

# **InterRidge: International Cooperation in Ridge-Crest Studies**

**[www.interridge.org](http://www.interridge.org)**



## **Steering Committee Meeting 2017**

**20-21 July 2017  
Paris, France**

**Jérôme Dymont, Co-Chair  
Nadine Le Bris, Co-Chair  
Kamil Szafranski, Coordinator**

**September 2017**

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**Absent Steering Committee Members:**

Kim Juniper (Canada) (contact by e-mail during the meeting)

Rolf Petersen (Norway)

Fernando Barriga (Portugal)

Dan Fornari (USA) (contact by e-mail during the meeting)

**Meeting Agenda Day 1, Thursday, 20<sup>th</sup> July 2017; 9:30 – 18:30**

<b>1</b>	<b>9:30</b>	Welcome and introduction
<b>2</b>	<b>10:00</b>	Welcome address
<b>3</b>	<b>10:20</b>	Adoption of the Agenda, and confirm Steering Committee Members
<i>10:40 Coffee break</i>		
<b>4</b>	<b>11:00</b>	Adoption of the minutes from 2015 Steering Committee Meeting
<b>5</b>	<b>11:15</b>	InterRidge Coordinator's report: <ul style="list-style-type: none"> <li>• Installation of the new Office</li> <li>• Working Groups</li> <li>• InterRidge Fellowship Programme</li> <li>• Cruise bursaries</li> <li>• Updating of Vent Database</li> <li>• Workshop and meetings</li> <li>• IR Info, IR News, IR Website</li> </ul>
<i>12:00 Lunch, IPGP tour and group photo</i>		
<b>6</b>	<b>13:30</b>	National updates
<b>7</b>	<b>15:40</b>	Status of Membership and Steering Committee members, new member
<i>16:00 Coffee break</i>		
<b>8</b>	<b>16:20</b>	Working groups - updates
<b>9</b>	<b>17:00</b>	New Working groups – discussion of proposals, future workshops
<i>18:30 End of Day 1</i>		
<i>19:30 DINNER</i>		

**Meeting Agenda Day 2, Friday, 21<sup>st</sup> July 2017; 8:30 – 18:40**

<b>1</b>	<b>8:30</b>	Validation of: <ul style="list-style-type: none"> <li>• IR and IR/ISA Endowment Fund Fellowships</li> <li>• IR Cruise Bursaries Applications</li> </ul>
<b>2</b>	<b>9:30</b>	Budget 2017 and preliminary Budget 2018
<i>10:40 Coffee break</i>		
<b>3</b>	<b>11:00</b>	<u>Discussion 1:</u> improving IR rules for more efficiency <ul style="list-style-type: none"> <li>• reform of the IR Reform about budget use</li> <li>• earlier bid for a better transition to next Office</li> <li>• role and rotation of National correspondents</li> </ul>
<i>12:20 Lunch</i>		
<b>4</b>	<b>14:00</b>	<u>Discussion 2:</u> IR – SCOR interaction on the International Indian Ocean Expedition (IIOE2) <u>Discussion 3:</u> Update of the IR Code of Conduct <u>Discussion 4:</u> Position of InterRidge with regard to requests related to mineral exploration and exploitation: what are the limits?
<i>16:10 Coffee break</i>		
<b>5</b>	<b>16:30</b>	<u>Discussion 5:</u> InterRidge participation at ISA 23 <sup>rd</sup> Session <u>Discussion 6:</u> InterRidge in 2018-19
<b>6</b>	<b>18:00</b>	Next Steering Committee meeting location and date
<b>7</b>	<b>18:15</b>	List of actions
<b>8</b>	<b>18:30</b>	Meeting adjourns
<i>18:40 End of Day 2</i>		
<i>19:30 DINNER</i>		

## **1 Welcome and introduction**

The agenda of the 2017 Steering Committee meeting was circulated electronically to all Steering Committee members, national representatives, Working Group Chairs and guests prior to the meeting. On the behalf of the Director Marc Chaussidon, Jérôme Dymont welcomed members and guests to IPGP.

## **2 Adoption of the Agenda, and confirm Steering Committee Members**

Meeting agenda has been adopted unanimously.

### Current Steering Committee members:

China – John Chen

China – Jiabiao Li

France – Marcia Maia, succeeded by Daniel Sauter

France – Nadine Le Bris (also InterRidge Co-Chair)

Germany – Colin Devey, succeeded by Philipp Brandl

India – John Kurian

Japan – Toshi Fujiwara, succeeded by Shinsuke Kawagucci

Korea – Sung-Hyun Park

Norway – Rolf Pedersen

Norway – Cédric Hamelin

UK – Richard Hobbs

USA – Dan Fornari → Peter Michael (delegated)

USA – Marie-Hélène Cormier (ad hoc)

InterRidge Co-Chair – Jérôme Dymont

## **3 Adoption of the minutes from 2015 Steering Committee Meeting**

The 2015 meeting report is on the internet: <http://interridge.org/files/interridge/IR%20StCom%20Meeting%20report%202015.pdf>

Minutes from the previous meeting have been accepted unanimously.



## **4 InterRidge Coordinator's report**

### **A) Installation of the new Office:**

The proposal submitted by France, for the coordination by Jérôme Dymont and Nadine Le Bris was accepted unanimously by the Steering Committee members in Hangzhou (China) on 28<sup>th</sup> September 2015.

The IR Office was in transit to France and had a limited activity during 2016. Because of administrative issues, the final establishment of an operational office has been delayed until 2017.

The new InterRidge Coordinator (Kamil Szafranski) was recruited in February 2017 and took the position on 1<sup>st</sup> April 2017.

The InterRidge Office is hosted at the Institut de Physique du Globe de Paris (IPGP), which is responsible for the budget management and administration of the program.

The InterRidge website and vent database, operated by Peking University until 30<sup>th</sup> June 2016, have been running at IPGP since September 2016 and are updated regularly since April 2017.

### **B) Scientific activity of InterRidge:**

InterRidge Working Groups build small task forces, meet, brainstorm, come with reports and plans, they usually interact with the interested community by organizing InterRidge Workshops.

Call for proposals of new Working Groups was launched on 24<sup>th</sup> April 2017 and open to the whole international community.

Basic recommendations for new Working Groups:

- focus on a theme of emerging scientific promise or conducted in a unique geographic setting along global ridge-crests
- coordinated by two co-chairs and gathering about ten active members reflecting the national and disciplinary diversity of InterRidge
- work closely with the InterRidge Steering Committee and the InterRidge Office
- convene group meetings and community-wide workshops, promote and coordinate new cruises, experiments, and related work

- proposals of about two page-long describing the WG objectives, importance and timeliness to ridge-related science, available and required means, and expected achievements
- new WGs should substantially differ in objective from the existing or former WGs
- proposal should have at least four proponents from at least three InterRidge member countries
- cross-disciplinary proposals will be given special attention.

Deadline for submissions was fixed on 2<sup>nd</sup> June 2017, extended until 9<sup>th</sup> June 2017.

The Office has received 5 proposals, for more details see chapter **8 New Working Groups – discussions on proposals, future workshops.**

InterRidge Vent Database include portals toward other external databases of interest for ridge scientists.

Transferred to a new server in Paris (off-line between June and September 2016)

Upgraded to Version 3.4 (launched on 13<sup>th</sup> October 2016 and has the same vent field listings as Version 3.3)

Revised by Stace Beaulieu (supported by the NSF Grant “Metacomunity Dynamics at Hydrothermal Vents”)

InterRidge Coordinator is progressively taking responsibility for the Database (appointment scheduled during the CBE6 conference)

689 records in the current version – confirmed or inferred active vent fields in the database and the corresponding kml file for visualization in Google Earth.

### InterRidge website

Transferred to a new server in Paris in July 2016

The website requires:

- an important upgrade from Drupal 6 to Drupal 8 (or newer)
- a new design (new theme, new photos)
- a new structure (the actual one is not homogeneous)

### InterRidge Info

Published every 2 weeks starting from 24<sup>th</sup> April 2017

Contains current and most important information to be disseminated within the community

6 IR Info + 1 special (AGU Fall Meeting) published so far

### InterRidge News

Published annually by the InterRidge Office - the next - 23rd Volume shall be published in November 2017

Call for articles for the next InterRidge News has been launched on 3<sup>rd</sup> July 2017.

The following types of articles are accepted:

- cruise reports: shipboard or immediate post-cruise results,
- preliminary results of recent field work related to ridge research, back arc basins and ophiolites,
- general interest articles: new equipment, new ships, opinion articles, workshop reports, news or updates of ridge-related projects.

Deadline for submissions was fixed on 25<sup>th</sup> September 2017

Cruise Information to promote the exchange of information, technologies and facilities among international research groups

As the InterRidge Office did not receive any feedback from the community, the National Correspondents are invited to provide any details on recent or upcoming ridge-related cruises to feed the InterRidge Cruise Database.

Code of Conduct for responsible research at hydrothermal vent

The current text was finalized under the German IR presidency and is cited as a model of self-organization of the scientific community on different high-level international instances.

The text certainly needs to be updated as regard to both new knowledge, technological developments and societal issues related to ridge-research.

Only the whole ridge community can provide an outline of the critical needs and organize the discussions/fora with the community in the next months (gathering information internationally and across disciplines).

### **C InterRidge actions for early-career scientists:**

#### InterRidge Fellowships

These fellowships promote the involvement of young scientists in international, collaborative, and interdisciplinary studies of oceanic spreading centers. Fellowships are designed to encourage international collaboration on any aspect of ridge-crest science by graduate students or postdoctoral researchers, fostering long-standing partnerships for their future careers.

We announced the launch of the Student and Postdoctoral Fellowship Program on 9<sup>th</sup> May 2017.

This year, up to 6 IR Fellowships including 3 joint IR-ISA Endowment Fund Fellowships, were offered.

The Fellowships of up to 5000\$ each can be used for any field of ridge-crest research.

Application were to be submitted to the IR Office by 6<sup>th</sup> June 2017, extended once until 13<sup>th</sup> June 2017

The InterRidge Office received 5 applications, including 2 to the IR/ISA Endowment Fund fellowships:

- 2 women and 3 men,
- 2 graduate students and 3 postdoctoral researchers,
- pursuing their research in Canada, China, India, Spain or United Kingdom,
- originally from Canada, India, Iran, Italy or Nigeria,
- proposed host countries are Germany and the USA.

For more details, see chapter **9A Validation of IR and IR/ISA Endowment Fund Fellowships**.

#### InterRidge Cruise Bursaries

These bursaries are awarded for travel and subsistence costs to encourage new collaborations across the InterRidge member nations and to enable early-career scientists to participate in mid-ocean ridge research cruises. Bursaries of up to 2 000 US\$ may serve for travel costs to join the cruise. Applicants should have a clear role on the research cruise and not be part of the original research team.

The call for IR Cruise Bursaries was launched on 22<sup>nd</sup> May 2017. There is no deadline for application.

So far, the InterRidge Office received 6 applications, for more details see chapter **9B Validation of IR Cruise Bursaries Applications**.

Due to a short time before the cruise, and because it was matching all the selection criteria, the Office decided to support the application of Zhongwei Zhao (number 4).

The Office rejected the application of Audrey Mat (number 3). Although her application has been well prepared and the scientific project seemed to be interesting, it resulted on sending a student studying at a French University onboard a French research vessel. Thus, it did not fit the requirement for opening a new international cooperation to the benefit of the fellow - a key condition to be supported by the program.

During this meeting, the InterRidge Office would like to get the feedback from Steering Committee on 3 other applications (1, 2, 5 and 6).

Support to ridge-related meetings, for instance the 6<sup>th</sup> International Symposium on Chemosynthesis-Based Ecosystems (CBE6 in Woods Hole, Massachusetts, USA). In this case the support took the form of Travel Awards offered to young scientists to attend the meeting (11 students and 3 post-docs from 8 countries)

#### Spare berths information

Steering Committee Members are kindly asked to notify the IR Coordinator about any berth availability that would suit the Cruise Bursary program.

#### **D) Membership:**

##### Principal members:

China

France (host)

Norway

United States

##### Regular members:

Canada

Germany

India

Japan

Korea

Portugal\*

United Kingdom

##### Corresponding members:

Iceland, Russia, Australia, Italy, Spain, Mexico, Sweden, Switzerland, Denmark, Brazil, South Africa, Morocco, New Zealand, SOPAC, Philippines, Austria, Mauritius, Chile, Chinese Taipei, Bulgaria, Ireland

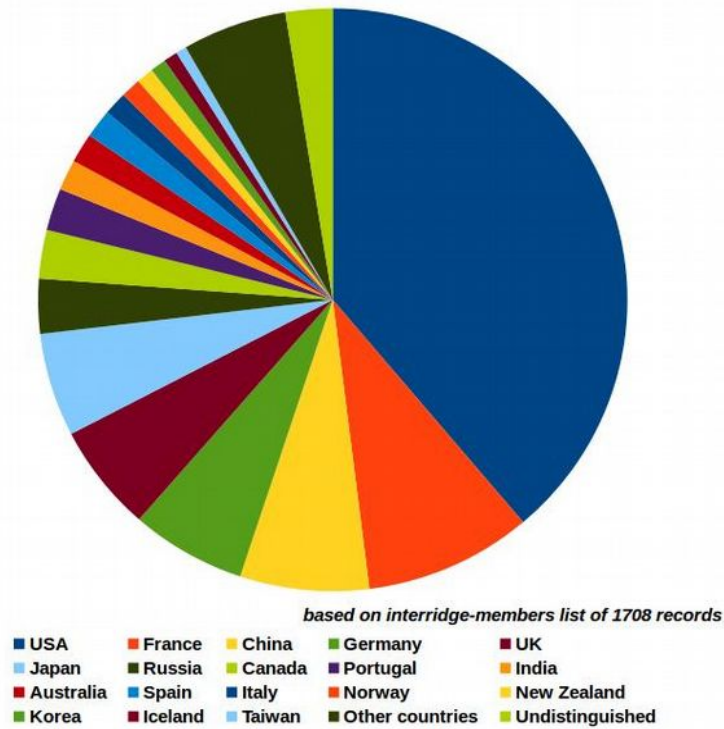
\* - to be confirmed

**E) Membership timelapse:**

Member country	Year																									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2017	
France	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Japan	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
UK	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
USA	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Germany	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Portugal	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Spain	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Norway	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Canada	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Italy	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Korea	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
India	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
China	Yellow	Yellow	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Iceland	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Russia	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Australia	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Mexico	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Sweden	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Switzerland	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Denmark	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Brazil	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
South Africa	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Morocco	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
New Zealand	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
SOPAC	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Philippines	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Austria	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Mauritius	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Chile	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Chinese Taipei	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Bulgaria	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Ireland	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow

MEMBERSHIP    Green    Host    Red    Principal    Blue    Regular    Yellow    Corresponding

**F) Nationality of InterRidge mailing list subscribers:**





## 5 National Updates

### Canada National Update

 *Kim Juniper*

There have been two major Canadian-led ridge research initiatives in the past year, both centred on the Juan de Fuca Ridge.

Endeavour-Middle Valley with Tully/ROPOS – Scientists from the Canadian Department of Fisheries and Oceans (DFO) and academic researchers from the Canadian Healthy Oceans Network (CHONe), staged a joint cruise to the Endeavour Segment and Middle Valley hydrothermal fields on the Juan de Fuca Ridge in collaboration with geologists from Memorial University of Newfoundland. The Endeavour Segment vents lie within a Marine Protected Area established by Canada in 2003. The 2-week cruise (2-16 August 2017) deployed the remotely-operated vehicle ROPOS from the Canadian Coast Guard Ship John P. Tully for sampling and survey operations. Dives in the Endeavour MPA focussed on collecting samples of vent fauna and microbes and sulphide minerals.

The biological sampling involved collecting replicate submersible grab and suction samples from siboglinid tubeworm assemblages from adjacent locations that were subjected to high and low hydrothermal discharge, the so-called ‘high flow’ and ‘low flow’ tubeworm assemblages. Samples are being analyzed to assign ecosystem functional properties to the faunal and microbial assemblages within the two tubeworm habitats. A unique component of this study is the inclusion of microbes (prokaryotes and protists) in the evaluation of ecosystem function.

Geological surveys and sampling were led by Dr. John Jamieson of Memorial University of Newfoundland. The primary goal of this work was to use the ROV for direct observation and sampling of putative sulphide deposits identified in high resolution multibeam bathymetry. This ground truthing exercise is an important component of the development of this potential exploration technique for seafloor massive sulphides. The exploration dives also provided an opportunity to test the exploration potential of an ROV-mounted magnetometer provided by Seafloor Geophysics of Vancouver, British Columbia.

Two survey and sampling dives were also conducted at Middle Valley, a sedimented hydrothermal site on the Juan de Fuca Ridge, north of the Endeavour Segment. The first dive explored the Bent Hill sulphide mineral deposit area that was drilled by the the International Ocean Drilling Program during the 1990’s. Several small active vents were found on the southern edge of the Bent Hill site. The second dive visited the more active Dead Dog hydrothermal field, sampling bivalves, tubeworms (*Ridgeia* and *Lamellibrachia*) and sulphide minerals.

Expansion of Observatory Infrastructure at Endeavour Segment - Ocean Networks Canada in collaboration with Dr. Laurence Coogan of the University of Victoria and his collaborators at the University of Minnesota, the University of Washington and the Sanya Institute of Deep-Sea Science and Engineering (SIDSE), has initiated a major expansion of the cabled observatory infrastructure at the Endeavour Segment hydrothermal vents. The project is funded by the Canada Foundation for Innovation and SIDSE, with additional support from other partners. When completed in 2018, three hydrothermal fields will be instrumented with sensors ranging from short-period seismometers to high and low temperature fluid samplers and cameras. Extension cables, junction boxes and sensor

platforms have been deployed at the new locations and most instruments will be installed during cruises planned for the summer of 2018.

## **China National Update**

*Jiabiao Li and Y. John Chen*

In 2016-2017, China has organized 5 ocean science cruises, in which the “*Jiaolong*” manned submersible was used for investigation in the mid-ocean and trench areas.

On the other side, deep-sea detection vehicles gradually goes into application after testing, such as the “*Qianlong*” series AUVs and the “*Hailong*” series ROVs to provide powerful guarantee for resources exploration and scientific researches.

### ***Ridge and Trench Surveys***

In Southwest India Ridge Cruise, Second Institute of Oceanography of China (PI: Dr. C Tao) used the R/V “*Xiangyanghong 10*” on November 2015 to May 2016, November 2016 to June 2017 and R/V “*Dayang Yihao*” on December 2015 to June 2016, to conduct polymetallic massive sulfide resources exploration and environment baseline research. The deep-tow system, “*Qianlong II*” AUV, and the electromagnetic detection system, 20m borehole coring system was used to obtain geological, geophysical, environmental and biological samples and data of the investigation area. On the cruise, the “*Qianlong II*” finished 16 diving work with underwater operation time up to 239 hours, total mission distance 747 km to obtain high resolution three-dimensional seabed topography.

Second Institute of Oceanography of China (PI: Dr. X Han) use the manned submersible *Jiaolong* with the R/V “*Xiangyanghong 9*” on February to June 2017 to investigate the Carlsberg ridge in the northwestern Indian Ocean for hydrothermal vent systems.

Meanwhile, in a trench cruise, China Deepsea Research Center used “*Jiaolong*” manned submersible on April to July 2016 by the R/V “*Xiangyanghong 9*” to investigate the Vega Seamounts, Yap Trench and Mariana Trench in the northwestern Pacific. A total of 22 diving operations were carried out, with the maximum depth of 6,796 meters, and a large number of seabed organisms, sediment samples and underwater video, photographs and environmental data were obtained.

In another trench cruise, the Institute of Deepsea Science and Technology of Chinese Academy of Science used R/V “*Tansuoyihao*” to explore the Challenger Deep of Marianas Trench during 22 June to 12 August 2016. This voyage last 52 days, carried out 84 items of comprehensive tasks with ten-thousands-meters-deep launcher used first time.

### ***Other Surveys***

IODP Expeditions 367 and 368, with Dr. Z Sun of the Institute of South China Sea and Dr. Z Jian of the Tongji University as chief scientists, were carried out from February to June 2017. It addresses the mechanisms of lithosphere extension during continental breakup. State of the art deep reflection seismic data show that the northern South China Sea (SCS) margin offers excellent drilling opportunities that can address the process of plate rupture at a magma-poor rifted margin.

### ***Symposiums and National Conferences***



1. The 2016 International Conference on Marine Science and Technology was held at the Shanghai international conference center on 10 to 13 April. The meeting organized by Shanghai Jiaotong University, which is the largest marine science and technology meeting hold in mainland China for the first time. It provides a good communication platform for exchange of the new progress and new direction in marine technology research, development and utilization. Over 800 scientists and students participated in this conference.
2. On 30 to 31 May 2016, the fifth International Symposium on the Scientific and Legal Aspects of the Regimes of the Continental Shelf and the Area held in Nanjing organized by China Institute for Marine Affairs, SOA and Second Institute of Oceanography, SOA. More than 80 scientists and lawyers from more than 20 countries and regions attended the meeting.
3. The 4th Conference on Earth System Science Symposium was held in Shanghai on 4-6 July 2016. Over 1000 Chinese scholar come from domestic and overseas participated in this meeting. This conference strongly focused on interdisciplinary studies in ocean science including biological evolution and environment, ocean and climate, biogeochemical cycle, deep process and planetary cycle, deep-sea resources and technology, earth system dynamics etc. Two sessions “The deep structure and dynamic process of the continental margin of Asia” and “The South China Sea: a natural laboratory for deep-sea processes” were organized by China ridge program.

## **France National Update**

*Daniel Sauter, Nadine Le Bris & Marcia Maia*

Since 2015, the French ridge community continued its research over different spreading centers around the world and started several new projects.

Geosciences cruises focused on the Indian Ocean ridges with four long cruises: the STORM cruise (PI Anne Briaies) on the Southeast Indian Ridge (SEIR) axis and off-axis seamounts in February 2015, the ROVSMOOTH (PI Mathilde Cannat) on the Southwest Indian Ridge (SWIR) axis in December 2016-January 2017 and the MAGOFOND 4 cruises (2 legs PI Jerome Dyment) on the flanks of the SWIR in January-March 2017.

The STORM (South Tasmania Ocean Ridge and Mantle) cruise, on board the R/V “L’Atalante”, targeted the SEIR east of the Australian-Antarctic discordance in the furious fifties (Briaies et al., this issue). A recent paper reports the first results of the exploration for hydrothermal plume occurrences along ~700 km between 130°E and 140°E, confirming the presence of hydrothermal activity (Boulart et al., 2017). Chemical evidence for high-temperature hydrothermal venting has been found all along the SEIR axis in relation with high magma supply but, plumes likely linked to serpentinization were also identified in the George V FZ and possibly along the axis (Boulart et al., 2017).

The ROVSMOOTH cruise on board the R/V “Pourquoi Pas?”, was the 4th stage of the geophysical and geological characterization of the easternmost part of the SWIR, after a general mapping cruise in 2003 (SWIR61-65 cruise), sidescan imagery and dredging in 2010 (Smoothseafloor cruise) and seismic imaging in 2014 (SismoSmooth cruise). ROVSMOOTH combined the acquisition of microbathymetry and magnetics, geological observations, sampling and other en-route measurements with the ROV Victor. The cruise

allowed the geological mapping of the footwall of an active detachment fault exhuming mantle derived rocks. A new low temperature hydrothermal vent with 40m high active chimneys, called 'old city', has been discovered during the cruise.

The aim of the MAGOFOND 4 cruises was to investigate the Cretaceous Normal Superchron, the almost 40-million-years long period during which this field did not revert, on the northern flank of the SWIR in the Mozambique Channel and on the southern flank in the Rijser-Larsen Sea on the Antarctic Plate. Deep tow magnetic profiles were acquired during the first leg on R/V Pourquoi pas? and were complemented by sea-surface magnetic profiles from both the first leg and the second leg onboard R/V Marion Dufresne to dispose of a consequent dataset.

The monitoring of the seismic activity of the three Indian ridges is going on with the array of hydrophones of the OHA-SIS-BIO experiment moored between Réunion Island and the French Austral and Antarctic Territories (TAAF) (Tsang-Hin-Sun et al., 2016). The network is annually serviced during the R/V Marion Dufresne cruises for maintenance of the TAAF stations in Crozet, Amsterdam and Kerguelen islands. It included a marine mammal ecology component.

In the Atlantic Ocean, the European Multidisciplinary Seafloor and water-column Observatory EMSO-Azores (also called MoMAR Monitoring the Mid-Atlantic Ridge ; MAR), located on the Lucky Strike volcano, on the MAR south of the Azores is maintained since 2010 with annual cruises (see <http://www.emso-fr.org/fr/EMSO-Azores>). EMSO-Azores is a fixed-point buoyed observatory with a multidisciplinary approach (from geophysics and physical oceanography to ecology and microbiology) that acquires time-series data at and around active hydrothermal vents. The primary aim of the observatory is to provide data for research on the impact of changes in hydrothermal fluid fluxes, fluid chemistry, and water column processes on the microbial and faunal compartments of deep sea vents, at a range of spatial (km to microbial habitats) and temporal (seconds to several years) scales. The geophysical component of the observatory is composed of a seismometer and two pressure gauges, installed within 200 m of the vents. It transmits a catalogue of detected seismic events, including information on their apparent local magnitude, as well as pressure and temperature data. HD video and seismometer data are stored locally and collected during the yearly maintenance cruises. The ecology observation module that includes a video camera and temperature sensors allows exploring behavioral cycles in deep-sea organisms (Cuvellier et al. 2017).

Monitoring the seismic activity on the MAR south of the Azores is also the aim of the HYDROMOMAR experiment, which is of a long-term program since 2012. Several cruises deployed and retrieved hydrophones in the SOFAR channel leading to a large catalog of events down to MB=2.1-3.2. The last cruise, in 2016, moored 5 instruments that will be retrieved in 2018.

Finally, the first cruise to explore mineral resources in the French permit on the MAR (under contract with AIFM) was realized in 2017 between 10 and 20°N (TAG/Snake Pit area). This cruise, called Hermine (PI Yves Fouquet), on board the RV Pourquoi pas?, collected multibeam data to complete the bathymetric map of the area, sampled inactive vents with the Nautilie, mapped existing plumes and explored the area to discover new active vents.

For the future there are several cruises scheduled in the upcoming years. Efforts of the French community on the MAR will go on with the SMARTIES (Smooth regions at the Mid-

Atlantic Ridge Transform Intersections under extreme thermal gradients) cruise (PI Marcia Maia) which is scheduled in 2019 at the Romanche transform intersection with the MAR. In the field of biology-ecology, in addition to the co-lead of the next annual MOMARSAT cruise (PI: P.M. Sarradin), the Chubacarc cruise is now scheduled on the R/V Atalante in 2019. The 60-d cruise with the ROV is assembling different teams on connectivity issues on West Pacific vents, from Manus to Fidji and Lau basin, (PI S. Hourdez and D. Jolliver). In 2018, the TRANSECT cruise (PI N. Le Bris) focusing on energy transfer on chemosynthetic ecosystems is scheduled on Rainbow, Lost City and Menez Gwen.

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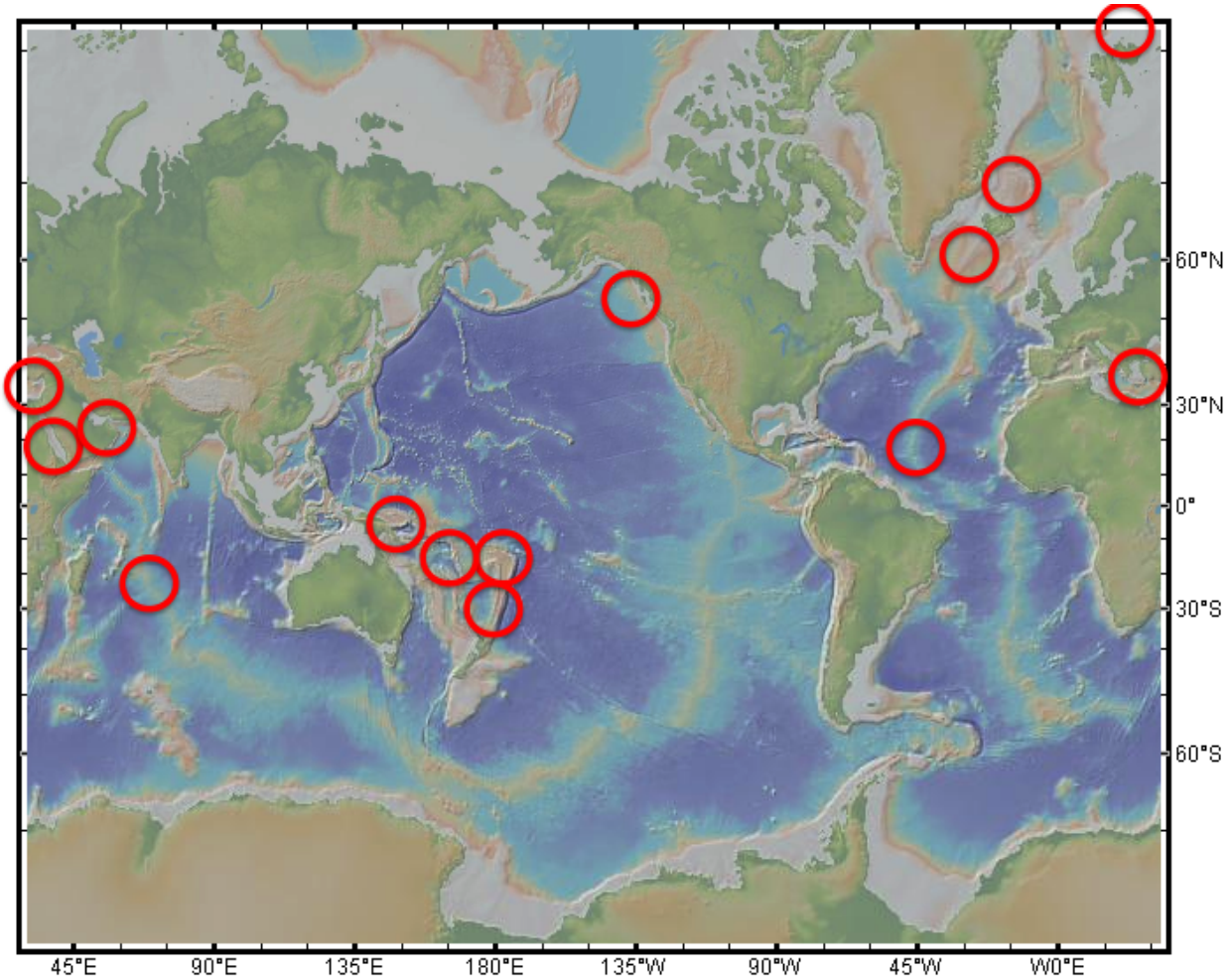
### **Germany National Update**

*Sent by Philipp Brandl*

After a break of some years, 2017 sees Germany coming back as an active member of InterRidge at the Regular Member level. This year has also seen a change in leadership of the InterRidge community in Germany, with Philipp Brandl taking over from Colin Devey.

Ridge-related science is alive and well in Germany, with groups from many institutes around the country studying active and fossil ridges. Foci of recent research are: Magma plumbing and crustal accretion at oceanic ridges, volatile fluxes, hydrothermal cooling of the oceanic crust, seafloor massive sulfides, arc rifting and backarc formation. A map of the regions currently being targeted by German scientists is given in Figure 1.

*Figure 1: Locations around the globe where German scientists are carrying out or planning ridge-related research.*



***Some highlights of German ridge-related research in recent times include:***

**A major strengthening of marine mineral studies in Germany:** This includes the establishment, in 2014, of the Marine Mineral Resources group at GEOMAR, under the leadership of Prof. Mark Hannington (formerly Ottawa). The German marine research consortium (KDM - representing the leadership of Germany's major marine science institutes) also set up a Marine Mineral Resources strategy group to help make marine mineral science more accessible to policy-makers. Research in this field is carried out by the Federal Institute for Geosciences and Natural Resources (BGR) in their license area in the Indian Ocean (in collaboration with GEOMAR, HafenCity Universität Hamburg, GeoZentrum Nordbayern, Christian-Albrechts-Universität zu Kiel *et al.*) and by GEOMAR within the Marine Mineral Resources Group and the EU-funded project Blue Mining (see below).

**Blue Mining:** In the framework of the EU-funded FP7 project "Blue Mining" two multi-disciplinary research cruises were conducted near the TAG active hydrothermal field in the Central Atlantic. The first cruise with the German research vessel RV Meteor (led by Sven Petersen, GEOMAR, Germany) performed large-scale, high-resolution AUV-based mapping to develop exploration tools for detecting inactive massive sulfide occurrences. This was combined with 2D seismic observations and the investigation of surface sediments to determine the structure of the deposits, the geological controls of the deposits and to develop vectors to ore. Further exploration and assessment of those



inactive sulfides was conducted during the second cruise (RRS James Cook led by Bramley Murton, NOC Southampton) by using controlled-source electromagnetics, hyperspectral imaging, surface sampling, and drilling (British Geological Survey BGS Rockdrill-2).

**Hydrothermal vents:** Antje Boetius (AWI) together with collaborators from Bremen and Woods Hole, have made two expeditions with Germany's ice-breaker Polarstern to the Arctic ocean. Both regions they targeted were initially discovered during the InterRidge-initiated AMORE Gakkel expedition in 2001. The first expedition (PS86) aimed to study the Aurora hydrothermal field located at 6°W on the Gakkel ridge, the second expedition (PS101) targeted the Gakkel Ridge axis at 60°E and Karasik Seamount. Andrea Koschinsky (Jacobs University) and Wolfgang Bach (Univ. Bremen/MARUM) studied the hydrothermal vents along the Tonga-Kermadec arc during RV Sonne Exp. SO253.

**Icelandic Ridges:** Work led by Isobel Yeo (formerly GEOMAR, now NOC Southampton) on the north Kolbeinsey ridge culminated in an EPSL paper (Yeo et al., 2016) and a cruise with RV Poseidon in 2016. The cruise involved extensive video surveys of the ridge axis to assess the volcanology and ages of the flows described in the paper. 2018 will see research cruises to Reykjanes Ridge led by Colin Devey and to Grimsey (GrimseyEM) led by Sebastian Hölz, both from GEOMAR.

**Backarc Basins:** In recent years, the evolution of backarc basins has come into focus of several research groups in Germany. Interdisciplinary research, led by Wolfgang Bach's group, shed new light onto the volcanological-geochemical-microbiological linkages in hydrothermal vents in the Eastern Manus Basin (SO218) (e.g., Meier et al., 2016, 2017; Thal et al., 2016, Price et al., 2016). Schmidt et al. (2017) published results from vent fields in the New Hebrides backarc studied during SO229 and complemented by the studies on the local magmatic system by Lima et al. (2017) and the regional tectonics by Anderson et al. (2016). SO255 VITIAZ (led by Kaj Hoernle, GEOMAR) aimed at studying the life cycle of the Vitiaz-Kermadec Arc/Backarc system. Two research cruises related to arc rifting and backarc evolution in the Tonga Arc-Lau Basin area are scheduled for 2018.

**Red Sea volcanology and hydrothermalism:** Nico Augustin (GEOMAR) and colleagues have led a strong effort to understand the geology and hydrothermalism of the Red Sea rift, culminating in several papers (e.g., Augustin et al., 2016; Mitchell & Augustin, 2017) and an up-coming expedition using the Dutch RV Pelagia.

**Ophiolite studies:** Karsten Haase's group at GeoZentrum Nordbayern (FAU Erlangen-Nürnberg) is continuing their successful work on the petrology of ophiolites with a focus on Troodos (Cyprus) and Myanmar. Jürgen Koepke (and his group) is involved in several field-based projects in the Semail ophiolite (Oman) and in the leadership of the ICDP Oman Drilling Project.

**Lower oceanic crust:** Jürgen Koepke's group at Leibniz-Universität Hannover follows an integrated approach of direct petrographic observations (e.g., ocean drilling), modern geochemical methods and experimental petrology to further constrain the magmatic processes in the lower oceanic crust with a focus on the cycling of volatile and chalcophile elements.

**A 3D-Virtual reconstruction of vent structures at Endeavour:** Tom Kwasnitschka (GEOMAR) and his team used the Canadian ROV ROPOS aboard the Schmidt Ocean Institute vessel "Falkor" to produce the world's first virtual video reconstruction of seafloor

vents. The results can be viewed at <https://www.youtube.com/watch?v=YnBerSUqSKQ> and are 3D-navigable with the right internet browser.

**Research Cruises:**

**Ridge-related expeditions in 2017:**

M139: Deep Microbes & BrightFlows (Arndt, Univ. Köln & Augustin, GEOMAR)

MSM68: KNIPAS (Schlindwein, AWI)

POS509: PalinuroEM (Hölz, GEOMAR)

POS510: AEGEAN RIFTING (Hannington, GEOMAR)

SO253: HYDROTHERMADEC (Koschinsky, Jacobs University)

SO255: VITIAZ (Hoernle, GEOMAR)

SO259: INDEX 2017 (Schwarz-Schampera, BGR)

**Ridge-related expeditions scheduled for 2018:**

MSM65: REYKJANES (Devey, GEOMAR)

POS524: GrimseyEM (Hölz, GEOMAR)

SO263: TongaRift (Haase, GZN, FAU Erlangen-Nürnberg)

SO267: ARCHIMEDES 1 (Hannington/Kopp, GEOMAR)

RV Pelagia: SALTAX (Augustin, GEOMAR)

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## **India National Update**

*John Kurian*

India is a regular member in the InterRidge and was being coordinated by Dr. Kamesh Raju, National Institute of Oceanography, Goa, India. Membership coordination is now transferred to Dr. John Kurain P, National Centre for Antarctic & Ocean Research, Goa, India.

Having carried out preliminary surveys and sampling operations in the parts of Central and South West Indian ridges, close to the Rodregious Triple Junction, India filed application to International Seabed Authority for grant of license for exploration in the area. After grant of license in 2016, India carried out second round of survey and sampling operations in the area in 2017 by deploying the research vessels R/V MGS Sagar. The planned studies include hydro-dynamics, water column chemistry, Environmental baseline data collection etc. Few promising inferences have been obtained on the presence of hydrothermal plumes in three locations the area. Further study is in progress.

## **Japan National Update**

*Kyoko Okino*

The InterRidge-Japan program continues efforts to promote ridge-related studies in Japan and to maintain our community. The outline of the ongoing project and other activities are described below.

### ***Domestic Situation***

We are forced to get along without an umbrella project supporting InterRidge-Japan activity and ridge-related studies are performed using individual project funding. A government-led program “Next-generation technology for ocean resources exploration” has started in 2014. JAMSTEC and other national research institutions join the program, and some IRJ members press forward the studies on hydrothermal fields in the Okinawa Trough under the program.

Total shiptime for proposal-based cruises is decreasing in these years. Especially, the usage of AUV, ROV or HOV is highly competitive. A new ship R/V Kaimei (5800t, Length 100m, Breadth 19m) equipped with 3D seismic system and long piston coring system was launched in 2015 and sea trial and training cruises were conducted in 2016 and early 2017.

### ***Domestic Meeting***

We had a business meeting on May 24, 2017, at a Japan Geoscience Union Meeting 2018, where we shared information on a budget of the IR, cruises, international affairs, and discuss the InterRidge-Japan annual activity plan. Dr. Shinsuke Kawagucci was elected as new StCOM member from Japan. The membership fee payment is shared by JAMSTEC and The University of Tokyo in 2017.

An InterRidge-Japan symposium will be held on November 27-28, 2017, at Atmosphere and Ocean Research Institute, University of Tokyo. We plan to propose a special session on the serpentinization of oceanic lithosphere.

### ***Finished and ongoing cruises FY2016-2017***

R/V Hakuho-maru and R/V Yokosuka with AUV Urashima visited the Central Indian Ridge again in early 2016. The Hakuho-maru cruise was conducted under the collaboration with Mauritian and Korean scientists and surveyed the area between Marie Celeste Fracture Zone and Argo Fracture Zone. Rock sampling, CTD hydrocasts and shallow/deep magnetometer survey were carried out. The Urashima dives were done mainly south of Argo Fracture zone and observed the altered area with dead chimneys.

The extensive hydrothermal explorations were also done in the Okinawa Trough, including AUV dives and drilling.

## **Norway National Update**

*Cédric Hamelin*

In 2016/2017, Norway continued developing a strong ridge-related scientific program.

### ***New Infrastructure:***

Early 2017, the K.G. Jebsen Centre for Deep Sea Research (KGJ CDeepSea) has officially opened in Bergen. This new research centre, funded by the Kristian Gerhard Jebsen Foundation, is based on the successes of the Centre for Geobiology, which was ending its term as a Norwegian Centre for Excellence in May 2017.

The research at the Centre incorporates: the formation of oceanic crust by magmatic and tectonic processes, heat transport from magma to the oceans by large hydrothermal convective systems, water-rock reactions and the formation of mineral deposits at the seafloor. It also encompasses the synthesis of organic compounds and the formation of chemical energy by water-rock reactions, and the links between energy and the functioning of microbial life and higher organisms. Finally, it deals with the ecosystems inhabiting the sub-seafloor, the seafloor and the water column above. Another mission of the Centre will be to transfer knowledge from basic research and technology developments, to applied questions that will impact a sustainable “blue growth” future. The Centre will provide insights into deep sea mineral and bioprospecting resources, focusing on areas under Norwegian jurisdiction. It will also address the potential environmental impacts of industrial activity on the ocean floor.

Finally, the new Centre will have a leadership role for the NORwegian MARine Robotics facility (NORMAR), home of Ægir 6000, a work-class ROV with a Tether Management System (TMS). This will be a primary tool for exploring, sampling and deploying instruments and experiments along mid-oceanic ridges. The ROV system is specially designed for operation from RV G.O. Sars and from forthcoming research icebreaker RV Kronprins Haakon, where it will operate through a moon-pool when operating in ice-covered water.

### ***MARMINE project:***

The 4 years MarMine project is directed by the Norwegian University of Science and Technology (NTNU) and funded by the Research Council of Norway. The overall objectives of this project are to assess and develop new exploration and exploitation technologies for seafloor massive sulfide deposits along the Arctic Mid-Oceanic Ridges.

### ***Cruises:***

The yearly expeditions to the north atlantic ridge system continued during summer 2016 and 2017. New vents have been discovered along Mohns ridge and new instrumentations (temperature probes, OBSs, fluid and rock sampling) were deployed to gather data on these systems.

As a part of the MarMine project, NTNU also conducted a successful cruise along the Arctic Mid-Oceanic Ridge in the spring 2017.

### ***Upcoming:***

The RV Kronprins Haakon, a Polar Class 3 icebreaker, was launched on 28 February 2017. The vessel will be delivered to the Norwegian Polar Institute in the upcoming months and should be ready for scientific operations in 2018. This new research vessel will be equipped for various ridge related sciences, from deep marine biology to geology. The main deck will be dedicated to scientific activities with laboratories, refrigerated storage rooms, an A-frame, and a 3-by-4 m moon pool permitting ROV deployment operations in ice-covered seas. Detailed exploration of the ultra-slow spreading Gakkel ridge using modern underwater vehicle is one of the primary objectives of the Norwegian efforts in the upcoming years. Because of limited maneuverability in ice-covered seas, combining the RV Kronprins Haakon capabilities with Ægir 6000 and its 1000m TMS system will play an important role to make this task achievable.

### **UK National Update**

*Richard Hobbs*

A new polar research vessel is currently being built at the Cammel Laird shipyard in Liverpool. The new 128m vessel will enter service in 2019 and will have a 60-day endurance and will accommodate up to 60 scientists. Besides a suite of laboratories and work areas the ship will have a moon-pool making it easier to deploy instrumentation especially in poor weather.

The following have been extracted from the UK Research Council Website that lists currently funded grants.

### **Over the past year completed projects:**

#### ***Characterising hydrothermal alteration across the Atlantis Massif: IODP Expedition 357*** ***Principal Investigator: Dr M Harris, University of Plymouth***

Used scientific ocean drilling of the Atlantis Massif during IODP Expedition 357 to investigate the role of hydrothermal circulation in the formation of ocean crust along long-lived detachment faults where gabbroic and mantle rocks are exposed at the sea-floor.

#### ***Investigating the influence of lithology and water depth on the composition and distribution of sulphides at the worlds deepest known vent sites.***

Investigator: Dr B J Murton, National Oceanography Centre

A study of the hydrothermal vents within the Cayman Trough, deep beneath the Caribbean Sea where supercritical fluids at nearly 500 degrees Celsius are venting into the abyssal ocean. This unique opportunity used this natural laboratory to test predictions about the formation, distribution and composition of ore deposits formed from such high-temperature supercritical fluids.

**Currently funded projects include:**

***OSCAR - Oceanographic and Seismic Characterisation of heat dissipation and alteration by hydrothermal fluids at an Axial Ridge***

Investigators: Professor R W Hobbs, Professor Christine Peirce, Durham University; Dr Miguel Maqueda Morales, Newcastle University; Dr Vincent Tong, University College London; Professor Joanne Morgan, Imperial College London; Dr David Smeed, National Oceanography Centre

An international project led from the UK, based on the Panama basin, acquired an interdisciplinary dataset combining both physical oceanography, heatflow and geophysics during a series of three acquisition cruises. These data have been used to build and parameterise new integrated models that provide valuable insight and new constraints of the thermal processes close to ocean ridges that includes a permeable seabed. These models provide new understanding of the fluid and heat fluxes at ocean ridges and how geothermal heating is a significant driver for global circulation.

***Crustal accretion and transform margin evolution at ultraslow spreading rates***

Investigator: Professor C Peirce, Durham University, Earth Sciences

Part of a British, German and American partnership, used sub-seabed seismic imaging to study the structure and lithology of the crust at the Mt Dent OCC in the Cayman Trough and to determine the relationship between this and the adjacent volcanic domain that also hosts hydrothermal vents. The project also investigated the deep fault geometries and the influence of the adjacent thick, cold continental lithosphere.

***The impact of Mid-Ocean Ridges on the Ocean's Iron cycle***

Investigators: Dr A Tagliabue, Dr A E Heath University of Liverpool; Professor M C Lohan, University of Southampton.

To measure mixing and other macronutrients over mid-ocean ridges to study the nutrient and carbon pump and the associated role for iron. The project provides state of the art observational and modelling constraints on two important aspects of the ocean iron cycle: 1) How does the ocean ridge impact physical mixing of iron to the surface and 2) what chemical processes control the large scale influence of the iron directly supplied by mid-ocean ridges. Ultimately to address the broader question of how the amount and chemical form of iron from mid-ocean ridges influences phytoplankton growth in the open ocean.

***The seismic signature of serpentinite in subduction zones: A rock physics approach***

Investigators: Dr N Brantut, University College London; Professor D Dobson, Dr T M Mitchell, University College London

The study provides a characterisation of the seismic signature of deformed and dehydrating serpentinites originally formed by hydrothermal reaction at mid-ocean ridges during subduction. The data contributes to a better understanding of the deformation and dehydration mechanisms that are key aspects of subduction zone dynamics.

***Role and extent of detachment faulting at slow-spreading mid-ocean ridges***

Investigators: Professor T J Reston, University of Birmingham; Professor C Peirce, Durham University; Professor C J MacLeod, Cardiff University.

The project aims to differentiate between two models of the role of detachment faulting at mid-ocean ridges. The data for this study comes from a comprehensive seismic and seabed topography and magnetic survey of the mid-Atlantic Ridge in the 13N region, where detachment faults are active at the ridge axis today. An array of ocean-bottom seismographs (OBSs) provide a 3D velocity image 3D velocity variations that can be related to different rock and a multi-channel reflection survey, images the sub-surface discontinuities. A subsequent passive seismology experiment recorded the locations of natural micro-earthquakes in the region to reveal the 3D geometry of the active faults.

***Passive Imaging of the Lithosphere Asthenosphere Boundary (PiLAB) – part of larger EU funded project***

Investigators: Dr C A Rychert, Dr N Harmon, Dr K A Weitemeyer, University of Southampton

The acquisition of a systematic image the entire length of an oceanic plate, from its birth at the Mid Atlantic Ridge to its oldest formation on the African margin at multiple scales of resolution and sensitivity, from a metre to kilometre scale using seismic and electromagnetic methods to determine the processes and properties that make a plate strong and define it. The project is accomplished through a large, focused international collaboration that involves EU partners (3.5 M euro) and industry (6.4M euro).

***From Ridge to Trench, MoHole to Bend-Faults***

Investigators: T Henstock, D A Teagle, University of Southampton

To test whether the plate offshore Central America is suitable for two ambitious deep drilling projects to drill into the Earth's mantle by determining the crustal thickness, and properties of the crust and upper mantle by seismic methods. A specific target is to determine where subduction related bend-faults form, how they evolve, and how the properties of the crust and mantle change as they do and search for sites along a bend-fault where hot water returns to the seafloor using AUV and detect any associated lifeforms.

***Rift volcanism: past, present and future***

Investigators: J Biggs, K V Cashman, J Gottsmann, J D Blundy, F F Whitaker, M Kendall, University of Bristol

To study the volcanic eruptions in Ethiopia associated with the Great Rift Valley by collecting samples, mapping the geology and deploying geophysical instruments. To determine the timing, size and style of past eruptions and the plumbing system feeding the volcanoes today. Finally, to model possible scenarios and create a long-range eruption forecast for Ethiopia.



***Transport of post-transition metals in hydrothermal fluids: thermodynamics from first-principles***

Investigator: D M Sherman, Bristol

By computer simulations of the chemistry of hydrothermal fluids at high temperature and pressure, determine how metals are complexed by dissolved ligands such as Cl<sup>-</sup>, HS<sup>-</sup> and derive equilibrium constants for these reactions entirely from first-principles. To provide new insights on the chemistry and role of fluids in the Earth's crust and understand how associated ore-deposits form.

***Radium in Changing Environments: A Novel Tracer of Iron Fluxes at Ocean Margins***

Fellow: Dr A L Annett, University of Southampton, School of Ocean and Earth Science

To measure Fe and Ra near hydrothermal vents along the Mid-Atlantic Ridge to determine the removal of Fe from vent fluids as they drift away from vent sites and provide vital information for evaluating the contribution of this source to the total amount of Fe in the world's oceans. These measurements will be combined with measurements of Fe and Ra from glaciers in both Antarctic and Greenland. Hence predict the impacts of changes in Fe supply on phytoplankton health, the biological pump, and global climate.

***A nutrient and carbon pump over mid-ocean ridges (RidgeMix)***

Investigators: Alberto Naveira Garabato, University of Southampton; Jonathan Sharples, University of Liverpool.

Phytoplankton growth in the mid latitude ocean is more than might initially be expected, and is globally very important as it drives about half of the oceans' biological removal of carbon out of the atmosphere. Using a combination of measurements of the turbulence and nutrient concentrations over and adjacent to the mid-Atlantic ridge together with computer models of circulation explore the wider implications and test if mixing over the mid-Atlantic ridge really does provide enough nutrients to explain the phytoplankton production in the mid-latitude N Atlantic.

***The colonisation of hydrothermal vents by complex life: a natural experiment in macroevolution.***

Investigators: Dr A G Glover, Professor R Herrington, Dr A Riesgo, The Natural History Museum; Dr J T P Copley, University of Southampton; Dr C T S Little, University of Leeds

To gain vital evolutionary insights into the colonisation of hydrothermal vents, both in the modern ocean and throughout Earth history. Primary data for this project will be from key geological localities in Norway, Canada and Tasmania, and the southern Ural Mountains. Collected fossil samples will be subjected to new detailed palaeontological investigations, and high resolution sulphur isotopic analyses. To investigate recent and ongoing adaptation at modern hydrothermal vents we will work on samples of traditional non-vent fauna that we can observe colonising new hydrothermal systems, using advanced DNA techniques.

### ***EU-funded projects (current)***

Blue Mining Breakthrough Solutions for the Sustainable Exploration and Extraction of Deep-sea Mineral Resources

Investigators: Dr B J Murton, National Oceanography Centre.

This 15 Million Euro EU-funded programme is a partnership between industry and academia. The scientific focus is on hydrothermally extinct seafloor massive sulphide deposits (eSMS) and has involved UK and German cruises (in 2016) to map the central area of the TAG segment of the Mid-Atlantic ridge with AUV's, conduct multi-resolution EM and seismic reflection and refraction surveys and drill a number of eSMS deposits with a seafloor drilling rig. The objectives include 3D imaging of the sub-seafloor mineralised sulphide body, stockwork and fluid pathways, to understand the evolution of hydrothermal mineralisation from high-temperature formation to the close of activity, to image the structural and volcanic controls on hydrothermal activity, to quantify alteration and remobilisation of metals within the deposit and to determine the processes forming metaliferous sediments and their preservation.

### **USA National Update**

*Marie-Hélène Cormier*

After the ending of the RIDGE 2000 program in 2012, the number of investigations at the three legacy “integrated study sites” - the 9°N segment of the East Pacific Rise, the Endeavour segment of the Juan Fuca Ridge, and the Lau backarc spreading center, have significantly decreased. Nonetheless, the selection of Axial Volcano on the Juan de Fuca Ridge as one of several seafloor observatories to be cabled under the Ocean Observatories Initiative ([oceanobservatories.org](http://oceanobservatories.org)) has resulted in the deployment of a diverse array of geophysical, chemical, and biological sensors, as well as an HD camera and digital still camera, all of which provide real-time information on linkages between seismic, volcanic, and fluid flow events at that location.

US-lead expeditions to the mid-ocean ridge for 2016 to 2018 are summarized in the accompanying table. The U.S. National Science Foundation is presently funding well over 70 projects touching on mid-ocean ridges, which collectively covers a broad range of topics from geology, geophysics, biology, chemistry, to physical oceanography; a significant number of these projects do not involve any field expeditions. These past few years, Monterey Bay Aquarium Research Institute ([mbari.org](http://mbari.org)), the Ocean Exploration Trust ([oceanexplorationtrust.org](http://oceanexplorationtrust.org)), and the Schmidt Ocean Institute ([schmidtocean.org](http://schmidtocean.org)) have also provided opportunities to visit the mid-ocean ridges with their oceanographic ships, the *R/V Western Flyer*, the *E/V Nautilus* and the *R/V Falkor*. Of special interest to the InterRidge community, the Ocean Exploration Trust offers the opportunities for “scientists ashore” from all nationalities to participate live in their expeditions via satellite telepresence: Scientists ashore can view live video and limited data feeds from the ROVs *Hercules* and *Argus*, view data from seafloor and water column mapping efforts, participate in a text dialogue with onboard scientists and other onshore scientists, and therefore directly contribute to ROV dives and mapping operations



([www.oceanexplorationtrust.org/scientists-ashore](http://www.oceanexplorationtrust.org/scientists-ashore)). Data collected during the *E/V Nautilus* expeditions are archived at three locations based on data type (digital, geological, and biological) and are available to interested scientists upon request. The three respective databases can be queried online ([oceanexplorationtrust.org/data-request](http://oceanexplorationtrust.org/data-request); [ngdc.noaa.gov/mgg/curator/curator.html](http://ngdc.noaa.gov/mgg/curator/curator.html); [mcz.harvard.edu](http://mcz.harvard.edu)).

The “Descend2” workshop, held at Harvard University on January 14-15, 2016, gathered 74 scientists to discuss current and future needs for deep submergence technology. Many of the participants were issued from the mid-ocean ridge community and emphasized the need for maintaining and expanding present capabilities. A draft report is available here:

<https://descend2blog.wordpress.com/2017/01/26/descend2-draft-report/>

Ridge-related US expeditions, 2016-2018			
Cruise Dates	Ship / Vehicle	Location	Chief Scientist
March 7- April 2, 2016	<i>R/V Atlantis, HOV Alvin &amp; AUV Sentry</i>	Mid-Atlantic Ridge, 14°N	Mark Kurz (WHOI)
April 7- May 5, 2016	<i>R/V Falkor, ROV ROPOS</i>	Eastern Lau Spreading Center	Chuck Fisher (Penn State U.)
June 26 - Aug. 16, 2016	<i>R/V Western Flyer, ROV Doc Ricketts</i>	Juan de Fuca Ridge, Axial Volcano	David Clague (MBARI)
July 8 - Aug. 15, 2016	<i>R/V Sikuliaq, ROV Jason</i>	Juan de Fuca Ridge, Axial Volcano	Deb Kelley (U. Washington)
Oct. 8-27, 2016	<i>R/V Atlantis, HOV Alvin</i>	East Pacific Rise, 9°N	Kang Ding (U. Minnesota)
Nov. 3-Dec. 3, 2016	<i>R/V Atlantis, HOV Alvin &amp; AUV Sentry</i>	EPR, 8°20'N, off-axis seamounts	Patricia Gregg (U. Illinois)
Nov. 29-Dec. 20, 2016	<i>R/V Falkor, ROV SuBastian</i>	Mariana backarc spreading center	David Butterfield (U. Washington)
Dec. 8-27, 2016	<i>R/V Atlantis, HOV Alvin, AUV Sentry</i>	Gulf of California, Guaymas Basin	Andreas Teske (U. North Carolina)
Jan. 14-Feb. 20, 2017	<i>R/V Atlantis, ROV Jason, AUV Sentry</i>	Easter microplate, Pito deep	Michael Cheadle (U. Wyoming)
March 27-Apr. 19, 2017	<i>R/V Atlantis, HOV Alvin</i>	East Pacific Rise, 9°50'N	George Luther (U. Delaware)
April 24-May 14, 2017	<i>R/V Atlantis, HOV Alvin</i>	East Pacific Rise, 9°50'N	Stefan Sievert (WHOI)
July 13-23, 2017	<i>R/V Revelle, ROV Jason, AUV Sentry</i>	Juan de Fuca Ridge, Axial Volcano	Bill Chadwick (Oregon State U.)
July 25 - Aug. 29, 2017	<i>R/V Revelle, ROV Jason</i>	Juan de Fuca Ridge, Axial Volcano	Deb Kelley (U. Washington)
Sept. 13-23, 2017	<i>R/V Revelle</i>	Juan de Fuca Ridge, Axial Volcano	William Wilcock (U. Washington)
Oct. 2 - Nov. 1, 2017	<i>R/V Atlantis, ROV Jason</i>	Mid-Atlantic Ridge, 23°N, North Pond	Geoffrey Wheat (U. Alaska)
Oct. 3-17, 2017	<i>E/V Nautilus</i>	Revillagigedo Archipelago (Mathemat. Ridge)	Nicole Raineault (U. Rhode Island)
Oct. 20-27, 2017	<i>E/V Nautilus, ROV Hercules</i>	Gulf of California, Guaymas Basin	Adam Soule (WHOI)
Oct. 30 - Nov. 3, 2017	<i>E/V Nautilus, ROV Hercules</i>	Gulf of California, Pescadero Basin	Anna Michel (WHOI)
Nov. 8 -20, 2017	<i>E/V Nautilus, ROV Hercules</i>	Revillagigedo Archipelago (Mathemat. Ridge)	Steve Carey (U. Rhode Island)
Nov. 10-Dec. 17, 2017	<i>R/V Falkor, ROV SuBastian</i>	Northeast Lau Basin	Ken Rubin (U. Hawaii)
Dec. 16 2017 - Feb 3 2018	<i>R/V Atlantis</i>	Rio Grande Rise, south Atlantic	Anthony Koppers (Oregon St. U.)
March-April 2018	<i>R/V Sally Ride</i>	Cocos-Nazca Ridge near Galapagos T.J.	Emily Klein (Duke U.)
June 2018	<i>R/V Atlantis, HOV Alvin, AUV Sentry</i>	Mid-Atlantic Ridge, 14°N	Mark Kurz (WHOI)
August 2018	<i>R/V Kilo Moana, ROV Jason</i>	Juan de Fuca Ridge, Axial Volcano	Scott Nooner (U. North Carolina)
August 2018	<i>R/V Kilo Moana, ROV Jason</i>	Juan de Fuca Ridge	Meg Tivey (WHOI)
end June - beg. Aug. 2018	<i>R/V Revelle, ROV Jason</i>	Juan de Fuca Ridge, Axial Volcano	Deb Kelley (U. Washington)
October 2018	<i>R/V Atlantis, ROV Jason</i>	Mid-Atlantic Ridge, Lost City	Susan Lang (U. South Carolina)
November 2018	<i>R/V Atlantis, HOV Alvin</i>	Gulf of California, Guaymas Basin	Andreas Teske (U. North Carolina)
December 2018	<i>R/V Atlantis, HOV Alvin, AUV Sentry</i>	EPR near 8°20'N, off-axis seamounts	Patricia Gregg (U. Illinois)

The 6th International Symposium on Chemosynthesis-Based Ecosystems (CBE6) was held in Woods Hole (MA) on August 27 – September 1, 2017 (<http://cbe2017.org>), a meeting that highlighted the newest discoveries and developments.

The US ridge community values the objectives of the InterRidge and, thanks to the combined effort of the National Science Foundation and several research institutions and scientists, funding has been secured for the US participation as a principal member of InterRidge for 2017.

## Chile national update

*Luis E. Lara*

Chile has contributed with a very modest effort to the ridge research. However, interest in scientific research of active (spreading) and aseismic ridges, seamounts and oceanic islands is in good health and some projects with national funding are going on. On the other hand, SERNAGEOMIN (the Chilean Geological Survey) is setting a long-term program for research on marine geology and geophysics, where certainly spreading centers (especially the Chile Ridge) will be present. Since 2015, oceanic research in Chile is further supported by Conicyt, the science agency that provides funding for work on board of the AGS 61 Cabo de Hornos. At national scale, the government is promoting a national policy for the oceans, which will be the framework for new developments in this line and for what Earth sciences are a key component.

A brief summary of recent research on these topics include:

A couple of years of geophysical survey of the Chile Ridge close to the triple junction (Nazca, South America and Antarctic plates), aimed to produce basic knowledge of the potential areas for the extended continental shelf according to the UNCLOS. Derived research about the morphology of the Chile Ridge based on high-resolution bathymetry is in progress.

More than 4 years of active research on the Juan Fernández Ridge (a chain of seamounts and oceanic islands in the Pacific SE) are producing some interesting results. With support of Conicyt (through Fondecyt grants) and IFOP (Instituto de Fomento Pesquero), new bathymetric surveys have allowed sampling of the most outstanding seamounts (e.g., O'Higgins guyot), where volcanic rocks representing rejuvenated volcanism have been recovered and dated with high-resolution  $^{40}\text{Ar}$ - $^{39}\text{Ar}$  geochronology. Oceanic islands (especially Robinson Crusoe) have been focus of detailed geological studies and results have been published, for example about the vertical movements (e.g., Sepúlveda et al., 2015. Biogeosciences) and petrology (e.g., Reyes et al., 2017. J Volcanol Geotherm Res.). FIPA projects granted by IFOP have supported new bathymetric surveys of seamount along the Juan Fernández Ridge aimed to better constrain the biological resources and protection of these sensitive habitats. On the other hand, CONA (the National Oceanographic Committee) funded in 2016 a cruise to the Easter Seamount Chain and San Félix and San Ambrosio islands with a leg segment in Juan Fernandez Ridge. Finally, for next December 2017 a cruise is scheduled to map seamounts along the margin from the Juan Fernández Ridge (33°S) to the Copiapó Ridge (27°S) as part of a continued effort to better understand volcanism in the Nazca Plate.

## Philippines National Update

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Ridge research in the Philippines is currently focused on geologic mapping and detailed petrological studies of ophiolite suites (Figure 1) that may provide important clues in the reconstruction of the tectonic and geodynamic evolution of the Philippine island arc system. In the past year, our group conducted geologic mapping of the Pujada and Palawan ophiolites. Located in southeastern Mindanao, the Pujada Ophiolite possibly represents trapped slivers of oceanic lithosphere exhumed during the collision of Halmahera arc with the Sangihe arc (e.g. Pubellier et al., 1999). The Palawan Ophiolite is located in western Philippines and has been interpreted to be the exhumed forearc segment of the Cagayan arc - Cagayan de Sulu ridge emplaced during collision with the North Palawan continental terrane (NPCT; e.g. Keenan et al., 2016).

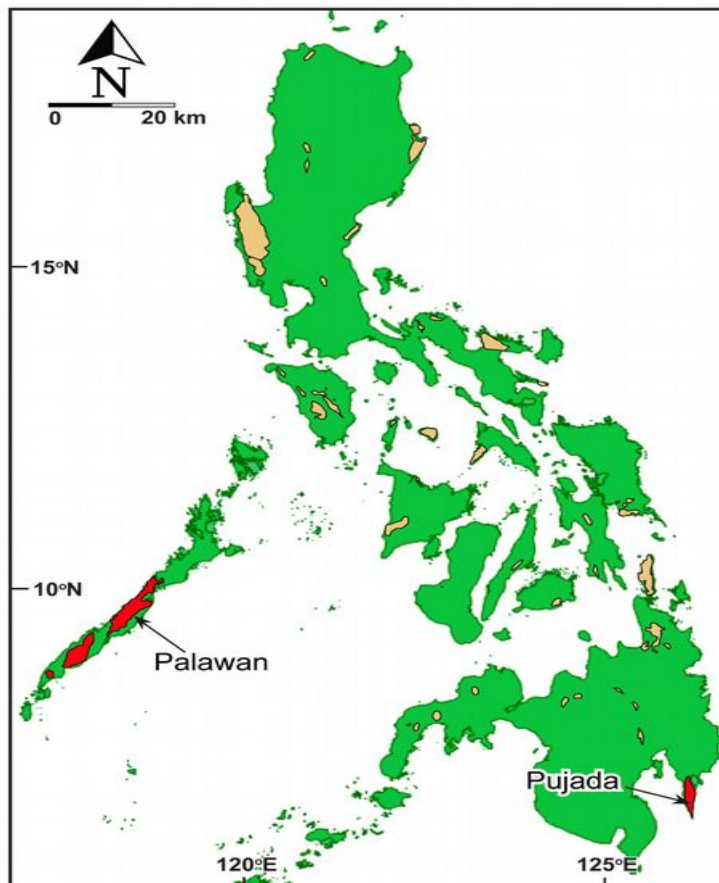


Figure 1 Map of the Philippines showing the distribution of the different ophiolite and ophiolitic bodies (beige) including Palawan and Pujada (red). Distribution is from Guotana et al., 2016

### ***Pujada Ophiolite***

The Pujada ophiolite is a well-preserved oceanic lithosphere exposed in the Pujada Peninsula at the southeastermost tip of Mindanao. Geologic mapping conducted in 2016 revealed that the base of the ophiolite is comprised of the Bitaogan metamorphic unit. This metamorphic unit, composed of garnet amphibolites and quartz muscovite schists, corresponds to the metamorphic sole of the Pujada Ophiolite. The mantle section is represented by fresh exposures of lherzolites, harzburgites and dunites which occur as two separate belts, the Surop (Figure 2a) and Nagas peridotites (Figure 2b). Occasional chromitite pods and lenses are enveloped by massive dunite bodies of the Nagas peridotites. Limited exposures of isotropic gabbros and sheeted dikes are observed as NW-SE trending units separating the two ultramafic belts. Interstratified pillow basalts, ribbon cherts, siliceous mudstones and tuffaceous clastic rocks were also mapped as a distinct unit bound by either thrust faults or the Diwata Mélange. The latter is composed of heavily fractured clasts of peridotites, gabbros and cherts set in a scaly tectonized matrix.



Figure 2 A. Harzburgite outcrop of the Surop belt in Brgy. Tiblawan. B. A sample of fresh lherzolite of the Nagas belt composed of pyroxenes, olivine and spinel from Brgy. Macambol in the Pujada Peninsula.

### ***Palawan Ophiolite***

Palawan island is a rifted block on the southeastern margin of the South China Sea. The island is comprised of two contrasting terranes with continental lithologies (e.g. quartz arenites and granites) dominating the northern half. On the other hand, ophiolite-related units thrust over metamorphosed continental rocks are extensively exposed in the central and southern sections. Field mapping campaigns conducted in central and southern Palawan this year (2017) revealed a harzburgite-dominated residual mantle (Figure 3). These refractory units are overlain by an extensive crustal section composed of mafic-ultramafic layered and isotropic cumulates and pillow lavas with intercalated sediments.



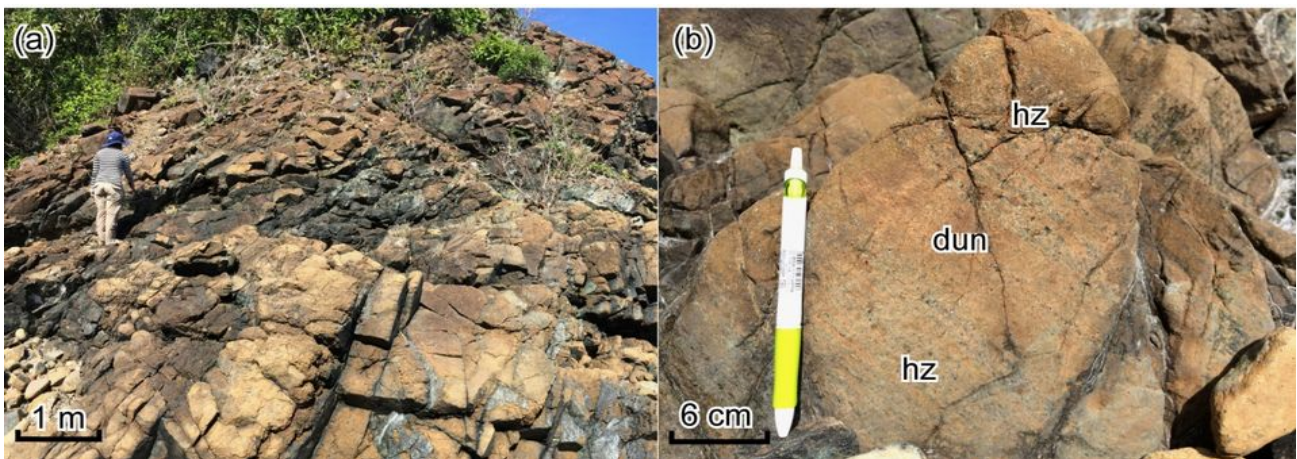


Figure 3 A. Massive outcrop of harzburgite exposed along Bentoan point, Palawan. B. Sample from the same locality shows interlayers of harzburgite (hz), rough surface with aligned grains, and dunite (dun), uniformly brown layers.

Detailed petrographic and geochemical analysis of the different lithologies comprising these two exhumed oceanic lithospheres is underway. Ultimately, information from the two ophiolites will be used to further refine and complement models on the geologic evolution of this region.

## Russia National Update

Sergei Silantiev



The biennial workshop of Russian-Ridge was held in St.-Petersburg on 1-2 June 2017 in VNIIOkeangeologia, St. Petersburg. The topic of this workshop was “The Mid-Ocean Ridges - new data on geology, mineral deposits and ecology of hydrothermal systems”. Workshop brought up for discussion most important results of multidisciplinary investigations of the Mid-Oceanic Ridges obtained by Russian scientists during last two years, R-Ridge activities as well as upgrade of the R-Ridge web-site: <http://intranet.geokhi.ru/russianridge>

Among the most important results of investigations of ridge processes carried out by Russian scientists during 2015 - 2017 and presented on Russian Ridge Workshop'17 it should be to highlight the following:

### 1. Mid-Atlantic Ridge Hydrothermal ore deposits

Most important achievement of 37-th Cruise of R/V “Professor Logachev” (Shipowner: PMGE, St. Petersburg) that was conducted in MAR crest zone during Spring time, 2015, is finding a few new active hydrothermal fields those belong to single large hydrothermal cluster “Pobeda”: “Pobeda-1” (17°08,7'N, 46° 23,44'W, depth 2200m); Pobeda-2”, 4 km to SW of “Pobeda-1” (17°07,4'N, 46° 24,5'W, depth 2900m. ); “Pobeda-3”, 2 km to SW of “Pobeda-1” (17°08,3'N, 46° 24,2'W, depth 2700-2500m.. Massive sulfides were dredged here. Until now this segment of MAR has been unexplored and information about structure of basement rock was absent. Judging from the data obtained in 37-th Cruise of R/V “Professor Logachev”, characteristic sign the considered MAR segment is wide distribution of plutonic rock, often with features of syntectonic recrystallization. MAR segment between 17°30' and 17°35' N, is characteristic the most submerged section of the rift valley (4500-4700 m) with low magmatic budget. – *Polar Marine Geosurvey Expedition, St.Petersburg*, [www.pmge.ru](http://www.pmge.ru), [www.vniio.org](http://www.vniio.org)

### 2. Petrology and Geochemistry: different aspects of petrogenesis in the Mid-Oceanic Ridges

#### New data on composition of primary magmatic melts originated in Bouvet Triple Junction

- New evidence for heterogeneity of Bouvet Triple Junction (BTJ) primary melts revealed by volatile components systematic was obtained. Data on the presence and concentrations of volatile components in the gas phase and dissolved in the quenched glasses of the BTJ melts allow assume the geochemical heterogeneity of the primary melts which might be caused by the involvement of the different substances in melting of primary BTJ magma source and/or the influence of the Bouvet hot spot activity. – *N.A. Migdisova., A.I. Buikin., T.A. Shishkina. Vernadsky Institute PAS, Moscow*, [www.geokhi.ru](http://www.geokhi.ru)

- The complex study of major, trace, chalcophile elements and volatile components of BTJ magmas evidenced for the long-lasting development of BTJ region in conditions of complex geological setting has resulted in formation of heterogeneous metasomatized enriched suboceanic mantle. *T.A. Shishkina., M.V. Portnyagin, N.A. Migdisova., N.M. Sushchevskaya Vernadsky Institute RAS, Moscow, [www.geokhi.ru](http://www.geokhi.ru)*

### **Geochemical and Petrological peculiarities of plutonic rocks composing Oceanic Core Complexes**

- Data on distribution of siderophile and chalcophile elements in abyssal peridotites has been used as reflection of interaction of endogenous and exogenous processes in the Mid-Ocean Ridges. Significant Sr influx into ocean peridotites was determined to be associated with both carbonation of these rocks and their serpentinization (Silantyev, 2003). Hence, the level of the Sr concentration is an informative geochemical indicator of the degree of alteration of abyssal peridotites. This parameter makes it possible to estimate the relative mobility of siderophile and chalcophile elements in the course of low-temperature metamorphism of MOR peridotites and the dependence of the distribution of these elements on the serpentinization and carbonation processes. *S.A. Silantyev, I.V. Kubrakova., O.A. Tyutyunnik. Vernadsky Institute RAS, Moscow, [www.geokhi.ru](http://www.geokhi.ru)*

- Compositional microheterogeneity of Zircon from plutonic rocks composing Oceanic Core Complex may reflect mixing of variously differentiated melt portions and mixing of diorite-plagiogranite melts from different sources. Interaction of gabbro with hydrothermal brine (30—32 wt.% NaCl) results in zircon (re)crystallization with its extremely uneven enrichment in Y, P, Th, and U in aggregates with heterogeneous amphibole.

*A.N. Pertsev, O.M. Zhilicheva, IGEM RAS, Moscow, [www.igem.ru](http://www.igem.ru)*

### **3. Geophysics data and Tectonic in the Mid-Oceanic Ridge Crest Zones**

- An interesting results from analysis of the distribution of geochemical signs of MAR peridotites along its axis and footwall position of seismic tomography anomaly are realized. Overview of these data shows, that tomography models of upper mantle of modern precision could already provide the basis for geochemical parameters interpretation and for prediction of them into the areas with no oceanic bottom sampling. *S.Yu. Sokolov., S.A. Silantyev, GIN RAS, Vernadsky Institute RAS, [www.ginras.ru](http://www.ginras.ru), [www.geokhi.ru](http://www.geokhi.ru)*

- Results of investigation of evolution of Spreading Basins based on wedge shaped pattern of anomalous magnetic fields data put allow to have new ideas on geodynamic history of Galapagos Spreading Center (GSC) and eastern segment of Southwest Indian Ridge (SWIR). The spreading systems of GSC and SWIR were formed due to the change in the motion vector of the large lithospheric plates, which changed the configuration of the rift systems. Despite the difference in spreading rates, the GSC and the eastern part of SWIR have similar morphology, which is formed as a result of changes in the motion vectors of plates to the north or south of the wedge axis *K.O. Dobrolyubova, S.Yu. Sokolov, A.S. Abramova. GIN RAS, Moscow, [www.ginras.ru](http://www.ginras.ru)*

### **4. New data on Structure of Gakkel Ridge**

- East of 70° E the Gakkel Ridge is still well expressed in the relief. South of 81° N the Gakkel Ridge is not observed in the relief of the Arctic Ocean floor. Analysis of isopachite maps of the various sediment layers and the bottom relief features in the zone of transition from the Eurasian Basin to the continental slope of the Laptev Sea indicates that during

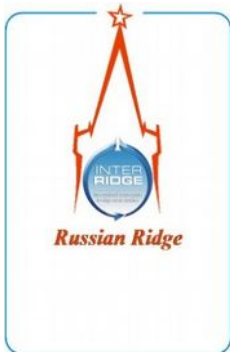
the Miocene time the axial spreading zone in this area was to the east of its present position

*A.L. Piskarev, S.P. Pavlov, V.A. Savin., D.V. Elkina, VNIIOkeangeologia, St. Petersburg, , [www.vniio.org](http://www.vniio.org)*

- It was established that the Rift Zone of the Eurasian basin, which is southward of the Kiseleva depression is filled with a sedimentary series with thickness up to 3 km and is completely devoid of framing uplifts, while northwardly -the thickness is reduced to 2 or less km and the rift zone is surrounded by a chain of seamounts. This implies that the conclusion about the sequence of geological events in the formation of the Mid-Oceanic Gakkel Ridge can be made. In the beginning the rift zone had been formed in sedimentary basin, then tectonomagmatic and volcano-tectonic uplifts developed around and the mid-oceanic ridge was finally formed. In the Laptev part of the Eurasian basin we are dealing with the first stage of generation and evolution of the mid-oceanic ridge

*Artemyeva D. E., Gusev E. A., Vinogradov V. A. VNIIOkeangeologia, St. Petersburg, [www.vniio.org](http://www.vniio.org)*

Listed above data are presented in more detailed design on the web-site of Russian Ridge as abstract Volume of Workshop-RR'13 (open access): <http://intranet.geokhi.ru/russianridge>.





## **6 Status of Membership and Steering Committee members, new member**

Declarations of membership level in 2018:

China – principal member

France – host

Norway – principal member

United States – to be decided

Germany – principal member if funding found

India – regular member

Japan – regular member

Korea – regular or principal member

United Kingdom – at least regular member

The Steering Committee has accepted unanimously the Polish application as InterRidge corresponding member. Dr Teresa Radziejewska (University of Szczecin) will be the Polish national correspondent and will interact with the InterRidge Office.

## 7 Working Group Updates

### Recent activities of the InterRidge Circum-Antarctic Ridges Working Group

*Anne Briais*

The activities of the InterRidge Working Group on Circum-Antarctic Ridges in the last few years included coordinating science with one workshop, gathering new data, with cruises performed all around the Antarctic, and sharing the results, with a special session at the 2017 AGU Fall meeting.

#### ***Workshop in Incheon, South Korea, on October 12-15, 2015***

The meeting was organized by the KOPRI and gathered about 50 scientists from all over the world, and included 30 oral presentations and 12 posters (see Workshop agenda and abstracts on the InterRidge web site). It was the opportunity to have an update on researches in multiple topics from mantle sources and processes to hydrothermal activity and biological communities, from the Southwest and Southeast Indian Ridges, the Pacific-Antarctic ridge or the Scotia Sea. Two keynote presentations were given by Joanne Whittaker (Univ. Tasmania) and Charlie Langmuir (Harvard Univ.). The discussions following the presentations permitted to initiate new collaborations for researches around the Antarctic plate.

**Numerous cruises** have occurred in the past two years, including UK cruises in the East and West Scotia seas, French and Korean cruises on the Southeast Indian Ridge south of Tasmania (Australia-Antarctic Ridge), and cruises on the Southwest Indian Ridge.

#### ***2017 Fall Meeting AGU special session***

To have a new update on the results and projects regarding the southern ridges, we have organized a special session at the 2017 Fall AGU meeting, which is included in Session T31C/T33G "From Mantle Plumes to Ocean Plumes: Mapping Heat Transfer from Mantle to Ocean" (Co-conveners: Richard W Hobbs, Anne Briais, Seung-Sep Kim, and Ali Mashayek). The session will bring together members of the solid earth and ocean research communities to discuss interactions between the mantle, the crust and the oceans, focusing on the mid-ocean ridge and its flanks, through a holistic interdisciplinary approach.

Posters Wednesday, Dec. 13, 2017, 08:00-12:20:

T31C-0633 Mantle heterogeneity across segment at southernmost segment of Central Indian Ridge **Hiroshi Sato** et al.

T31C-0634 Segmentation and Contrasting Magma Supply Along the South-East Indian Ridge, 130°E to 140°E: Results of the STORM Cruise **Anne Briais** et al.

T31C-0635 U-Series Disequilibria Across the New Southern Ocean Mantle Province, Australian-Antarctic Ridge, **Sean R Scott** et al.

T31C-0636 Geophysical Investigation of Upper Mantle Anomalies of the Australian-Antarctic Ridge Hakkyum Choi et al.

T31C-0637 Morpho-tectonic characteristics of Australian-Antarctic Ridge. **Sung-Hyun Park** et al.

T31C-0638 Numerical Modeling of Hydrothermal Circulation at the Longqi-1 Field: Southwest Indian Ridge **Zhikui Guo** et al.

T31C-0639 Estimating the Total Heat Flux from the ASHES Hydrothermal Vent Field Using the *Sentry* Autonomous Underwater Vehicle **Timothy J Crone** et al.

T31C-0640 Axial crustal structure of the Costa Rica Rift: Implications for along-axis hydrothermal circulation **Ling Zhang** et al.

T31C-0641 Porosity, Fracturing and Alteration of Young Oceanic Crust: New Seismic Analyses at Borehole 504B **Emma P M Gregory** et al.

T31C-0642 Evolution of Heat Flow with Age on the Southern Flank of the Costa Rica Rift **Kannikha Parameswari Kolandaivelu** et al.

T31C-0643 Modelling Deep Ocean Circulation in the Panama Basin Driven by Geothermal Heating **Jowan Menhinick Barnes** et al.

T31C-0644 Geothermal heating in the Panama Basin and its impact on water mass transformation **Donata Banyte** et al.

Oral presentations Wednesday Dec. 13, 2017 13:10 to 15:40:

T33G-01 Geothermal influences on the abyssal ocean (Invited) **Julien Emile-Geay**, and Gervan Madec

T33G-02 Observation and modeling of hydrothermal response to the 2015 eruption at Axial Seamount, Northeast Pacific: An OOI Cabled Observatory case study **Guangyu Xu** et al.

T33G-03 Hydrothermal and Chemosynthetic Ecosystems in the Southern Ocean: Current Knowledge on their Biology (Invited) **Katrin Linse** et al.

T33G-04 *Examining the Effect of Temperature, Pressure, Seismicity and Diffuse Fluid Flow on Floc Events at Axial Seamount* **Meethila Rahman** et al.

T33G-05 Determining the Extent of Hydrothermal Interaction on the Southern Costa Rica Rift Ridge Flank During the Past 8 Ma from Joint Inversion of Geophysical Data **Dean J Wilson** et al.

T33G-06 Complex Tectono-Magmatic Interaction along the George V Transform Fault, South-East Indian Ridge, 140°E, and Implications for Mantle Dynamics **Etienne Ruellan** et al.

T33G-07 Isotopic evidence for a large-scale plume-derived mantle domain between the Indian and Pacific mantles beneath the Southern Ocean. (Invited) **Sung-Hyun Park** et al.

T33G-08 Geochemical and Isotopic Variations Along the Southeast Indian Ridge (126°-140°E) Related to Mantle Flow Originating from Beneath Antarctica **Barry B Hanan** et al.

A **proposal** for a follow-on of this working group to continue the major, coordinated effort started in 2012 was submitted to the Steering Committee in July. The Southern Ocean area is so vast that no single nation can make large scientific advances on the Circum-Antarctic Ridges. InterRidge can help with the survey of Circum-Antarctic Ridges, launch new projects, coordinate existing cruise projects, and share information. The Steering Committee recommended that the proposal be re-submitted with a more focused scientific objective, for example concerning biogeography or the link between hydrothermal systems

and oceanic circulation. A new workshop will be organized in 2018 and a new proposal submitted before the next SC meeting.

### **Recent activities of the InterRidge Ecological Connectivity and Resilience Working Group**

Working group chairs Anna Metaxas (Dalhousie University, Canada) and Lauren Mullineaux (Woods Hole Oceanographic Institution, USA) have presented the WG at a dedicated meeting during the Deep-Sea Biology Symposium (Aveiro, Portugal in September 2015). The objectives of the open meeting were to refine the goals and the content of the papers to be produced, to identify task leaders, interested participants, their roles, and a time-line.

The ecological connectivity of vent communities, and their resilience in the face of disturbance, has been a hot topic of research ever since their discovery. This topic has become particularly timely and societally relevant as plans for deep-sea mining progress toward implementation. It is also directly relevant to management decisions under consideration for recently designated deep Marine Protected Areas (MPAs), such as those on the Endeavour Segment, in the Marianas region, on the mid-Atlantic Ridge off the Azores, and in the Guaymas Basin and Eastern Pacific Rise. These topics were also identified in InterRidge's Third Decadal Plan (2014-2023). The objectives of the WG were to generate a synthesis of scientific data on vent community connectivity. The intent was to assemble a group of objective scientists with broad expertise in this field (including physical oceanography, larval biology, environmental geochemistry, microbial ecology, population genetics, metacommunity dynamics and biogeography) to assemble existing data, interpret it in the context of human disturbance, and disseminate it to the scientific community, the public, and policy makers. Part of this effort was also to identify and evaluate potential ecosystem services from vent communities. Use the data synthesis to identify gaps in our knowledge and facilitate international cooperation in future research in fields relevant to this topic.

Since September 2015, the WG has been working on an article. As planned, the co-Chairs circulated an outline of the potential structure of the article to the Steering Committee in October 2015, which, after many edits and input from the Steering Committee, was finalized by mid-January 2016. In late January 2016, the outline was circulated to the InterRidge community, and particularly all members that had expressed interest in participating, requesting short proposals on their potential contribution. Based on the proposals, we refined the structure of the paper and requested input from the authors in June 2016. This was a long process, particularly given the number of co-authors and everyone's busy schedules. We had received most input by November 2016, which we then combined, edited, integrated and sent out to the authors again in March 2017 for the next stage of their input. We have now received most input from all co-authors and are editing the manuscript for what we hope is the final stage before submission. We hope to

submit the article for review by July 2017. It will be submitted to an open access journal and we hope that we can use the IR funding to our working group to cover the cost.

## 8 New Working Groups – discussions on proposals, future workshops

Until 9<sup>th</sup> June 2017 the Office has received 5 proposals for new working groups, summarized in the table below.

Nb	Title	Proponents	Workshops and proposed actions
1	Working group on mid-ocean ridge islands and seamounts	Neil C. Mitchell, UK; Rui Quartau, Portugal; Christoph Beier, Germany; David Barnes, UK; and Robert Turnewitsch, UK.	
2	Working group proposal on Oceanic Transform Faults	Marcia Maia, France; Barry Hanan, USA; Daniele Brunelli, Italy; and 15 members: France (3), Germany (4), Italy (3), Korea (1), Norway (1), Portugal (2), USA (1)	First meeting at the AGU Fall session in 2017 First workshop in 2018 Second workshop in 2021
3	Resources Exploration of Seafloor Massive Sulfides along Mid-Ocean Ridges	Chunhui Tao, China; Georgy Cherkashov, Russia; Chris German, USA; and 4 members: Canada (2), Germany (1), UK (1)	2-3 day InterRidge Theoretical Institute on a specific topic related to Resources Exploration of Seafloor Massive Sulfides along Mid-Ocean Ridges WG web site to include topical discussion, geographical discussion, data information, cruise information Foster and strengthen links to other efforts and programs towards the study of seafloor massive sulfides (e.g., ISA, IODP, other IR WGs, other SMS contractors etc.)
4	Proposal for an extension of the IR working group Circum-Antarctic Ridges	Anne Briais, France; Jian Lin, USA; Sung-Hyun Park, Korea, and 11 members: China (2), France (1), Germany (1), Italy (1), Japan (2), UK (2), USA (2)	WG web site to include topical discussion, geographical discussion, data information, cruise information coordinate cruises (cruise info), sample sharing, protocols to compare vent fauna new discussion will occur at the 2017 AGU Fall Meeting
5	IMOVE: Integrating Multidisciplinary Observations in Vent Environments	Thibaut Barreyre, Norway, and 10 members: Canada (1), France (3), Germany (1), Portugal (1), USA (4)	IMOVE workshop (w1) small workshop at the end of the first year IMOVE workshop (w2) larger workshop in the second/third year at least 2 reports a special issue

During the discussion, the Steering Committee has given recommendations to improve the proposals and make them compliant with the goals and practices of IR. The Committee has decided to support the creation of two new WGs, pending minor modifications of the proposal, and has recommended some more substantial improvements after which the three other proposals will be reconsidered, if the proponents choose to resubmit them. The discussions and recommendations are summarized as follows:

### Working Group 1 on mid-ocean ridge islands and seamounts.

Although of great interest, this proposal in its present form does not appear fully mature. However, it has a big potential by offering IR an opportunity to broaden its scope landward. Indeed, the transition from island to mid-ocean ridge is a place where many important processes can be described and analyzed.

The proposal needs to be sharpened by stating clear scientific questions that can be addressed and hopefully solved during the WG lifetime. A work plan and deliverables, that are lacking in the present version, should imperatively be added. The proposed WG should include more scientists to increase the multidisciplinary and international dimensions of the proposal. It has also been suggested to highlight the biological aspects of the ridge-island transition and to broaden the number of target areas in order to increase the generality of the results. Finally, the proponents should state why their proposed WG is important for InterRidge.



InterRidge encourages the proponents to modify their proposal in accordance with the above comments and to resubmit it as soon as possible. Should the proposal be resubmitted before the end of October 2017 the Steering Committee will discuss the proposal electronically and announce a decision by the end of this year. Otherwise the decision will be taken at the next Steering Committee meeting.

### **Working Group 2 on Oceanic Transform Faults.**

The topic of this WG proposal has been considered very interesting and important for IR. However the submitted text is too long. At the moment, the proposal is limited to geosciences – it has been suggested to consider potential biological aspects and try to involve biologists. The participation of scientists from China, Japan and Korea is recommended (Steering Committee members from these countries may provide names if needed). Conversely, topical specialists unrelated to the core of the project may be consulted but not necessarily be members of the WG to reduce an already long list of participants (e.g., the subduction specialists).

The Steering Committee recommends the creation of a new WG on Oceanic Transform Faults, pending the following improvements on the proposal: (1) revise the list of participants as suggested above, and (2) give more details on the work plan and the list of deliverables.

### **Working Group 3 on Resources Exploration of Seafloor Massive Sulfides along Mid-Ocean Ridges.**

The Steering Committee has no doubt that the topic of the proposed WG focuses on interesting and important problems which have to be addressed as mineral exploration progressively becomes a reality. However, it should be clear that an IR WG can only deal with the scientific aspects of exploration. If other aspects were considered, the WG analyses would mostly benefit to private or national interests, what is out of the scope of IR. IR should remain independent with respect to such interests if only to keep its international credit as an organization.

IR may support a revised version of this proposal, pending that the "specific scientific topics" to which the proposal refers are well defined and clear scientific objectives are indicated. Usually WG organize workshops whereas IR as a whole organizes "theoretical institutes". The Steering Committee members would appreciate knowing more about the scientific topic of the proposed workshop. A detailed work plan and realistic deliverables (i.e. not duplicating efforts that are conducted at the level of the IR Office) should complete the revised proposal.

InterRidge encourages the proponents to modify their proposal in accordance with the above comments and to resubmit it as soon as possible. Should the proposal be resubmitted before the end of October 2017 the Steering Committee will discuss the

proposal electronically and announce a decision by the end of this year. Otherwise the decision will be taken at the next Steering Committee meeting.

**Working Group 4: proposal for an extension of the IR working group Circum-Antarctic Ridges.**

The Steering Committee noted that the WG has been successful in making possible new collaborations between French, Korean, and American colleagues on the mid-ocean ridge located south of Australia and New Zealand. However, these collaborations are now established and running well, and the Steering Committee had a long discussion on the value added by extending the WG for three more years - WGs are by nature transient structures that should focus on a question in a limited time. The Committee agreed that the Circum-Antarctic Ridges have a huge potential for new discoveries, especially in biogeography, including the differences between biogeographic provinces and how they are colonized, and physical oceanography, with the major question of iron input from hydrothermal systems.

The Steering Committee therefore suggests major changes in the proposal, which should show a new emphasis on the biological and physical aspects. For this reason, the few new names added to the list of participants should be completed to reach a significant renewal and a focus on the new disciplines. There should be scientists from these fields among the WG chairs.

IR reserves an amount of 2000 \$ for a meeting aiming to wrap up the pending work of the existing WG and help preparing a new proposal to be submitted for the next Steering Committee meeting.

**Working Group 5: IMOVE: Integrating Multidisciplinary Observations in Vent Environments.**

The Steering Committee found this interdisciplinary and international proposal timely and convincing. It is recommended to involve scientists from China, Japan and Korea. The Steering Committee would also like appreciate a commitment to provide a direct access to the proposed database from the IR website. This would increase the visibility of the WG 'final product' and would help promoting IR.

Pending these minor modifications, the Steering Committee recommends the creation of a new WG on Integrating Multidisciplinary Observations in Vent Environments (IMOVE).

## 9A Validation of IR and IR/ISA Endowment Fund Fellowships

Until 13<sup>th</sup> June 2017 (the deadline for application submissions), the Office has received a total number of 5 applications, including 2 to the IR/ISA Endowment Fund fellowships. Details of these applications are presented in the table below.

Nb	Fellowship type	Title of proposal	Level	Applicant contact information:	Current advisor(s) contact information:	Proposed sponsor(s) contact information:	Project period	Funds requested
1	IR	Geology, structure, and geodynamic evolution of the Jean Charcot Troughs, northern New Hebrides backarc	Postdoctoral researcher	Melissa O. Anderson	Mark Hannington	Sven Petersen	1 Dec, 2017 – 1 Aug, 2018	5000\$
				University of Ottawa	University of Ottawa	GEOMAR Helmholtz Centre for Ocean Research Kiel		
				Nationality: Canadian, gender: female	Letter of support: YES	Letter of support: YES		
2	IR	GDGT, LCA and LCD signature for the impact of hydrothermal activity on carbon cycle and paleoclimatic information of Southern Central Indian Ridge	Graduate student	Umoh, Unyime Udouo	Li Li	Schwarz-Schampera, Ulrich	11 months	4460\$
				School of Ocean and Earth Science, Tongji University China	School of Ocean and Earth Science, Tongji University China	Federal Institute for Geosciences and Natural Resources (BGR)		
				Nationality: Nigerian, gender: male	Letter of support: YES	Letter of support: YES		
3	IR/ISA	Understanding the effect of bottom topography on the dynamics of the Southern Ocean and Chandler wobble using an eddy-resolved ocean dynamics model	Postdoctoral researcher	Seyedeh Elnaz Naghibi	Sergey Karabasov	Igor Kamenkovich	4 months	3960\$
				School of Engineering and Materials Science, Queen Mary University of London	School of Engineering and Materials Science, Queen Mary University of London	Rosenstiel School of Marine and Atmospheric Science, University of Miami		
				Nationality: Iranian, gender: female	Letter of support: YES	Letter of support: YES		
4	IR/ISA	Dissolved trace metal studies of hydrothermal plumes over 23°-25°S, Central Indian Ridge, Indian Ocean	Postdoctoral researcher	Surya Prakash L.	John P. Kurian	Joseph Resing	4 weeks	5000\$
				National Centre for Antarctic and Ocean Research	National Centre for Antarctic and Ocean Research	NOAA-Pacific Marine Environmental Laboratory and JISAO-Uni. of Washington		
				Nationality: Indian, gender: male	Letter of support: YES	Letter of support: YES		
5	IR	Ferromanganese crusts from Canary Islands Seamount Province compared with Mid Atlantic Ridge: High resolution studies and Fe isotopic signatures	Graduate student	Egidio Marino	Francisco Javier González Sanz	James R. Hein	11 months	5000\$
				Geological Survey of Spain	Geological Survey of Spain (IGME)	United States Geological Survey (IUGS)		
				Nationality: Italian, gender: male	Letter of support: YES	Letter of support: YES		

Steering Committee members have proposed reviewers upon solicitation of the Office. Applications were sent for evaluation to 3-5 experts in the field of the application. Up to 3 reviews for each proposal were received before the Steering Committee meeting. The anonymous evaluations were presented to the Steering Committee during the meeting and each application was discussed individually before taking the final decision.

The Steering Committee has accepted three applications, has rejected one and has given a recommendation to re-submit one.

The application of Melissa Anderson has been rejected as not establishing a new collaboration beneficial to the applicant, a key condition to be supported by our program. Although the project was well written and interesting, it did not meet the criteria for funding by InterRidge.

The application of Unyime Umoh has been recommended for re-submission if some clarifications are given by the applicant. Comprehensive lipid biomarker studies in deep-sea hydrothermal systems are still sparse, therefore the general research idea of the proposal is interesting. However, the paleoclimate approach was not understood, especially as the focus of the cruise is exploration of polymetallic sulphides. Sampling strategy and some background information are missing. What is already known from that vent site? What has been done by others? Steering Committee members questioned whether the results will be published in scientific journals or in the confidential cruise report only. IR requires that results from all projects developed with its funding are publicly accessible through scientific publications.

The applications of Seyedeh Elnaz Naghibi, Surya Prakash and Edigio Marino have been accepted for funding.

## 9B Validation of IR Cruise Bursaries Applications

Six applications have been received by the Office before the date of the Steering Committee meeting. Details of these applications are presented in the table below.

Nb	Applicant details:	Cruise details:	Host scientist details:	Chief Scientist details (if different to host scientist):
1	<b>Name: Emmanuel Quayson (PhD student)</b>	<b>Cruise ID: INDEX2017</b>	Name: Dr. Ulrich Schwarz-Schampera	
	Kobe University, Kobe, Japan	Cruise location: German license area, international waters of the western Indian Ocean	The Federal Institute for Geosciences and Natural Resources, BGR, Germany	
	native language: ENGLISH	Start date: 24th August, 2017		
	fluency in other languages: FRENCH AND NORWEGIAN (Writing)	End date: 13th October, 2017		
	<b>country of origin: GHANA</b>	Ship name: German research vessel TFS SONNE		
gender: male	Required travel funds : 2000\$			
2	<b>Name:Unyime Udoudo Umoh (PhD Student)</b>	<b>Cruise ID: INDEX2017</b>	Name: Prof. Li Li	Name: Schwarz-Schampera, Ulrich
	School of Ocean and Earth Science, Tongji University China	Cruise location: Western Indian Ocean	School of Ocean and Earth Science, Tongji University China	Federal Institute for Geosciences and Natural Resources (BGR)
	native language: ENGLISH	Start date: 24th August 2017		
	fluency in other language: CHINESE	End date: 13th October 2017		
	<b>country of origin: NIGERIA</b>	Ship name: TFS SONNE		
gender: male	Required travel funds : 1970\$			
3	<b>Name: Audrey Mat (post-doc)</b>	<b>Cruise ID: Momarsat 2017</b>	Name: Marjolaine Matabos	Name: Pierre-Marie Sarradin
	Université de Bretagne Occidentale / LabexMER	Cruise location: Azores, Horta (Ile de Faial Portugal)	Ifremer	Ifremer
	native language: FRENCH	Start date: 8/7/2017		
	fluency in other language: ENGLISH, notions in FLEMISH	End date: 28/7/2017		
	<b>country of origin: BELGIUM</b>	Ship name: Pourquoi Pas ?		
gender: female	Required travel funds : 1865\$			
4	<b>Name: Zhongwei Zhao (PhD student)</b>	<b>Cruise ID: PLATMAR2</b>	Name: Rui Quartau	
	Institution: The University of Manchester	Cruise location: Santa Maria, Azores	Portuguese Hydrographic Institute	
	native language: CHINESE	Start date:25/07/2017		
	fluency in other language: ENGLISH	End date:11/08/2017		
	<b>country of origin: CHINA</b>	Ship name: R/V Arquipélago		
gender: male	Required travel funds : 2000\$			
5	<b>Name: Alexander Diehl (PhD student)</b>	<b>Cruise ID: not jet fixed</b>	Name: Susan Humphris	
	University of Bremen/Department of Geosciences	Cruise location: Brothers Volcano, off New Zealand	Woods Hole Oceanographic Institution	
	native language: GERMAN	Start date: 26 December, 2017		
	fluency in other language: ENGLISH	End date: 14 January, 2018		
	<b>country of origin: GERMANY</b>	Ship name: RV Thompson		
gender: male	Required travel funds : 2963\$			
6	<b>Name: Jean-Arthur Olive (post-doc → researcher)</b>	<b>Cruise ID: Popping Rocks 2018</b>	Name: Adam Soule	Name: Mark Kurz
	Lamont-Doherty Earth Observatory / Columbia University	Cruise location: 14oN, Mid-Atlantic Ridge	Institution: Woods Hole Oceanographic Institution	Institution: Woods Hole Oceanographic Institution
	native language: FRENCH	Start date: May 16, 2018 (St. George's, Bermuda)		Name: Eric Mittelstaedt (co-chief scientist)
	fluency in other language: ENGLISH	End date: June 17, 2018 (St. George's, Bermuda)		Institution: University of Idaho
	<b>country of origin: FRANCE</b>	Ship name: R/V Atlantis		
gender: male	Required travel funds : 1800\$			

The application of Zhongwei Zhao (number 4) has been accepted by the Office as matching all the selection criteria and because of a short timing before the cruise. The application of Audrey Mat (number 3) has been rejected at the same time as not fitting the requirement for opening a new international cooperation to the benefit of the fellow.

After the discussion at the meeting, the Steering Committee gave its feedback on 4 other applications (1, 2, 5 and 6). One more application has been accepted, while three others rejected by the members of the Steering Committee.

The application of Alexander Diehl (nb 5) has been accepted for funding with the limit of 2000\$.

The proposals of Emmanuel Quayson (nb 1), Unyime Umoh (nb 2) and Jean-Arthur Olive (nb 6) did not match the criteria for funding by InterRidge. The first two cannot be eligible as the focus of the cruise is exploration of polymetallic sulphides in the framework of ISA contracts, which results may not be published in scientific journals but limited to confidential cruise reports. The application of Jean-Arthur Olive could not be supported

because the applicant has obtained a permanent position in France and will no longer be a post-doctoral researcher during the cruise.



## 10 Budget 2017 and preliminary Budget 2018

The budget of InterRidge for 2017 and the preliminary budget for 2018 have been introduced by Jérôme Dymont and are summarized in the tables below.

### Budget 2017

Incomes	Bid 2015 (pessimistic) [\$]	Arrived 2017 [\$]	Expected 2017 [\$]	Total 2017 [\$]
Host country	25 000.00	25 000.00		25 000.00
Principal Members	100 000.00	50 000.00	50 000.00	100 000.00
Associate members	25 000.00	5 000.00	25 000.00	30 000.00
Unpaid due				
Contingency fund		66 615.00		66 615.00
<b>TOTAL</b>	<b>150 000.00</b>	<b>80 000.00</b>	<b>75 000.00</b>	<b>155 000.00</b>

Expenses	Planned 2016 [\$]	Spent 2017 [\$]	Expected 2017 [\$]	Total 2017 [\$]
<b>Salaries</b>				
Salary – Coordinator	65 000.00	15 000.00	30 000.00	45 000.00
<b>Total Salaries</b>	<b>65 000.00</b>	<b>15 000.00</b>	<b>30 000.00</b>	<b>45 000.00</b>
<b>Office</b>				
Travel expenses	10 000.00	6 490.00	4 100.00	10 590.00
Steering Committee Meeting	2 000.00		2 000.00	2 000.00
Supplies/Telephone/Communications	1 000.00	2 000.00	500.00	2 500.00
Overheads	18 000.00			
<b>Total Office</b>	<b>31 000.00</b>	<b>8 490.00</b>	<b>6 600.00</b>	<b>15 090.00</b>
<b>Member benefits</b>				
IR Fellowship	20 000.00		20 000.00	20 000.00
IR Cruise bursaries	9 000.00		10 000.00	10 000.00
IR Student poster award	2 000.00		2 000.00	2 000.00
IR Workshops, IR working groups	20 000.00		15 000.00	15 000.00
IR News	3 000.00		6 000.00	6 000.00
IR Web Site		1 500.00		1 500.00
<b>Total Member benefits</b>	<b>54 000.00</b>	<b>1 500.00</b>	<b>53 000.00</b>	<b>54 500.00</b>
Contingency fund		66 615.00		66 615.00
<b>TOTAL</b>	<b>150 000.00</b>	<b>24 990.00</b>	<b>89 600.00</b>	<b>114 590.00</b>

Ratio Benefits : Office (wo salaries)	1.74		3.61
Ratio Benefits : Office (with salaries)	0.56		0.91

<b>Budget 2017-2018</b>
-------------------------

<b>Incomes</b>	Bid 2015 (pessimistic) [\$]	Arrived 2017 [\$]	Expected 2017 [\$]	Total 2017 [\$]	Planned 2018 [\$]
Host country	25 000.00	25 000.00		25 000.00	25 000.00
Principal Members	100 000.00	50 000.00	50 000.00	100 000.00	100 000.00
Associate members	25 000.00	5 000.00	25 000.00	30 000.00	30 000.00
Unpaid due					
<i>Contingency fund</i>		66 615.00		66 615.00	66 615.00
<b>TOTAL</b>	<b>150 000.00</b>	<b>80 000.00</b>	<b>75 000.00</b>	<b>155 000.00</b>	<b>155 000.00</b>

<b>Expenses</b>	Planned 2016 [\$]	Spent 2017 [\$]	Expected 2017 [\$]	Total 2017 [\$]	Planned 2018 [\$]
<b>Salaries</b>					
Salary – Coordinator	65 000.00	15 000.00	30 000.00	45 000.00	65 000.00
<b>Total Salaries</b>	<b>65 000.00</b>	<b>15 000.00</b>	<b>30 000.00</b>	<b>45 000.00</b>	<b>65 000.00</b>
<b>Office</b>					
Travel expenses	10 000.00	6 490.00	4 100.00	10 590.00	14 000.00
Steering Committee Meeting	2 000.00		2 000.00	2 000.00	2 000.00
Supplies/Telephone/Communications	1 000.00	2 000.00	500.00	2 500.00	1 000.00
Overheads	18 000.00				
<b>Total Office</b>	<b>31 000.00</b>	<b>8 490.00</b>	<b>6 600.00</b>	<b>15 090.00</b>	<b>17 000.00</b>
<b>Member benefits</b>					
IR Fellowship	20 000.00		20 000.00	20 000.00	30 000.00
IR Cruise bursaries	9 000.00		10 000.00	10 000.00	10 000.00
IR Student poster award	2 000.00		2 000.00	2 000.00	3 000.00
IR Workshops, IR working groups	20 000.00		15 000.00	15 000.00	20 000.00
IR News	3 000.00		6 000.00	6 000.00	6 000.00
IR Web Site		1 500.00		1 500.00	
<b>Total Member benefits</b>	<b>54 000.00</b>	<b>1 500.00</b>	<b>53 000.00</b>	<b>54 500.00</b>	<b>68 000.00</b>
<i>Contingency fund</i>		66 615.00		66 615.00	70 615.00
<b>TOTAL</b>	<b>150 000.00</b>	<b>24 990.00</b>	<b>89 600.00</b>	<b>114 590.00</b>	<b>151 000.00</b>

Ratio Benefits : Office (wo salaries)	1.74			3.61	4.00
Ratio Benefits : Office (with salaries)	0.56			0.91	0.83

The presentation by Jérôme Dymont has been followed by the general discussion concerning the budget management. The Steering Committee members have suggested to:

- add the IR website upgrade costs with high priority,
- not to increase the contingency fund,
- keep some money for the organization of a Theoretical Institute next year (the topic of which has to be a subject of wider discussion),
- organize the second round of IR Fellowships in 2017,
- add some promotion costs to the planned expenses.

The adjusted funding plan has been accepted unanimously by the Steering Committee members.

## **11 Discussion 1: improving IR rules for more efficiency**

### **(1) Reform of the IR Reform about budget use**

The main discussion on the InterRidge budget took place after the presentation of the budget of InterRidge for 2017 and the preliminary budget for 2018. However, according to the IR Reform about budget use only 5000\$ out of 25000\$ contribution of a Principal Member can be used for office expenses. Thus, if the number of Principal Members is low, there are difficulties to respect this rule. During the discussion, it has been suggested to remove or modify this rule. Finally, it has been decided that the Steering Committee will validate the expenses of the Office each year.

### **(2) Earlier bid for a better transition to next Office**

The Steering Committee has agreed that a bid for the next IR Office should take place earlier in order to ensure a better transition of the Office to the following host country. It has been suggested to choose the successor between 1 and 1,5 year before the end of the current presidency.

### **(3) Role and rotation of National correspondents**

Lack of contact with or any answer from some National Correspondents representing several Corresponding Member countries or regions has an impact on potential interactions between scientists unified in InterRidge. In order to avoid this kind of problem in future, Steering Committee recommends to:

- (a) remind duties of National Correspondents (reports on national activity, mediation)
- (b) require periodical confirmation or recommendation from the local community
- (c) replace inactive correspondents if there is no feedback during a longer period

## **12 Discussion 2: IR – SCOR interaction on the International Indian Ocean Expedition (IIOE2)**

The Steering Committee has recommended to wait for more details before supporting the International Indian Ocean Expedition, however individual groups are encouraged to organize their collaborations and participate to the cruises.

## **13 Discussion 3: Update of the IR Code of Conduct**

Since the creation of the current version of the Code of Conduct in 2006, scientific research, instruments, analytical methods and potential dangers for the deep-sea have evolved. In order to adapt the limits of responsible conduct of the deep-sea research, it is high time to revise the current version of this set of recommendations. The Steering Committee has discussed the road-map for an update of the IR Code of Conduct and agreed that before its next meeting in 2018, feedback from the community should be collected. Nadine Le Bris will introduce this subject at the CBE6 Symposium in September 2017 in Woods Hole and will launch the discussion via e-mail or discussion forum. The first

ideas, mainly from the biological science community will be then presented to the earth science community at the AGU Fall Meeting in December 2017 in New Orleans. The importance of the opinion and input of young scientists to this task, has been highlighted. The feedback from all these meetings and relevant discussions should be consulted with the authors of the current version. Further decisions and an eventual creation of the Working Group dedicated to prepare the new revision of the Code of Conduct will be taken at the next Steering Committee meeting.

#### **14 Discussion 4: Position of InterRidge with regard to requests related to mineral exploration and exploitation: what are the limits?**

The main question of this discussion concerned the criteria that a given project should match to be supported by InterRidge (both by affiliation or by financial support). InterRidge should be still considered as neutral organization promoting knowledge and science-based expertise, that is why the Steering Committee members agreed that such a project should have a scientific value. Projects with mining or economic activities only should not be considered. Data from the InterRidge-supported project should be published in scientific peer-reviewed journals. It is also strongly recommended that the proponents adopt the InterRidge Code of Conduct on research practices at deep-sea hydrothermal vents.

#### **15 Discussion 5: InterRidge participation at ISA 23<sup>rd</sup> Session**

Since 2012, InterRidge has been granted observer status at the ISA, allowing InterRidge to be present at public meetings of the Assembly and by invitation, to make oral statements on issues of concern, although it will not be able to participate in decision-making. This increases our links with the ISA and will strengthen our ability to engage with developing countries, which remains one of InterRidge's main challenges.

Two members of the Office will attend the 23<sup>rd</sup> Session of ISA on 8-18 August 2017. The presence of the IR Office in Kingston will give the opportunity to discuss many aspects of IR – ISA collaboration like the joint fellowships, reports on IR activity, and will open the discussion about legal questions concerning research activity in the area of permits. The main questions that raised at the meeting are:

What kind of activity can have scientists that do not have a permit?

What are the duties of scientists conducting research in such areas?

What are the rights of biologists?

The Steering Committee would like to get a feedback from the IR Office participation at the ISA 23<sup>rd</sup> Session.

#### **16 Discussion 6: InterRidge in 2018 – 2019**

The IR Office was in transit to France and had a limited activity during 2016 because of administrative issues. The final establishment of an operational office has been delayed until 2017. According to the bid at the last Steering Committee meeting in China in 2015, the French presidency of InterRidge has been expected for 2016-2018. This would mean

that many aspects of the proposal could not be fulfilled before the end of the French chair. The first point of the discussion concerned the possibility of the extension of French presidency until 2019. Even if this option is still not sure, mainly because of necessity to get a positive feedback from funding agencies, the Steering Committee members agreed unanimously not to count the year 2016 and postpone the Office rotation to the end of 2019. In order to convince the French funding agencies, IR Office should clearly indicate the objectives of this prolongation. It has been decided to organize the Theoretical Institute, to launch the update of the Code of Conduct and to highlight the importance of Working Groups. The Steering Committee members would like to stay informed about the evolution of this proposition, to have enough time for reaction in case if it is not possible. In this case, the bid should be organized at the beginning of 2018.

The Theoretical Institute should be organized in the 2<sup>nd</sup> half of 2018 or in 2019. The Steering Committee members, having supported this idea, will help the Office by collecting ideas for such an Institute within the community. The Office is supposed to launch a call for proposal for the topic and all the suggestions for the organization of the Theoretical Institute and will distribute the results of consultations to the Steering Committee members for validation. It has been decided to keep the same formula as previously (classes and scientific lectures, poster sessions and travel bursaries for young scientists to join the meeting). The location remains open.

#### **17 Next Steering Committee meeting location and date**

Cédric Hamelin has proposed to organize the next Steering Committee meeting in Bergen (Norway) in May 2018. This proposition has been accepted.

Kim Juniped would like to propose to host a future IR Steering Committee meeting in Victoria (British Columbia, Canada) in 2019.

## **18 List of actions**

- (1) National Updates
- (2) Reports from Working Groups
- (3) Add cruises to the database on the website – Steering Committee members shall send the relevant information from their countries
- (4) Creation of new Working Groups – summarize the decisions, ask for revisions
- (5) IR (and IR-ISA) Fellowships and Cruise Bursaries – send the decisions, prepare payments
- (6) Budget – actualize with all the corrections and decisions of the Steering Committee
- (7) Discussions:
  - i. Discussion 1: Summarize the three points on improving IR rules for more efficiency.
  - ii. Discussion 2: Jérôme Dymont will represent InterRidge during the SCOR meeting and will prepare a report.
  - iii. Discussion 3: Nadine Le Bris will introduce the need for update of the IR Code of Conduct at the CBE6 Symposium and will launch a discussion; first ideas will be collected and presented at the AGU Fall meeting. Suggestions for the modifications of the Code of Conduct will be discussed at the next Steering Committee meeting.
  - iv. Discussion 4: Requests related to mineral exploration and exploitation addressed to InterRidge must respect two key conditions:
    - (a) results of the research can be published in peer-reviewed journals,
    - (b) researchers should respect the IR Code of Conduct.
  - v. Discussion 5: InterRidge Office will report on its participation at the ISA 23<sup>rd</sup> Session.
  - vi. Discussion 6: To postpone the Office rotation to the end of 2019, the proposal will be submitted to the French funding agency.
- (8) Next Steering Committee meeting will take place in May 2018 in Bergen (Norway).

## **19 Meeting adjourns**

Jérôme Dymont thanked for the attendance of the Steering Committee members and declared the meeting adjourn.



## APPENDIX I

### InterRidge Chairs and Coordinators – Past and Present

#### InterRidge Chairs:

Jérôme Dymont, co-chair (France)	2016 –
Nadine Le Bris, co-chair (France)	2016 –
John Chen, chair (China)	2013 – 2015
Jiabiao Li, co-chair (China)	2013 – 2015
Bramley Murton, chair (UK)	2010 – 2012
Jon Copley, co-chair (UK)	2010 – 2012
Jian Lin, chair (USA)	2007 – 2009
Chris German, co-chair (USA)	2007 – 2009
Colin Devey, chair (Germany)	2004 – 2006
Kensaku Tamaki, chair (Japan)	2000 – 2003
Mathilde Cannat, chair (France)	1997 – 1999
Roger Searle, chair (UK)	1994 – 1996
John Delaney, co-chair (USA)	1991 – 1993
H. David Needham, co-chair (France)	1991 – 1993

#### InterRidge Coordinators:

Kamil Szafranski	Apr 2017 –
Zengxi Ge	Jan 2013 – Dec 2015
Debbie Milton	Jan 2010 – Dec 2012
Stace Beaulieu	Oct 2007 – Dec 2009
Rhian Waller	Jan – Oct 2007
Sabine Lange	July – Dec 2006
Valérie Epplé	May – July 2006
Kristen Kusek (Education & Outreach)	Mar 2004 – Dec 2007
Katja Freitag	Mar 2004 – May 2006
Agnieszka M. Adamczewska	Nov 1999 – Mar 2004
Cara Wilson	Mar 1997 – Nov 1999
Ruth Williams (acting)	Oct 1996 – Mar 1997
Heather Sloan	Oct 1993 – Oct 1996
Trileigh Stroh	1991 – Oct 1993