abby to ensure that the metadata form requests the name of both the responsible researcher and the analyst.

GDAC plans to make some filled examples available upon request. This information will be available on the GEOTRACES website.

Resources

BODC has assigned extra resources to help Abby. Abby is working 100% on GEOTRACES and now BODC has been assigned 30% of Emma's time to help Abby.

GDAC data processing update

272 datasets have been submitted by April 2016. 160 datasets have been processed. Abby will be now putting 100% of her time in data processing. She will set an out an e-mail reply account which states that she will not be answering e-mails unless they are directly related to IDP2017.

All guaranteed data will be completed first. For data submitted before December 1st priority will be given to key TEI from sections, then from process studies and finally from compliant data.

How you can help GDAC?

Abby presented a list of actions SSC members can do in order to help speed data processing. This includes to:

- Complete and submit the pre and post cruise metadata forms asap
- Provide an estimated data arrival date when asked for outstanding data
- Provide cruise track co-ordinates when asked by GDAC
- Submit data/metadata template form early
- Include all appropriate metadata (relevant sample/analytical information - including instruments used to sample)
- Quick reply to GDAC's e-mails requesting further information

Report on DMC meeting – Alessandro Tagliabue

Alessandro Tagliabue reviewed DMC membership. He then reviewed the key decisions taken during the DMC meeting:

- Decision #1: DMC co-chairs will help in the dialog with PI, GDAC and S&I to expedite intercalibration/data process
- Decision #2: BODC new metadata form was endorsed (examples to be provided, feedback from community is required).
- Decision #3: Web page maps and colours – It has been decided to keep the simple 3 colours map (black, red, yellow) but to make the table more informative. This will be implemented after the release of the IDP2017.
- Decision #4: The cookbook needs to be updated to include new parameters, protocols, etc.

Action: Greg Cutter to work on updating the cookbook to be released in August along with the IDP2017.

- Decision #5: It has been decided that the S&I will be empowered to take decisions on the quality of hydrography parameters (T, S, O from sensors).

Discussion about empowering the S&I to take decision on the quality of hydrography parameters:

Phoebe – She asked whether transmissometer data should be excluded from the IDP if it cannot be verified that the transmissometer was maintained on the cruise? She emphasised that it is critical that someone aboard the ship maintains the transmissometers during the cruise. Gideon recommended that the data be included as “raw” data and that the metadata indicate what was done, or what was not done, to maintain the transmissometer at sea.

Maeve - She reported that hydrographers are not responding to queries about sensor calibration.

Phoebe – She recommended two designations: raw transmission as voltages or calibrated data as beam attenuation coefficient (1/meters unit).

Problem: The IDP sensor data files do not include metadata. So it will be hard for users to find information about the quality of sensor data.

Reiner – He proposed having in the sensor package two 2 columns: when the data is confident data will be included in a column called “transmissometer data” and when data are not calibrated will be included in a “raw transmissometer data” column. Information should be available explaining that the raw column has not gone through the S&I.

Maeve – She would like to include a statement that oxygen sensor data have been calibrated against bottle oxygen data. A simple statement like this is sufficient for each cruise. So far there has been no GEOTRACES cruise where sensor data was not calibrated against bottle data. Nevertheless, a statement should be included.

Decision: SSC accepts DMC recommendation that the S&I committee reviews hydrographic data and decides what to include. Oxygen sensor data must contain a statement of whether or not it was calibrated against bottle data. Transmissometer data must contain a statement about the cleaning of the sensor windows and dark calibration at sea. Otherwise the transmissometer data will only be reported as raw voltage in a separate “raw” column. Scientists who have non calibrated data should contact the S&I.

There was a discussion of fluorometer and PAR data as well. In IDP2014 there are both raw and calibrated fluorescence data.

Action: Reiner to link IDP2017 sensor metadata in a manner analogous to the linking of metadata to the bottle data.

- Decision #6: DMC agreed minor changes to the process study and compliant data criteria. Bill Landing has been tasked to update them. Changes agreed include: more expressly request full metadata; compliant data requests come after the cruise only and must be submitted with the post cruise metadata form to the IPO.

Sunil will be responsible for reviewing requests for endorsement and feeding back to DMC who will then report to SSC.

There was discussion on what a process study versus compliant data is. Compliant data was defined as data that have been collected on a cruise (non necessarily GEOTRACES cruise) that adds to the GEOTRACES programme. On the other hand, a process study is a project on a GEOTRACES cruise specifically designed to explore a particular process.

- Decision #7: Co-chairs plan to improve the way the DMC works to become more active throughout the year. This will include assigning tasks and roles to other members of the committee, having virtual meetings and sending quarterly reports. They also want to consider rotation of some members. One particular need is to add BioGEOTRACES expertise. Maite Maldonado has tentatively agreed to become a member of the DMC.

GEOTRACES Intermediate Data Product 2017 (IDP2017) – Alessandro Tagliabue

Alessandro reviewed IDP2017 milestones and timeline:

- 1st of December 2016 (Data deadline)
- 21st of December 2016 (Date for completing new parameter naming list)
- 1st of March 2017 (Intercalibration complete, DMC co-chairs start to ask permission for data to be included in IDP2017). This e-mail will also include a request for all the relevant publications and should clarify who is the relevant analyst for each parameter.
- 1st of May 2017 (Data processing complete and passed to Reiner)
- 13-18 August 2017 (Data released at Goldschmidt, Paris)

Action: DMC co-chairs to start asking permission for data to be included in the IDP2017 from 1st March 2017. In this e-mail they should request for all the relevant publications and clarify the name of the relevant analyst.

Action: SSC to make sure that all their colleagues submit data for the 1st December deadline.

Assigning a DOI for IDP2017

Alessandro reported that BODC will not assign a DOI to the data if the registration step to download data is in place. DMC discussed the following 2 options:

Option 1: Retain the “download agreement” and the registration step, and publish a scientific paper as it was done for IDP2014.

Option 2: Retain the “download agreement” but remove the registration step. This opens up the possibility to publish a “data paper” for IDP2017.

Decision will affect permission granted to previous IDP2014.

One example for option 2 is the SOCCAT data product. In this product, data can be downloaded freely (no registration step) but when downloading the data you are implicitly agreeing a download agreement including the citation policy.

Discussion about requiring registration in IDP2017?

Which is the workload of option 2? Alessandro and Andy would be happy to do the work.

Hein de Baar - He strongly argued against removing the registration step. GEOTRACES has built trust within the trace metal community by providing a level of protection for data.

Adrian Burd – He argued that having a DOI for the data set rather than for a *Marine Chemistry* paper allows each version to have its own DOI so users can easily identify the version of data being used by citing its DOI.

Gideon - He noted that the number of authors have doubled. GEOTRACES needs to be sure that it will be possible to publish another paper like the *Marine Chemistry* for IDP2014.

Eric Achterberg – He suggested that *Frontiers* would accept a paper for IDP2017.

Alessandro – He pointed that the registration step does not really enforce people to comply with the download agreement. Also there is no verification of the identity of the person who downloads the data, people can register under another name or pass the data to another non-registered user.

Katharina – She noted that post-docs feel more confident about submitting unpublished data if there is a registration step.

Andy – He reminded that some researchers would have not provided data for IDP2014 without the registration step.

David – He proposed keeping the registration step to maintain consistency.

Reiner – He pointed that there are strong arguments to keep the registration step so he proposed SSC to retain it. SSC members agreed.

Phoebe and Gideon – They raised the point that GEOTRACES does not want to have a registration requirement for the final GEOTRACES registration product. SSC members agreed.

Phoebe – She proposed creating a poll after the IDP2017 to survey data generators about the value of a registration step. She proposed to use the following terms: thank you for submitting the data, please now register which your preference is.

Ed Urban – He suggested the question be included in the survey that is made to ask feedback from IDP2017. Agreed.

Action (after IDP2017, October 2017): IPO and Ed Urban to prepare a “Survey Monkey” asking for feedback from IDP2017 and including a question to ask community’s opinion regarding the registration step.

Decision: SSC decided to keep the same access procedure to IDP data as was used for IDP2014 and publish a paper like the *Marine Chemistry* paper for IDP2014.

Action: DMC co-chairs to explore ways of having the IDP2017 paper published with all the names of the authors included. They will report any information to SSC by e-mail so that a decision can be taken.

Action: Eric Achterberg to explore with *Frontiers* whether they would accept the IDP2017 paper.

Action: Bill Landing to explore with *Marine Chemistry* whether they would accept the IDP2017 paper.

IDP2017: The Process

Alessandro summarised main topics discussed during the DMC and reported the decisions taken including:

- Data flow between GDAC and Reiner will be done on a section by section basis.
- Virtual meetings will be held between DMC and S&I co-chairs to keep updated on the progress.
- As in IDP2014, a parameter naming committee has been set up and charged with dealing with the new datasets and their grouping for IDP2017. Catherine Jeandel is the chair of this committee. Other members are: Reiner Schlitzer, Bob Anderson, Jing Zhang, Bill Landing and Maite Maldonado.
- Collating publications by the IPO can be time consuming. SSC should encourage active response to the DMC co-chairs emails.

Action: SSC members to urge colleagues to answer DMC co-chairs e-mail requesting IDP2017 references otherwise the link between the data and the publication cannot be established.

- Tier-2 data will not exist in IDP2017 (this was already decided last year).
- GDAC will dedicate 100% all their time to processing data.
- DMC will chase data not submitted, S&I will focus on data that is submitted but not intercalibrated.
- IDP2017 will not have a creative commons licence.
- BioGEOTRACES is encouraged to prioritise a “showcase” section to be included in the IDP2017.

- After the IDP release a repository for user provided scripts will be created. They will be provided as a convenience for users but they will not be GEOTRACES endorsed.

New functionality to select and download data

Alessandro presented Reiner's new web functionality that will allow to select and download subsets of data directly from internet. Reiner needs testers for the system. Reiner invited SSC members willing to test the system to contact him.

Action: SSC members who volunteer to test the new web functionality to select and download subsets of data directly from internet to contact Reiner Schlitzer.

Question:

Maeve – She wanted to know whether the login would be the same already used in ODV. Reiner answered that it would be a separate one specific to download the GEOTRACES data.

IDP2017 release at Goldschmidt meeting

What will be the “wow” factor for the new IDP? Some possibilities include the new coverage, the aerosol datasets linking inputs and distributions and the BioGEOTRACES data.

Katharina – She suggested creating maps, perhaps with thick lines so people can see spatial patterns. Reiner is willing to explore whether spatial coverage is sufficient for distribution maps.

Bob - He pointed that Goldschmidt has a very large paleochemist audience, so it would be interesting to target this community. Gideon agreed. Some examples: Nd as a circulating tracer (where it matches circulation and where it does not).

Other proposals include: metal isotopes (Cd); hydrothermal impacts on deep ocean chemistry; aerosols biology; BioGEOTRACES.

Reiner noted that the above are possible science highlights to be presented during the IDP launch. However, there is still a need to find a “wow” factor.

Adrian – He proposed creating a “fly-through”. Bob pointed that physical oceanographers are going in this direction.

Action: Reiner to explore a “fly-through” functionality for IDP2017.

Other suggestions: changing the resolution as soon as you approach; spherical display; “walking” functionality; video such “perpetual ocean”.

Catherine – She has a contact for developing 3D virtual tools.

Action: SSC members to provide Reiner with links of fly-through applications.

Discussion: How will the IDP2017 be presented?

Goldschmidt town halls are directed to early stage scientists. Shall we do it at Goldschmidt or hire a venue somewhere else?

Gideon – He noted that Goldschmidt is very prescriptive and will not allow an open town hall as the one done at Ocean Sciences. In his opinion the town hall should be done in an independent venue. Catherine agreed but alerted that the neighbourhood is very expensive, she suggested the meeting to be done outside central Paris.

Discussion on possible venues: UNESCO IOC, the Oceanographic Observatory, Pierre Marie Curie University (may be the cheapest option), hotels next to the Conference venue (but are expensive), Natural Museum (this could be a combined museum visit with IDP presentation), IPGP (Institute de Physique du Globe de Paris, this is very well situated and metro linked. It is where most of the Goldschmidt workshops will be held).

Gideon – He pointed that the problem of having the meeting far from the convention centre is that we risk to lose people who are not hard core GEOTRACES. Several SSC members agreed.

Action: IPO to find potential venues close to the Goldschmidt 2017 convention centre.

Discussion on IDP2017 gimmicks:

Shall we offer USB drives? The IDP2017 will include a large amount of data so USB-drives if produced will be more expensive.

Decision: USB-drives will not be produced for IDP2017.

Other proposals: releasing an app or preparing a Rubik's cube with different section plots.

Action: Alessandro to explore the possibility of producing Rubik's cubes with eGEOTRACES 3D scenes.

Reiner – He proposed to do T-shirts. Bill Landing explained that doing colour t-shirts is too expensive. Each t-shirt is around 20 USD. Gideon was also concerned about the sizes.

Other proposals: Coffee mugs with the 3D scenes, tote bags, mouse path, bottle opener...

Bob – He recommended concentrating on gimmicks that could attract users of the data.

Discussion on the format of the Town Hall: What kind of presentations?

Gideon – He supported several short science talks following a general introduction; very much like in Honolulu. Greg recommended including educational and outreach materials.

Action: Bob and Gideon to organise the IDP2017 launch.

Action: SSC members who have an idea about the release event should inform Bob and Gideon.

Status of IDP2017 data

Alessandro presented a table summarizing the status of IDP2017 data (document: IDP2017_summary_data.doc enclosed to the minutes as annex 1).

Atlantic

GA01: It is too soon to have data.

GA02: Missing dCu, Delta 15N and Delta 13C.

Hein noted that dCu data should be included since it is intercalibrated.

GA04: Missing Delta 15N, Pb isotopes, Nd isotopes aerosols. Intercalibration reports are missing.

Action: Hein to clarify the status of all the data that have not been submitted to GDAC/S&I for GA02 and GA04

GA06 and GA11: Eric Achterberg informed that they are currently analysing some GA06 and GA11 samples. So missing data will not be ready for IDP2017.

GA10: Some intercalibration reports are missing. Delta 13C needs to be submitted. Gideon informed that Nd and 231Pa will not be ready for IDP2017.

Discussion: *Can GEOTRACES allow for sections that do not have all key trace metals be a section?*

Gideon – He observed that GA02 is missing 3 key TEIs, yet it is a flagship section so GEOTRACES does not want to eliminate it. Does GEOTRACES need a threshold minimum number of key TEIs to qualify as a section? Hein proposed to set up that a section couldn't be eliminated if it has 70% of key TEIs. Gideon noted that part of the value of a section is to be able to compare the distributions of multiple TEIs. Hein suggested illustrating sections by colour coding according to the number of key TEIs measured.

Reiner – He argued that if a line appears as completed although not all key TEIs are measured it prevents other countries to apply for funding for this line. Also the DMC has agreed the colour code should remind simply.

Gideon – He reminded that the role of the SSC is to identify the gaps and try to fill in them by proposing other cruises. So if there is a cruise where some parameters are not completed then SSC should consider dropping it from the map.

Catherine – She recommended keeping all the sections but putting the information on the parameters not been measured on the table available under the basin maps.

Bob – He pointed that there are still large wholes to be completed. Since the opportunities for cruises are limited he recommended GEOTRACES to prioritise filling gaps rather than re-doing cruises to complete missing parameters. Also, he advocated

for having a map where you click on it and you get a table where the information is provided. Finally, Bob encouraged people making cruises in the Pacific rather than repeating cruises in the Atlantic.

Jing – She proposed postponing the discussion about removing lines until someone has the opportunity to re-do a line.

Reiner – He summarised the discussion: there is some concern about completeness of the sections but the SSC it is not prepared to set benchmarks and remove sections from the maps.

Action: DMC to monitor the completeness of the sections and alert the SSC in those cases where there are completeness issues.

Gideon – He reiterated the value of having global databases of certain key TEIs that allow spatial distributions to be interpreted in terms of processes. It is important that GEOTRACES keeps pressure on this.

GEOTRACES was sold to funding agencies on the vision of having global data sets to interpret the biogeochemical cycles of key TEIs. If we don't achieve that goal then the program is a failure.

Bob – He recommended cruise leaders to find other researchers who can measure those key TEI they do not have the capacity to analyse to ensure the completeness of GEOTRACES sections.

Action: SSC members to think on how to obtain the most complete global coverage of key TEI data possible.

Action: IPO to include in the agenda for next SSC meeting to revisit whether or not to retain all historical sections on the global map if those sections are missing several key TEIs.

Pacific

GP12: Catherine mentioned that ancillary parameters are available. REE are right now analysed. Hg is done, ²³¹Pa and ²³⁰Th is nearly completed.

Action: Catherine to push for GP12 Al and Mn to be submitted.

GP03: Measurements made but there is an issue in terms of having the data submitted and the intercalibration to be started. Most data is from Yoshiki Sohrin. Is there anything that the SSC can do to help pushing the PI to submit the data?

Action: Hajime to send an example of the intercalibration report to Yoshiki Sohrin.

Action: Andy to contact Yoshiki Sohrin to inquire about the reason for data not being submitted. If an answer is not received, Gideon and Bob, as co-chairs at the time of Yoshiki was SSC member, to write Yoshiki.

GP13: ²³¹Pa and ²³⁰Th were collected. Data will not be available for IDP2017.

GP16: Aerosol and Al (Joe Resing) should be in IDP2017. For Nd they are still in the process of making measurements so it will not be in.

Indian

GI01, GI02 and GI03: Fe, Zn, Nd, REE, Mo and Si should be sent by IDP2017. Pb samples were collected. But Indian colleagues have no the expertise to analyse them.

Arctic

It is too early for the data to be available. Walter mentioned that perhaps some GN04 data could be included.

Ludmila - She informed that some Russian aerosol data could be available as compliant data.

Action: S&I and Ludmila to work together to see if the aerosol data from Russian cruises could qualify as compliant data.

Review applications for approval as GEOTRACES Section cruises

Reiner reviewed the criteria for section cruises.

Indian Cruise SK224 – Sunil Kumar Singh

Sunil explained that in Vancouver the SSC expressed the willingness that someone could sample the Eastern part of the Arabian Sea. In September, India had the possibility to held a cruise in this area so they completed it. Permission to hold the cruise was granted in a short notice. The cruise is now presented to be approved as GEOTRACES section cruise.

The cruise has a crossover station with the Japanese cruise. It covers all the key trace metals but they are missing an analyst for the Pb isotopes for now. The spacing of the sampling is correct.

Decision: SSC approved Indian SK224 as GEOTRACES section cruise GI09.

Indian SK/2016/05 cruise– Sunil Kumar Singh

This cruise is to be held in February-April 2017. Starting with this section India will collect particles.

Phoebe – She noted that they are still not intercalibrated for particles. Sunil said that they plan to start the process.

Decision: SSC approved Indian SK/2016/05 cruise as GEOTRACES section cruise GI10.

Ed Urban suggested for Sunil to seek endorsement from the second International Indian Ocean Expedition (IIOE) for this cruise. This will help in creating connections for Sunil's project.

Action: Sunil to submit a request for the SK/2016/05 to be endorsed by the second International Indian Ocean Expedition (IIOE).

International joint Japanese/Chinese cruise (RV Hakuro-maru from Japan and RV Dongfanghong-2 from China) – Jing Zhang and Liping Zhou

This cruise was endorsed as GEOTRACES process study a year ago. Jing Zhang was encouraged to measure all key TEI so that the cruise could be re-assessed this year to be converted in section cruise. The completed cruise included all key TEI parameters so she is now presenting it to be endorsed as section cruise. It also included other biogeochemical tracers. 20 labs from 7 countries and 40 individual studies were involved.

The Chinese cruise contributing to this study was done simultaneously. Jingling Ren was the chief scientist for the Chinese cruise.

They made 2 crossover stations. From all the tracers Fe, Al and Mn have been intercalibrated but report has not been sent to S&I yet. In these area there is a huge temporal variability so agreement in the crossover stations might not be possible. Unfortunately, replicate samples were not collected.

Gideon – He believes that the cruise qualifies more for a process study than a section.

Phoebe – She argued for calling it a section because (a) it was listed as a section on our original planning maps and (b) because it's a political success for GEOTRACES in terms of international cooperation in a politically sensitive region and for capacity building in China.

Maeve – S&I should work hard and think how they could help in making the intercalibration be completed. She offered analysing some replicates.

Decision: SSC approved joint Japan/Chinese cruise as section GP06.

Action: Abby and Elena to delete GPpr12 process study from the database, tables and maps and convert it as section GP06.

Action: Liping to speak with Maeve to compile information to convey to Jingling Ren about submitting data and intercalibration report for the Chinese contribution to GP06.

FRidge cruise – Alessandro Tagliabue

The cruise is scheduled to be held from 20 December 2017 to 1 February 2018. Chief scientists are Maeve Lohan and Alessandro Tagliabue. The cruise will crossover with GA03 and GA02. They plan to collect dissolved TEIs (but not all key elements so far) and nutrients. They are currently looking for collaborations to cover missing trace elements, including Pa and Th (Gideon), carbon and oxygen isotopes, Pb (Tina) and Nd isotopes are missing.

Katharina – She is interested in analysing Nd isotopes.

Decision: SSC agreed to provisionally endorse FRidge cruise as section cruise GA13.

Action (after IDP2017): Abby to update the map to include GA13 cruise.

Process studies and compliant data applications – Alessandro Tagliabue

Alessandro reported that in the future Sunil would be in charge of reporting about the process studies and compliant data requests. DMC has reviewed the requests during the meeting and recommends for all of them to be approved.

Decision: SSC decided to approve HERMINE and ZIPLOc cruises as process studies.

Decision: SSC decided to approve requests for data from UNOLS, SO225, METZYME, CASSIOPEE cruises to be approved as compliant data.

Action: IPO to inform scientists about the approval of the process studies and compliant data requests.

Bill Landing - He has a compliant data request for data from a CLIVAR cruise.

Action: Bill Landing to formally request compliant data status by sending the post-cruise metadata form to the IPO.

Ocean implementation plans

Results from GEOTRACES Indian Ocean Workshop - Catherine Jeandel

Catherine Jeandel summarised the cruise plans reported at the Indian Ocean workshop held at Goldschmidt 2016. India has plans to hold a cruise in the north. Germany (Eric Achterberg) plans a zonal cruise in early 2018 (GI05). France is proposing a collaborative cruise SWInGS with South Africa from South Africa to Kerguelan. Germany (Katharina Pahnke) is still trying for a section south of SW Australia. Australia (Andy Bowie) plans to reoccupy SR3 cruise in the South of Tasmania in addition, they would like also to undertake a cruise from Perth to Kerguelen following WOCE I05 line west of Australia and line I08 line south.

Roy - He informed that they have plans to hold a cruise following the GI06 section. Possible timing is March 2018.

Action: Roy to provide IPO and GDAC with the information about the Indian Ocean cruise as soon as plans are more concrete.

Action (after IDP2017): Abby to update the Indian Ocean cruise map.

Russian expeditions update – Ludmila Demina

Ludmila presented plans for Russian expeditions. They plan 5 sections to be held in 2017 across the Siberian Shelf in the Kara, Laptev and East Siberian Seas. She reviewed the objectives of these cruises.

There will be GEOTRACES scientists participating on some of these cruises: (1) Christopher Hayes and Alan Shiller. Collection of seawater samples for measurement of dissolved methane, particulate trace metals and dissolved radionuclides Th-230, Th-232 and Pa-231; (2) April Abbott and her student will collect seawater samples for measurement the dissolved REEs and Nd isotopes in pore fluids and water column.

Katharina – She asked whether it was still possible to formulate a request for samples. The answer was “Yes”.

Maite – She offered sending BioGEOTRACES protocols to Ludmila.

Reiner – He thanked Ludmila and Russian colleagues for making possible for GEOTRACES scientists to be on-board of the Russian cruises.

Meeting adjourned.

FRIDAY 16 SEPTEMBER 2016

Before addressing Friday’s agenda, we will complete the agenda from previous day.

Ocean implementation plans (cont.)

Atlantic Ocean – Alessandro Tagliabue

Alessandro reviewed main gaps in Atlantic Ocean coverage. The following sections are not completed: GA05, GA09 and GA12.

GA09: Vanessa and Geraldine were seeking funding for making this section but they did not get funded. They will try again.

GA12: Hein pointed that Netherlands may be interested as its research vessel goes there once each 3 years. This could be the interest of Rob Middag.

GA05: Hein noted that Netherlands may also be interested in this section.

Roy – He informed that they would like to repeat the GIPY4 cruise (Bonus Good Hope). This was an IPY so may be not all the parameters were measured so this could be very important.

Hein – He recommended filling the gap along the zero meridian between ZERO & DRAKE and the meridional portion of GA08.

Maeve – She informed that this could perhaps be reoccupied by UK. There is a NERC funded programme called ORCHESTRA (Ocean Regulation of Climate by Heat and Carbon Sequestration and Transports) that will work in the South Atlantic. It is a physical project focused in carbon. There will be two field programmes and one will be in the Drake Passage. NERC has complimented it with 7m pounds for a strategic initiative in the Southern Ocean. Alessandro and Maeve will submit a proposal focused on formation of mode waters and their chemical composition by the end of the year. They anticipate ship time for 2019 using the new Polar vessel.

Bob – Some US researchers are interested in working in the Caribbean and the Gulf of Mexico. Particularly, Allan Schiller is already doing work in this region. So if Netherlands is interested in doing GA05, some US researchers will be interested in joining the cruise.

Pacific

Japanese/Russian/Chinese cruise plans

Jing Zhang – She reviewed Japanese completed cruises in the Pacific area: GP02 (50% of it), GP03, GP18 and GP19. There is a gap in the tropical ocean since the line GP18 has been cut due to the Fukushima disaster.

There is a process study funded for 2017 (Oct 17 – Dec 18, tentative). It is funded by a grant from a huge Japanese programme called OMIX – Ocean mixing processes: Impact on Biogeochemistry, Climate and Ecosystem. This programme runs from 2015-2019. The principal investigator is Ichiro Yasuda.

They also plan to send a new proposal for a cruise in 2019. If funded this may be a GEOTRACES process study cruise.

She also reported Russian plans to hold a cruise in the Pacific Ocean. In August 2016, Jing was invited to participate in a workshop of the East Asian Cooperative Experiments (PEACE) programme. In there Jing was informed that Russia is willing to hold a GEOTRACES cruise along GP01 and invited Jing and Jun Nishioka on board of the ship. The cruise is planned for summer 2018. Russia welcomes international collaboration on the ship. Jing is talking with the Russian about implementing a clean sampling system. Russia is willing for a nation who could collaborate and provide a clean sampling (in the past Chris Measures offered clean sampling system to China). Phoebe noticed that this cruise will run simultaneously with the US GP15 cruise, so it might be difficult for US scientists to collaborate.

Jing continued by reporting Chinese plans to complete cruises along GP09 and GP10 for 2018. Jing is unsure whether berths will be open to international scientists. Jing believes that at least it might be possible to send samples to other international labs.

Hajime Obata – He reported about Japanese plans to complete GP02 section. The cruise (KH-17-1) is planned from 23 June to 7 August 2017. It will leave from Tokyo and return port in Vancouver. Hajime will be the chief scientist.

Maite – She is interested in having samples from GP02.

Greg – He recommended the cruise to overlap with GA02 previous stations. Hajime responded that they plan to do so.

Taiwan plans for future cruises

Tung-Yuan Ho - In 2018 or 2019 when the new vessel will be ready they can use this cruise to have a transect along GP07. In Taiwan they do not have to pay for ship time. Once the scientific proposal is funded then they can have the cruise. Tung-Yuan is confident in being able to cover all TEIs. The transect line GP07 could be longer than what is represented in the current GEOTRACES map but he will provide more details next year.

Reiner – He asked about international collaboration. Tung-Yuan informed that they plan to open some berths to international collaboration but he cannot plan anything until the new ship is available.

US plans for future cruises

Bob reported that US is putting a proposal to complete GP17. There is a debate on-going on the specific track of this cruise: should they capture chemical gradients along the upwelling isopycnals or capture geostrophic flow out of Pacific? Both characterise hydrothermal Fe supply to Southern Ocean. The US GEOTRACES SSC will discuss this next year (June 2017) and Bob will report back during next SSC meeting.

Bob asked Maeve and Alessandro whether they could send some slides about the ORCHESTRA programme to bring them to the US Workshop.

Action: Maeve and Alessandro to provide Bob with information about the NERC ORCHESTRA programme before June 2017.

Other plans?

Eric Achterberg - Martin Frank and Eric are also talking about taking *RV Sonne* to the South Pacific. This will be a biogeochemistry cruise.

Catherine – She reported that France is interested in doing a meridional line down the East Pacific Rise. They want to cover deep hydrothermal fluxes. This will be a possible process study. Possible timing is 2020 or 2022.

Bob – He mentioned that an US wish is to do a cruise from Australia to South America. This will be an extension of GP13 cruise.

Bill Landing – He informed that there is CLIVAR data along GP15 and along 60°S. These samples are now being analysed.

GP20 – This section is of interest of US scientists but the US SSC prioritised to undertake GP17 section.

GP11 – Andy said that Australia could be interested but this will be in the long run.

Gideon – He suggested that if China can complete GP09 and GP10 then maybe other nations could extend the line to North America along GP20. This line might be more valuable than GP11 on the Equator.

Action: Bob, Maeve, Alessandro and Eric to share plans about cruises in the South East Pacific in order to coordinate international research in this region.

Southern Ocean – Alessandro Tagliabue (on behalf of Andrew Bowie)

Alessandro reported that main point is that no section cruises have been conducted since IPY.

Reiner – He asked: should GEOTRACES hold a Southern Ocean planning workshop? Should some IPY lines be re-occupied? Maeve pointed that Roy is already planning to do so for GIPY04.

Andy – He suggested that maybe a workshop will be necessary in two years from now.

Action: Andy to coordinate Southern Ocean cruise planning.

Arctic Ocean

Last year it was a very active area with several cruises held for several nations. Currently only Russia has plans to hold cruises.

Maite – She informed that the Canadian Arctic Net programme goes there every summer. They can collect samples for other nations (if they do not need clean sampling).

Ed Urban – He asked: Is there a need for an Arctic synthesis workshop?

Bob – He explained that in the US there was discussion about making a joint workshop but decisions was to better do so during major international conferences. US submitted a session proposal at ASLO2017.

Action: Walter Geibert to contact Michiel Rutgers van der Loeff and ask whether he is willing to coordinate an international Arctic synthesis workshop.

Back to the agenda for Friday.

Outreach and publicity discussion

Launch IDP2017

Reiner asked whether SSC member have other suggestions for the IDP2017 launch. Reiner encouraged SSC members that have ideas for the launch of the IDP2017 to contact Bob and Gideon.

Actions to publicise IDP2017

Reiner – He said it would be good to have the paper describing the IDP2017 ready for the release event. The last paper took 10 days to prepare. Are there volunteers to write it? What should be the structure?

Gideon – He recommended to simply follow the format of the *Marine Chemistry* paper for IDP2014, with the addition of more information about Intercalibration. Maeve suggested that S&I co-chairs could use the intercalibration summary that they have been tasked to prepare during the DMC to write the article.

What journal? *Marine Chemistry* or *Frontiers*? Several SSC members indicated a preference for *Marine Chemistry*.

Decision: SSC decided the paper describing the IDP2017 will use the same format as the IDP2014 paper but with more information about intercalibration. If possible, publish it in *Marine Chemistry*. Second option is *Frontiers*.

Action: Maeve and Walter to recycle the document describing generally how the intercalibration was done and prepare it in a format that could be used in the *Marine Chemistry* (or *Frontiers*) paper. The goal is to be able to submit the paper within one week after the Goldschmidt event.

Other outreach activities

Catherine – She explained that following a request from Ed Urban the IPO has arranged for a journalist to interview several GEOTRACES SSC members during the meeting (on Wednesday). The videos will now be edited. Once editing is finalised the videos will be available on the GEOTRACES website and YouTube and they will be distributed broadly through YouTube. The person who ran the videos also writes for a local magazine that is distributed to Toulouse university students. He will write an article for this magazine and the plan is to reuse this it for other publications.

GEOTRACES children's book – proposal from Elisabeth Saito

Elena – She reported that Katlin Bowman and Elisabeth Saito have prepared a photographic book about the US cruise in the Arctic. The book is for children age 10-13. The book will be on sale soon.

Discussion about writing a GEOTRACES history on a non-scientific journal:

Bill Landing –Are we at risk of oversaturating the market if we pursue stories on GEOTRACES in too many magazines? Bill suggested focusing on getting the article published in the magazine that many think will have the biggest impact such as the *New Yorker*.

Gideon – He reported that with Phoebe they have agreed to try the *New Yorker* first and then go to other magazines (such as *New Scientist*) if the *New Yorker* does not want it.

Zanna – She suggested another option could be the *New York Times*. SOCCOM project got an article published in this journal:

<http://www.nytimes.com/2013/11/12/science/earth/ocean-drones-plumb-new-depths.html>

Action: Gideon and Phoebe to approach Elizabeth Colbert in order to publish a high profile article in the *New Yorker*. If the *New Yorker* does not want to publish it then approach other journals such as the *New Scientist* or the *New York Times*.

Communicating the IDP2017 release

Any other ideas to communicate the IDP2017 release? Approaching journals as *Science* and *Nature* it is very important.

Action: Gideon and Bob to contact Nature (Gideon) and Science (Bob) ahead of time to communicate the IDP2017 release.

Vanessa – She is willing to show the GEOTRACES banner at the IUPAC meeting in South America.

Action: SSC members to think about meetings at national levels where the IDP2017 could be promoted and contact ahead of time the IPO to provide promotional materials.

Bob – He reported that during the OCB synthesis workshop there was a journalist called Steve Mirsky who interviewed some scientists. Bob has no information about the release of the podcasts but he will send the information to the IPO as soon as available to be posted on the GEOTRACES website.

Action: Bob to provide the information about the podcasts prepared during the OCB synthesis workshop to the IPO to be posted on the GEOTRACES website, as soon as they are available.

GEOTRACES Special Sessions

Goldschmidt 2017

Geraldine will put a session with Kristen Buck on metal-organic speciation. Walter and Jing Zhang want to make a session on submarine groundwater discharges. Phoebe, Yves Plancherel, Catherine Jeandel and Chris Hayes are planning a session on scavenging. Zanna is willing to submit a session on paleo-climate and she will try to link her session with GEOTRACES.

Bill – He will send an e-mail to the aerosol community to put an aerosol session. He has a good mailing list from the Royal Society.

Action: Catherine and Geraldine Sarthou to approach Goldschmidt 2017 theme leaders to see how GEOTRACES sessions can have a major visibility. Sessions should include GEOTRACES in the title, if possible.

Action: Bill Landing to lead a session on aerosol at Goldschmidt 2017.

Alessandro – He is planning to make the first meeting of the new SCOR WG at Goldschmidt 2017.

ASLO 2017

There are three GEOTRACES sessions at ASLO 2017. One about the Arctic Ocean leaded by David Kadko et al., another about aerosols by Cliff Buck and Rachel Shelley, and finally, Johan Schiff is organizing a session on REE as tribute to Harry Elderfield.

OSM 2018

Are there already plans for sessions at OSM 2018?

Vanessa Hatje is planning to have a session on REE. Maite is also willing to have BioGEOTRACES session. Bob informed that there are plans to submit another session focused on the Arctic Ocean expeditions.

Reiner encouraged SSC members that if they feel that their session has a strong link with GEOTRACES then they should include GEOTRACES in the title, or the description.

Action: SSC members should include GEOTRACES in the title or in the description of any session at OSM2018 having a strong link with GEOTRACES.

Action: SSC members to send any plans for future sessions to the GEOTRACES IPO ahead of time.

Ed Urban - He mentioned that there will be a SCOR Booth at Ocean Sciences 2018 and GEOTRACES will be invited to participate. The layout probably will be changed.

Bill – He recommended having another Town Hall at OS2018 that features the BioGEOTRACES showcase section.

Bob is tasked to organise the Town Hall. Greg Cutter and Maite Maldonado volunteer to help. Greg may be the co-chair of the conference.

Gideon – He asked whether the same format as the one that will be done in Goldschmidt 2017 should be used? The audience of these two meetings are different so the format could be repeated. Maeve recommended including a new application using IDP2017.

Action: Bob to organise the Ocean Sciences 2018 Town Hall with the help of Greg Cutter and Maite Maldonado. The goal will be to follow the Goldschmidt format and update it if any exciting new application using IDP2017 can be introduced.

EGU 2017

Maeve explained that Torben Stichel tried to have a session last year but he was not successful.

Catherine – She noted that EGU is very close to Goldschmidt so she does not think it is possible to be in both. Geochemists tend to move toward Goldschmidt so they might not attend EGU.

Decision: SSC agreed not to promote a session at EGU 2017.

IUPAC-2017

Vanessa reported that the IUPAC 2017 World Chemistry Congress will be held in Sao Paulo next year. She described the programme. They are having a session on TEI fluxes across interfaces. Catherine Jeandel and Peter Croot will be keynote speakers. 5000 participants are expected at the IUPAC meeting. Vanessa believes this is a good forum to advertise GEOTRACES to other scientific communities.

Liping – He suggested having a GEOTRACES session as plenary speaker. Vanessa explained that she did push a lot for this but it was not possible.

PAGES Open Sciences Meeting 2017

There will be a GEOTRACES session at the PAGES Open Science Meeting (9-13 May 2017 - Zaragoza, Spain). The goal is to use this session to launch the collaboration with PAGES for a joint synthesis workshop. PAGES was an IGBP project which is now going to Future Earth.

Action: Bob and Elena to advertise GEOTRACES session at PAGES.

Action: SSC members having ideas for advertising GEOTRACES session at PAGES to contact Bob.

GEOTRACES Synthesis Results Initiative – Gideon Henderson and Bob Anderson

Gideon reported that two successful synthesis workshops have already been held. The first one covered the fluxes and boundaries and the second one the internal cycles. There is another third one planned with PAGES. He asked whether other new synthesis initiatives should be initiated. If so, shall this be regional focused? In the early stages of the programme there has been modelling workshops being done? Shall it be repeated to attract more modelers in? How do be built on the completed successful workshops?

Adrian Burd – He asked: Is there enough data to start particulate synthesis? Phoebe believes it is better to wait.

Joint OCB/GEOTRACES Workshop – Bob Anderson

The Workshop was a partnership of GEOTRACES and OCB. More than 100 scientists from 12 nations participated to the workshop. The plenary talks are posted on the workshop website: <http://web.whoi.edu/geotraces-synthesis/>

The workshop had 3 themes: Biological uptake and trace element bioavailability; Abiotic cycling and scavenging, including particulate and dissolved speciation; Export, recycling and regeneration.

Working groups were formed around each theme and ad hoc groups formed spontaneously to take up new themes as well. Each group came up with a list of products. He presented a synthesis of the recommendations and products. This document will be sent to all workshops participants and then it will be made public on the website.

Bob reported that the format of the two completed workshops were very different. The Royal Society (RS) workshop was designed to come up with papers. At the Lamont it was decided to leave the working group debate and decide about the final products. The momentum needs now to be on-going. He asked SSC to help in motivating the working group leaders to produce papers.

Gideon – He pointed that the RS it was prescribed and the Lamont was free so the outcome could be more exciting.

Bob – He proposed all the leaders of the products to work with the goal of release the product coincidentally with the release of the IDP2017.

Alessandro – He asked whether there was a way to publicise the results so that other people who could not participate could also contribute. Gideon argued the risk of people feeling excluded is low as they could have participated to the workshop. Bob added that the plan is to put the list in the website and publicise it so people may have the opportunity to comment.

Maite – She suggested including a deadline in the e-mail that Bob will send to all workshop participants.

Action: Bob to distribute the workshop product list to all participants and request the products to be published before the Goldschmidt 2017 conference.

Discussion (cont.): How to have this synthesis effort continue?

Alessandro proposed to focus on budgets of trace elements. Gideon proposed having a workshop to join with physical oceanography.

Action: IPO to include in the agenda for next SSC meeting the discussion on how to built on the initial synthesis workshop.

Joint PAGES/GEOTRACES Workshop - Bob Anderson

Bob reported progress done so far. A proposal for a joint workshop in 2018 was submitted and it was favorably reviewed to be funded up to 10k\$. Anyway, it is now necessary to develop a more detailed proposal. The PAGES executive committee will meet on 9th November. If a proposal could be submitted by November, this would allow Bob to apply for NSF in February to cover the cost of US participants. PAGES funding could be then used for European participants.

The strategy is for Bob and Catherine to work on the proposal in October (while Bob will be in Toulouse) to be presented in November. Liping will also help as he has successful experience in preparing these proposals. Gideon Henderson also offered to help.

Location and timing for the workshop it is not clear yet. There is one funding restriction that Bob cannot use NSF funding for Asian colleagues to go to Europe.

Ed Urban - He informed that in the SCOR budget there is 15k\$ for this workshop.

SSC members are invited to participate in organizing the meeting. Those interested should approach Bob.

Action: Bob Anderson, Catherine Jeandel, Liping Zhou and Gideon Henderson to prepare a full proposal for a joint GEOTRACES/PAGES Workshop to be submitted to PAGES.

GEOTRACES Workshops (other than synthesis workshops)

Report from Workshop Biogeochemical studies in the Siberian Shelf Seas - Reiner Schlitzer

Reiner reported that the workshop was held at GEOMAR in Kiel from 27-28 January 2016. A total of 37 scientists from 10 countries attended the workshop. GEOTRACES-SCOR contributed 5k\$ on this workshop.

Main outcome of this a collaboration opportunity for 4 GEOTRACES scientists to participate on board of two Russian cruises (as reported previously by Ludmila). Having GEOTRACES scientists invited on board Russian cruises in this area is very positive for GEOTRACES. Reiner hopes this opens the door to further collaboration.

Report from Workshop Exploring GEOTRACES Data with Ocean Data View - Reiner Schlitzer

The workshop was held as Goldschmidt 2016 Workshop in Yokohama. It was organised by Reiner, Jing and Elena. There were 52 registered participants. The workshop was a hands-on workshop but it also contained 3 science talks where Japanese colleagues explained the significance of the information shown on the sections.

Andy – He recommended the workshop to be repeated in other occasions. Reiner is open to this possibility if other SSC members have specific requests. Proposals included the 2018 Ocean Sciences Meeting.

Action: Reiner to consider repeating the ODV Workshop in other international conferences, especially at 2018 Ocean Sciences Meeting.

GEOTRACES Summer School – Geraldine Sarthou

Geraldine reported plans for organizing a GEOTRACES Summer School. The organizing committee is Hélène Planquette, Géraldine Sarthou and Thomas Gorgues. This will be held from 20 to 25 August 2017 in Plouzané (France). They are finalizing the scientific committee.

They are willing to do general introduction to GEOTRACES combined with practical work: at sea with in-situ pumps and trace metal clean rosette; in the labs; and in the IT rooms (ODV, modelling, oral and written communication).

25 senior researchers have already accepted to be involved. They aim to have 60-70 students. It will be held during one week from 20 to 25 of August 2017.

They have already secured 50k€ and they are proposing to secure funding from SCOR up to 15k€.

Ed Urban – He noted that some funding from SCOR's developing country travel grant could be also available in addition of the GEOTRACES core funding.

Andy – He suggested that this summer school could start as a regular sequence and be held in other countries, as the materials could be recycled. Several SSC endorsed the suggestion.

Bob – He noted that it is getting challenging to select participants (for the OCB workshop the selection rate was 50% of the applicants).

Tung-Yuan – He recommended preparing practical information videos so that the students can see the material ahead of time.

There was a discussion about the length of the summer school. Several SSC members considered that 5 days is not enough to do practical work and lectures. A possibility could be to reduce the scope of the summer school. The SSC recommended the summer school's scientific committee should brainstorm about this.

The following SSC members volunteered to sit in summer school's scientific committee: the Phoebe Lam, Tung-Yuan Ho, Greg Cutter, Maite Maldondo, Adrian Burd, Roy, Bob Anderson, Alessandro Tagliabue, Maeve Lohan and Catherine Jeandel.

Action: Geraldine and the summer school scientific committee are tasked to brainstorm and redesign the scope and duration of the GEOTRACES summer school.

Decision: SSC decided to support the GEOTRACES Summer School with 15k€.

GEOTRACES Arctic expeditions joint data workshop – Bob Anderson

As reported previously, the decision in the US was to hold the national workshops first and also, to propose sessions at ASLO 2017 and Ocean Sciences 2018. An action item is already assigned to talk to Michiel Rutgers van der Loeff about a joint Workshop in 2 years time.

User Workshop Ocean Circulation Inverse Models – Bob Anderson

This is proposal for a training workshop built around a model developed by Tim DeVries and Francois Primeau. A request came to Bob to organise a joint workshop about it. The workshop targets non-modelers including graduate students and post docs. They have done their own arrangements with OCB for a meeting in 2019. Does GEOTRACES wants to pursue a partnership, as well?

Reiner – He asked Bob to request Tim and François more information about the model.

Bill – He suggested asking if there is a graphical user interface analogical to the HYSPLIT interface that many users benefit from.

Ed Boyle – He replied that this is not how the model works. The model is obliged to match the T & S and then the chemist can match model TEIs vs observations.

Phoebe – She argued that the inverse model is very useful for using the IDP. But it has been hard to understand. It will certainly help to have just a basic understanding of how the model works. Zanna agreed.

Bill – He argued that if this could be done on an individual laptop then that would be very useful.

Alessandro – He noted that this could be a very useful tool on a future model-data workshop, especially if the workshop addresses ascertaining TEI fluxes in the ocean.

Reiner – He summarised: there is interest from the GEOTRACES community but more information about the model is needed.

Action: Bob Anderson to contact deVries and Primeau saying that there is interest in a model workshop especially if the workshop addresses ascertaining TEI fluxes in the ocean, but that SSC would like to receive first complementary information on the background and especially papers that describes the process. This information should be sent to be Reiner, Adrian Burd and Alessandro.

Action: IPO to add the User Workshop on Ocean Circulation Inverse Models in the agenda for discussion during next SSC meeting under the leadership of Reiner and Alessandro.

Recognition of past co-chairs of GEOTRACES committees and subcommittees

Reiner, on behalf of all the SSC, thanked Greg Cutter for his long-term commitment as co-chair of the S&I Committee. He also thanked Ed Boyle who is rotating off as co-chair of the GEOTRACES SSC. Both of them were offered with a glass barometer and thermometer.

At the time Chris Measures rotated off as DMC co-chair no recognition was given to him. SSC agreed that it would be appropriate to do an action to recognise his commitment.

Action: GEOTRACES Executive committee to think on how to recognise Chris Measures's commitment as co-chair of the DMC committee.

SSC, S&I and DMC Rotations

Reiner thanked SSC members who are rotating off this year for their service. This includes: Jordi Garcia-Orellana, Maeve Lohan, Maite Maldonado and David Turner. Other members who are rotating off include Micha Rijkenberg who has left the NIOZ and resigned as SSC member, and Ludmila Demina who is willing to step down this year.

Discussion on possible names for each rotating member:

Reiner invited SSC members, especially those rotating off, to propose names to replace the rotating off members. Proposed names were:

Netherlands: Rob Middag, Loes Gerringa and Caroline Slomp.

Spain: Antonio Tovar, Luis Langlera, Antonio Cobelo, Magdalena Santiana Casiana, and Melchor Gonzalez.

UK: Tina van der Flierdt, Marc Moore, Will Homoky, Laura Robinson.

Canada: Jay Cullen, Bridget Bergquist, Roger François.

Russia: Mikhail Flint or other name proposed by Russia.

Action: Reiner to ask Ludmila to provide at least two names of Russian colleagues to replace her.*

*The following names were provided : Dr. Marina Kravchishina, Dr. Vladimir Shevchenko and Dr. Alexey Klyuvitkin. Discussions were done by e-mail with SSC members. Vladimir indicated not to be available because of work overload. SSC members considered that Marina would be a very valuable addition to the GEOTRACES SSC because of her past involvement in international projects in the Arctic Ocean and the Siberian shelves and her future participation in GEOTRACES-related cruises.

Decision: SSC agreed for co-chairs to invite Marina Kravchishina as Russian SSC representative.

Discussion on which countries should be represented:

Netherlands and UK's commitment in GEOTRACES is substantial. For this reason SSC agreed that they should be represented in the SSC.

Catherine – She proposed inviting a representative from Croatia (Irene Ciglenicki-Jusic) or Slovenia (Nives Ogrinc) as they are very active and annually reporting their activities to SCOR. Maeve and Maite suggested Dario Omanović for Croatia.

Maite – She reported that there is strong interest from Israel to be more involved in the programme. She proposed Yeala Shaked as a possible name.

David – He reported that Per and he feel that there is no need for a Swedish representative in the SSC.

Discussion on replacement of Ed Boyle as co-chair:

Reiner – He noted that US NSF investment is so large that he feels US should continue being represented as co-chair. In Vancouver's meeting Phoebe Lam was suggested as a possible replacement for Ed Boyle.

Phoebe Lam – She would accept being co-chair but she asked her commitment to start after the IDP2017.

Ed Boyle – He would agree serving until after the IDP2017 release if SCOR approves this.

Ed Urban – He will have to ask SCOR to approve an exception for Ed Boyle to be extended as co-chair until the release of the IDP. He believes this should be possible.

Alessandro – He pointed that having only Reiner as chair until the IDP2017 release may overwhelm Reiner, as he is one of the main IDP2017 builders. Ed Urban informed that he would use this argument to get Ed Boyle extension.

Decision: SSC agreed for Phoebe Lam to replace Ed Boyle as co-chair of the SSC at the next SSC meeting.

Discussion on the possible replacements per country:

Ed Urban – He noted that two women are rotating off the Committee thus in order to guarantee gender balance the SSC should have 2 women invited as new members.

UK: Homoky has not a permanent position. Robinson is overcommitted with other projects. Moore is BioGEOTRACES. Tina van der Flierdt could replace Katharina Pahnke expertise when she will rotate off next year. Moore is one of the main users of the data product so he can be a good addition to the Committee to make training about the product.

Decision: SSC agreed for co-chairs to invite Tina van der Flierdt as UK SSC representative. If she declines the invitation then invite Marc Moore.

Canada: Jay Cullen would assure that the BioGEOTRACES and radionuclides expertise continue to be included in the SSC. Roger François has been involved in GEOTRACES since the beginning. Bridget Bergquist is a brilliant scientist.

Decision: SSC agreed for co-chairs to invite Jay Cullen as SSC Canadian representative. If he declines the invitation then invite Bridget Bergquist.

Croatia/Slovenia/Israel: Several SSC members spoke in favour of Dario since he is doing automating TM determinations. Nives and Irene are working on speciation. Is there any need to have a speciation represented in the SSC? It looks like they will not add any new expertise. Inviting Israel could be very positive for GEOTRACES and there is a strong candidate.

Action: Maite to explore about the willingness of Yeala Shaked to participate as SSC member and report to SSC co-chairs.

Decision: SSC agreed for co-chairs to invite Yeala Shaked as SSC member. If she declines the invitation then invite Dario Omanović.

Spain: From all the names proposed, Jordi suggested to invite first Antonio Tovar.

Decision: SSC agreed for co-chairs to invite Antonio Tovar as new Spanish representative

Netherlands: Rob Middag is the candidate proposed by the group of GEOTRACES in the Netherlands, he has expertise and interest in key TEI in the open ocean and he will have the capacity to raise funding for cruises. Loes has a part time position. Caroline Slomp undertook a GEOTRACES process study. She is not in NIOZ but in Utrecht, she is working on sediment-water interface thus she would add expertise to the SSC but does not work on micronutrients.

There was a large discussion about the proposed candidates. It was decided to hold a written secret vote with two possible options: Caroline Slomp or Rob Middag. Result was 9 votes for Rob and 6 for Caroline.

Decision: SSC agreed for co-chairs to invite Rob Middag as new member of the SSC. If he declines the invitation SSC co-chairs to invite Caroline Slomp.

**Discussion on the reappointment of Vanessa Hatje (this discussion was done by e-mail after the SSC):*

Vanessa's first 3-year term is ending this year and she is up for reappointment for another 3-year term. Vanessa was very active in the past helping to organize and coordinate GEOTRACES workshops, conferences and capacity building activities in Brazil and South America. She also will organize next year's DMC and SSC meetings.

Decision: SSC members agreed to ask SCOR to reappoint Vanessa Hatje for another 3-year term.

Action: SSC co-chairs to approach the new proposed SSC members and tentatively invite them to join the Committee.

Action: Elena and Ed Urban to prepare the SSC nominations memo.

DMC rotations

Alessandro reported that no one is rotating off the DMC this year. However, DMC would like to add BioGEOTRACES expertise to the Committee. Andy and Alessandro have tentatively approached Maite Maldonado to be included in the Committee and she has tentatively accepted.

Decision: SSC agreed Maite Maldonado to be appointed as new member of the DMC from October 1st.

S&I rotations

In the same lines as the DMC, Maeve reported that the S&I would like to add BioGEOTRACES expertise. Three names were mentioned: Adrian Marchetti (expert on eukaryote protists), Alyson Santoro (expert on prokaryotes) and Dreux Chapell (expert on eukaryote protists).

Catherine – She proposed François Lacan as a possible replacement for Tina if she steps down.

Action: S&I to approach Adrian Marchetti and invite him to step in the S&I committee. If he does not accept then invite Alyson Santoro.

Action: Elena to allocate more time to the rotations item in the agenda for next SSC meeting.

Next venue for SSC

Vanessa – She proposed to organise the meeting in a resort in a village next to Salvador as everything can be done in the same place. As an alternative, the meeting could be organised in Salvador, but this will require more time and work to organise it, as it is necessary to find other places for meetings and dinners.

She proposed organising the meeting during the first week of October. Several SSC members asked the meeting to be held earlier in September.

Action: Elena to arrange a doodle with the window 15 September to 15 October 2017.

Vanessa has already submitted a proposal to get funding to support the meeting. Results will be available in November. Vanessa would like to invite SSC members to make lectures to students.

Action: Elena to prepare a budget and send it to Vanessa and Ed Urban.

Decision: SSC provisionally approved Brazil as host for the SSC meeting in 2017.

Action: Vanessa to contact SSC members to make lectures to students during the SSC meeting.

Possible venues for 2018

Reiner – He reviewed the current proposals for hosting the 2018 SSC meeting. These options are Australia and the Netherlands. Is there any other proposal?

Tung-Yuan – He offered hosting the meeting in Taiwan.

Other Business

Maeve – She explained that George W. Luther, III has approached her asking whether it would be possible for a text book he has written to be advertised on the GEOTRACES website and mailing list. The answer was: “Yes”.

Action: Maeve to send George W. Luther’s textbook information to Elena to post it on the GEOTRACES website and send it through the mailing list.

Future Earth Workshop in Kiel: A Future Earth Oceans Knowledge-Action Network Workshop will be held in Kiel, Germany on 5-6 December 2016. It makes sense for GEOTRACES to participate in there. David is a potential candidate to go to Kiel.

Action: David Turner to report back to the IPO and Ed Urban about the possibility of attending the Future Earth Oceans Knowledge-Action Network Workshop (Kiel, Germany, on 5-6 December 2016).

Meeting adjourned at 17h.