



InterRidge

Steering Committee Meeting Report 2013

**Victoria, BC, Canada
16-17 August 2013**

**Chair, John Chen
Co-Chair, Jiabiao Li
Coordinator, Zengxi Ge**

October 2013

InterRidge Office
Institute of Geophysics
School of Earth and Space Sciences
Peking University
Beijing, China
Tel: +86 10 6275 6445
Fax: +86 10 6276 5854
Email: coordinator@interridge.org

List of Participants

1. **John Chen** (Chair,2013)
Institute of Theoretical and Applied
Geophysics
School of Earth and Space Sciences
Peking University, Beijing, 100871, China
johnyc@pku.edu.cn
2. **Stace Beaulieu** (USA, IR coordinator, 2006)
MS #7, Blake 203
Research Specialist, Biology
Woods Hole Oceanographic Institution
Woods Hole, MA 02543, USA
stace@whoi.edu
3. **Toshiya Fujikura** (Japan, 2013)
JAMSTEC
2-15 Natsushima-cho,
Yokosuka 237-0061, Japan
fujikura@jamstec.go.jp
4. **Zengxi Ge**(IR Coordinator, 2013)
Institute of Theoretical and Applied
Geophysics
School of Earth and Space Sciences
Peking University, Beijing, 100871, China
interridge@gmail.com
5. **Richard Hobbs** (UK, 2011)
Dept. of Earth Sciences
Durham University
South Road
Durham DH1 3LE, UK
r.w.hobbs@durham.ac.uk
6. **Stephane Hourdez**(WG Chair)
Station Biologique de Roscoff
CNRS-UPMC, UMR 7144
Genetique des Adaptations aux Milieux
Extremes
29680 Roscoff, France
Tel: +33-(0)298-29-2340
Fax: +33-(0)298-29-2324
hourdez@sb-roscoff.fr
7. **Kim Juniper** (Canada, 2012)
NEPTUNE Canada
University of Victoria
P.O. Box 1700
Victoria, BC V8W 2Y2 Canada
kjuniper@uvic.ca
8. **Marcia Maia** (France,2013)
Laboratoire Domaines Oc éaniques
UMR CNRS UBO 6538
Institut Universitaire Europ éen de la Mer
29280 Plouzan é France
Tel: 98 49 87 19
marcia.maia@univ-brest.fr
9. **Richard Lee** (USA, Alternate)
School of Biological Sciences
Washington State University
PO Box 644236
Pullman WA 99164-4236
rwlee@wsu.edu
10. **Jiabiao Li** (Co-China, 2013)
Second Institute of Oceanography, SOA
P.O. Box 1207, Hangzhou, 310012, Zhejiang,
China
jbli@sio.org.cn
11. **Nadine Le Bris** (France,2009)
Université Pierre et Marie Curie
Laboratoire Arago]
66650 Banyuls-sur-Mer, France
Tel : +33 04 30 19 24 14
lebris@obs-banyuls.fr
12. **Sung-Hyun Park** (Korea, 2007)
Korea Polar Research Institute
Songdo Techno Park
7-50 Songdo-dong, Yeonsu-gu
Incheon 406-840, South Korea
Tel :+82-32-260-6119
shpark314@kopri.re.kr
13. **Michinari Sunamura** (Japan, 2010)
University of Tokyo
Dept. of Earth & Planetary Science
7-3-1 Hongo, Bunkyo-ku, Tokyo
113-0033 Japan
Tel: +81-3-5841-4520
sunamura@eps.s.u-tokyo.ac.jp

Absent Steering Committee Members:

Colin Devey (Germany, 1999)

Nicole Dubilier (Germany, 2004)

Pedro Ferreira (Portugal, 2009)

Dan Fornari (USA, 2009)

Rolf Pedersen (Norway, 2001)

Kamesh Raju (India, 2005)

Table of Contents

1	Welcome and introduction	9
2	Accept 2012 meeting report, accept 2013 meeting agenda, and confirm Steering Committee Members.....	9
3	InterRidge Office	9
3.a	Coordinator – Update	9
3.a.i	Working Groups.....	9
3.a.iii	Member Database Website and email lists.....	10
3.a.iii	Cruise and Vents Databases.....	10
3.b	InterRidge Education and Outreach – Update.....	10
3.b.i	InterRidge Student and Postdoctoral Fellowship Programme.....	10
3.b.iii	Cruise bursaries.....	11
4	National updates.....	12
4.a	Principal Members	12
4.b	Associate and Corresponding Members.....	25
5	Current working groups – Updates	27
5.a	Arc-backarc Systems.....	27
5.b	Circum-Antarctic.....	27
5.c	Hydrothermal Energy and Ocean Carbon Cycles.....	27
5.d	Oceanic Detachment Faults.....	28
5.e	Seafloor Mineralisation.....	29
5.f	SMART (South Mid Atlantic Ridge Targeted Exploration)	30
5.g	Vent Ecology	30
5.h	Discussion future of Working Groups.....	31
6	Workshop and meetings	32
7	Discussion about the mandate of the industry Liaison Committee	32
8	Future of InterRidge – The Grand Mission.....	33
9	InterRidge Finances.....	34
9.a	InterRidge Budget 2013.....	34
9.b	Status of payment of billed nations.....	34
10	Next StCOM meeting location and date.....	34
11	Meeting Adjourns.....	34

Appendices

APPENDIX I

InterRidge Chairs and Coordinators; Steering Committee Members;
National Correspondents Appendices pg. 36

APPENDIX II InterRidge Budget for 2013; Appendices pg. 40

Meeting Agenda Day 1, Friday 16th August, 2013; 9:00AM – 5:00PM

1	9:00	Welcome and introduction	J. Chen and J. Li
2	9:15	Accept 2012 meeting report, accept 2013 meeting agenda, and confirm Steering Committee Members;	J. Chen and J. Li
3 A	9:30	InterRidge Office Coordinator's report ✓ Working Groups ✓ InterRidge Fellowship and Postdoctoral Fellowship Programme ✓ Cruise bursaries ✓ Membership ✓ Updating of Vent Database	Z. Ge
10:00 GROUP PHOTO AND COFFEE BREAK			
4 A	10:15	National updates Principal members	China – J. Li France –M. Maia Germany – (absent) Japan – M. Sunamura UK – R. Hobbs USA – R. Lee.
4 B	11:15	Associate and corresponding members	India-- absent Korea – S-H Park Norway –absent Canada – K. Juniper Portugal -absent
12:30 LUNCH			
5 A B C D E F G	14:00	Working groups – updates: Island Arc and Backarc (BI-ARC) Circum-Antarctic Hydrothermal Energy and Ocean Carbon Cycles Oceanic Detachment Faults Sea Floor Mineralization SMART Vent Ecology	Absent S-H Park N LeBris Z. Ge Absent Absent S. Hourdez
15:45 COFFEE BREAK			
5 H	15:00 – 17:00	Discussion of Working Groups	J. Chen
18:30 End of Day 1; DINNER			

Meeting Agenda Day 2, Saturday 17th August, 9:00AM – 3:00PM

6	9.00	Workshop and Meetings	J. Chen
7	10:00	Discussion about the mandate of the Industry Liaison Committee.	K. Juniper
10:30 COFFEE BREAK			
8	10:45	InterRidge finances: IR Budget 2013 Status of billed nations	J. Chen
10	11:45	Next Steering Committee meeting location and date	J. Chen
11	12:00	Meeting adjourns	J. Chen and J. Li

1 Welcome and introduction

The agenda of the 2012 Steering Committee meeting was circulated electronically to all Steering Committee members, Working Group Chairs and guests prior to the meeting. John Chen welcomed the StComm members and guests to the meeting and thanked Dr. Kim Juniper, our host at Ocean Networks Canada, University of Victoria, who helped in the organisation of the meeting.

Apologies were received from Jon Copley, Colin Devey, Nicole Dubilier, Pedro Ferreira, Dan Fornari, Sung-Hyun Park, Rolf Pedersen and Kamesh Raju.

2 Accept 2012 meeting report, accept 2013 meeting agenda, and confirm Steering Committee Members

The 2012 Steering Committee Meeting Report, finalised in October 2012 by former coordinator, Debbie Milton and available on the IR website at: <http://www.interridge.org/stcom/reports> was accepted, as was the 2013 Agenda. At the 2013 Meeting, we welcomed Raymond Lee, who acted as alternate for Dan Fornami (USA). Marcia Maia attended as the new StComm member and National Correspondent for France and Toshiya Fujiwara attended as the new StComm member of Japan.

3 InterRidge Office

3.a Coordinator – Update

Coordinator Presentation

Zengxi Ge, InterRidge Coordinator, highlighted the activities below.

Major activities for the Coordinator since the 2012 StComm meeting included:

- Last quarter of 2012: produced InterRidge News 2012 by Debbie Milton; prepared the Third Decadal Plan meeting in San Francisco; follow up of issues from 2012 StComm meeting.
- First quarter of 2013: Change of IR office from NOC, Southampton, UK to PKU, Beijing, China
- Second quarter of 2012: Evaluation and selection of 2013 InterRidge and InterRidge/ISA Student/Post-doc Fellowships; Steering Comm meeting preparation
- Expected 3rd quarter of 2013: follow up of issues from 2013 StComm meeting.
- Expected 4th quarter of 2013: production of annual IR Newsletter; AGU ridge related sessions and posters.

On-going activities for the Coordinator since the 2011 StComm meeting included:

- invoices to member nations, payments to IR-sponsored meetings;
- bi-weekly e-newsletters;
- education and outreach activities.

3.a.i. Working Groups

At the 2012 StComm meeting and since, there is one new working group.

New WGs

Circum-Antarctic Ridges Co-Chairs: Anne Briaes, Jian Lin and Sung-Hyun Park **3-year extension**

Seafloor Mineralisation Chair: Maurice Tivey

No new proposal for working groups

3.a.ii. Website and email lists

Daily activities at the IR office include posting events, news and jobs to the website. Since 1st Jan 2013, 15 emails have been posted with IR bi-weekly news to the interridge-mail emailing list. As of July 2012, there were 1217 members on this list. In addition, the IR bi-weekly news e-mails are transmitted to the InterRidge-Japan e-mail list. With regards to the interridge-classifieds emailing list, as of July 2012 there were 202 members on this list.

3.a.iii. Member Database Website and email lists

As of July 2013, the Member Database contained 1627 registered members from 63 different countries. Very few people now register as IR members, and even fewer give more than minimum data about themselves.

3.a.iii. Updating Vents Databases

The vent database is updated to version 3. In the new version the InterRidge Vents Database has joined the semantic web of Linked Data. We migrated the database to Drupal 7, still an open source content management system and now with Resource Description Framework (RDF) web services in its core.

We implemented additional contributed modules for query over the web using the SPARQL standard. Most database content and taxonomy terms are currently mapped to default RDF namespaces, with three important exceptions: we mapped the “vent field” content type to

- (1) an rdf: type for hydrothermal vents in a semantic knowledge base
- (2) to an rdf:type for geographical features from the Open Geospatial Consortium (<http://www.opengis.net/rdf#>)
- (3) we mapped the latitude and longitude positions of the vent fields to a semantic vocabulary for the WGS84 geodetic reference datum

Another new feature in Version 3 is live Google mapping of vent field positions..

3.b InterRidge Education and Outreach – Update

The interridge office award five InterRidge Student and Postdoctoral Fellowships and the InterRidge Cruise Travel Bursary Scheme has awarded 6 students in 2013.

3.b.i. InterRidge Student and Postdoctoral Fellowship Programme

There were six applicants for InterRidge Fellowships this year, and two applications for the ISA award, creating competition for the first time and evidence of the growth of this scheme in developing nations. We expect to award 5 Fellowships later 2013: three supported by InterRidge and two by the ISA Endowment Fund.

Recommended as IR Fellows:

Lily Muller - a PhD student at NOC Southampton, UK

Phillipp Nasemann - a PHD student at Otago University, New Zealand

Szitkar Florent - a PHD student at Institut de Physique du Globe, Paris, France *Recommended as ISA Endowment Fund*

Fellows: (to be confirmed by the ISA Advisory Board on 6th June 2012)

Xinxu Zhang - a PhD student at Shanghai Jiaotong University, Shanghai, China

R. Rajasabapathy - a PhD student at NIO, India

Advertising this year included the InterRidge e-mailing list and website, and through the IR website.

3.b.iii. Cruise bursaries

This scheme is becoming increasingly known. In 2013 we have six participants in the scheme. The French, Canadian and US ridge communities are playing a leading role.

Host Scientist	Cruise location and date	Recipient
Francis Lucazeau(France)	Oceanographer-Hayes 1 (OH1, Fig. 1), at 35°N.	Aldina Piedade (Cardiff University,UK) Ana Hipólito (Universidade dos Açores, Portugal)
Kim Juniper (Canada)	Endeavour	Daphne Cuvelier (UK)
Juan Pablo Canales(USA)	the Rainbow hydrothermal field area	Omar Benazzouz(Portugal) Michele Paulatto(UK) Maja Fabeta(Ireland)

4 National updates

As of May 2012, the total IR regional/national membership is 31.

4.a Principal Members

China National Update 2013

Report by Y. John Chen and Jiabiao Li, Co-Chairs, Steering Committee of InterRidge China
johnyc@pku.edu.cn; jbli@zgb.com.cn

The China ridge community pays more attention to the geological and ecological processes of the global mid-ocean ridges and their hydrothermal vents, completed several ridge cruises and developed some deep sea scientific equipment in 2012-13.

Ridge-Crest Surveys

In 2012, Chinese scientists used two research vessels to conduct their ridge-crest survey. Geology and ecosystem for active hydrothermal vents have been investigated during 6 consecutive ridge cruise legs on the Carlsberg Ridge and Mid-Atlantic Ridge on board R/V “*Dayang Yihao*” in April to October 2012. At the same time, a geophysical survey including multibeam bathymetry, gravity, and magnetics were conducted on the Carlsberg Ridge in the Indian Ocean using the R/V “*Zhukezhen*” in May to June 2012.

For 2013-14 the Chinese ridge program will be using four research vessels for the researches in the Indian and Mid-Atlantic ridges. R/V “*SONNE*” will be rent by COMRA to make a seafloor massive sulfide drilling and AUVs acoustic survey in the Southwest Indian Ridge in late 2014. Scientists from Germany, Cameroon, Zambia, Kiribati, and Argentina, are invited to participate in some of the cruise legs for joint research.

During the cruises, we revisited the TAG hydrothermal field in MAR. Six lines of TEM (Transient Electro-Magnetic) survey were deployed, with four of which across the ODP 158 drilling area. Besides, and other two lines of SP (Self-Potential) survey were also across the ODP drilling area for their comparison. Preliminary results show that the TEM and SP methods are capable of revealing the horizontal and vertical distribution of the seafloor hydrothermal fields. Then a dive was conducted by the ROV *Ocean Dragon II* dived at a deep-sea hydrothermal field on the Southern Mid-Atlantic Ridge, to be used to clarify the characteristics of the geology, ecosystems, and the environmental conditions around the hydrothermal field. Some evidence for a new hydrothermal vent was collected in equatorial Mid-Atlantic Ridge.

In the Carlsberg Ridge, a new hydrothermal vent was found and one sediment trap has been moored in the vicinity of this active hydrothermal vent to study the composition and sedimentation of hydrothermal plume particles. The morphotectonic characteristics of the northern part of the Carlsberg Ridge near the Owen Fracture Zone have been preliminary studied and 9 oceanic core complexes have been identified. Our observation displays that vigorous tectonic extension occurred in the segment of Carlsberg Ridge between 10.4°N -8.8°N. Further geological sampling would provide information on the nature of the potential OCC formation for the study of the emplacement and evolution of lower ocean crust and upper mantle of the investigated area of Carlsberg Ridge.

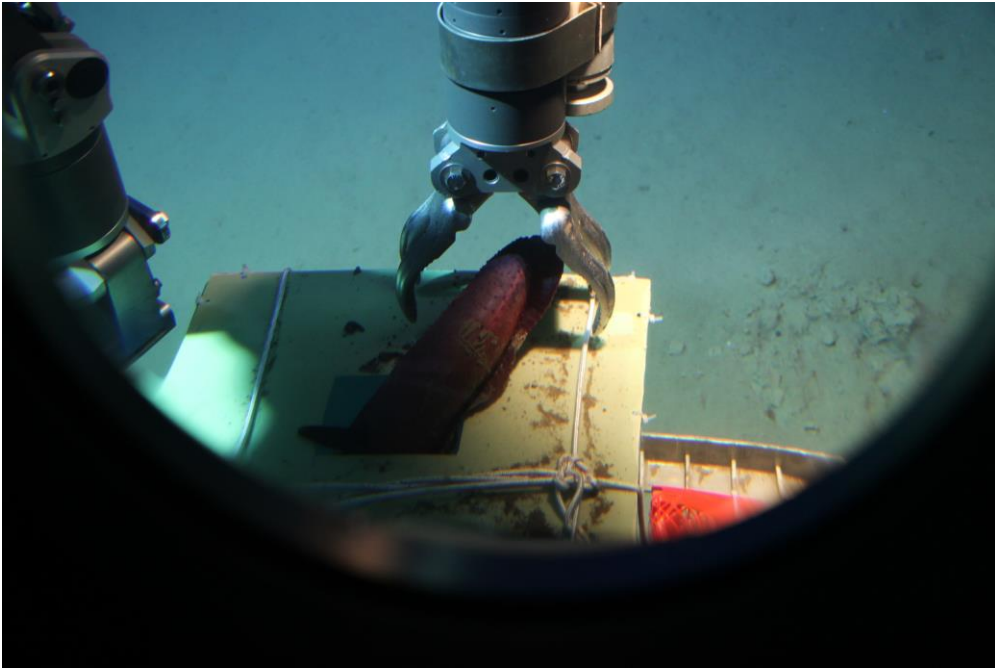
The IODP proposal 735-CPP titled “Opening of the South China Sea and its implications for Southeast Asian tectonics, climates, and deep mantle processes since the early Mesozoic” (by Chunfeng Li, Pinxian Wang, Dieter Franke, Jiabiao Li, *et al.*) was submitted to IODP in late 2011 and received in 2012. In 26 Jan-30 March 2014, IODP Expedition 349 (*P.I. Chunfeng Li and Jian Lin*) will drill the oceanic crust to present investigations and new insights of Mesozoic pre-rifting tectonic background, Cenozoic rifting mechanisms, ages and sequences of seafloor spreading, and their climatic and deep mantle aftermaths.

New Device and Equipment

In July 2012, the Chinese manned submersible *Jiaolong* has completed six dives to 7000 m depth in Mariana Trench. In June 2013, the submersible *Jiaolong* has been planned to eight dives in the northern South China Sea (SCS) to investigate the chemosynthetic communities, biology and geochemical system of the cold seeps, and to explore the volcanic seamounts in the deep sea basin of SCS with a focus on geochemical and geological processes of the basin. After that, the submersible *Jiaolong* is scheduled to explore and sample the benthos in the polymetallic nodules exploration area of China’s contract in the Pacific Ocean in August 2013.

Symposiums and National Conference

1. One international symposium “Unlocking the Opening Processes of the South China Sea” was held on January 31-February 1, 2012, at Tongji University, Shanghai. About sixty scientists participated in the symposium to boost further international collaborations in geological researches in SCS and refine both regional questions related to East Asian geology and fundamental issues regarding continental breakup and basin formation.
2. The 2nd national conference of “Deep Sea Research and Earth System Science Symposium” was held in Shanghai on July 2-4, 2012. Over 800 scientists and students participated in this national conference. This conference strongly focused on interdisciplinary studies in ocean science including biological evolution and environment, ocean and climate, biogeochemical cycle, deep-sea resource and technology, and dynamic process of deep earth.
3. The 41st Conference of the Underwater Mining Institute “Marine Minerals: Finding the Right Balance of Sustainable Development and Environmental Protection” was held in Tongji University, Shanghai, 15-20 October, 2012. Over 100 scientists participated in this international conference. Co-sponsor of COMRA, Mr. Jiancai Jin, and co-chair and host of the conference, Dr. Huaiyang Zhou were invited to give key-note speeches discussing issues for the exploration of metal resources and its impact in the deep-sea environment. After the meeting, a field guide provided geological and mineralogical perspectives of the landscape in the Xinqiao Cu-S-Fe-Au Deposit (large-scale polymetallic deposit) in Anhui Province, China.
4. The 4th symposium of “Global Mid-ocean Ridge Spreading Processes and Implications for the South China Sea Evolution” organized by Dr. Zhen Sun, was held at South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, 12-14 September, 2012. Over 100 scientists and students from various parts of China participated in this symposium. Distinguished international keynote speakers included Dr. Henry Dick, Dr. Jian Lin (Woods Hole Oceanographic Institution, USA), and Dr. Yaoling Niu (Durham University, UK).



Fifth dive to depth 7062 m by HOV *Jiaolong* in the Mariana Trench, July 2012.
(Photo by pilot Jialing Tang)

France National Update 2013

Report submitted by Marcia Maia.

In 2013, the French ridge community is pursuing several projects over different spreading centres around the world. The projects cover a wide panel of themes, including deep-sea observatories, hydroacoustics, ridge magmatic and tectonic processes, vent ecology and biology. Some projects developed in the scope of an international collaboration, such as RHUM-RUM (Germany) and COLMEIA (Brazil).

As in the previous years, much effort was focused on the study of the Mid-Atlantic Ridge, especially on the MoMAR (Monitoring the MAR) deep-sea observatory, located on the Lucky Strike volcano, south of the Azores. The annual cruise targeted to service the stand-alone observatory (MOMARSAT 2013) took place on board the R/V Pourquoi Pas? with the ROV Victor 6000 in August-September 2013 (P.I.s M. Cannat and P.-M. Sarradin). During the 16 days of the cruise, the two seafloor SEAMON (Sea Monitoring) seafloor stations and their connected instruments, i.e. a 3-components seismometer, two pressure probes for geodetic measurements, a turbidimeter, a video camera, a dissolved-iron analyzer, and an optode (oxygen and temperature probe) for ecological time-studies, were maintained and reinstalled. Sensors not connected to the SEAMON stations were also maintained (one pressure gauge, four OBS) as well as several microbial colonizers and 20 temperature probes. The BOREL transmission buoy, equipped with GPS and meteorological station was also maintained. This buoy is used to transmit data from the seafloor stations to the Ifremer node of the EMSO (European Multidisciplinary Subsea Observatory) data center. The MoMAR site, part of the EMSO network, is one of the priorities for the French ridge studies. Another cruise targeting the study of the Lucky Strike ridge segment and related to the MoMAR site was ranked high in the priorities for 2014, HYDROBSMOMAR 2 (P.I. J. Perrot), with the objective of redeploying the hydrophone network moored in 2011-2012 to monitor the seismicity of the Azores area. Still in the Azores area, the study of the hydrothermal mussel *Bathymodiolus azoricus* was the objective of the BIOBAZ cruise, on R/V Pourquoi Pas? and with ROV Victor 6000 in August 2013 (P.I. F. Lallier).

Other cruises targeted the study of the accretion processes and vent ecology on the Mid-Atlantic Ridge. The COLMEIA cruise (P.I.s M. Maia, S. Sichel and R. Santos) took place on board the R/V L'Atalante in January-February 2013, as part of a collaboration between France and Brazil for the study of the Equatorial Mid-Atlantic Ridge. The cruise surveyed and dredged the ridge portion inside the St. Paul FZ system and the St. Peter-St. Paul mylonite ridge. Five hydrophones were moored in the area to monitor the seismic activity as well as whale vocalizations and will be retrieved with a Brazilian ship mid-2014. OCEANOGRAPHER cruise (P.I. F. Lucazeau, R/V L'Atalante, June-July 2013) investigated the heat flux on the area of the Oceanographer FZ. ODEMAR cruise (P.I. J. Escartin) is scheduled for November-December 2013 on board R/V Pourquoi Pas?. Its objective is the detailed study of the structure of the OCCs mapped at 15°N, using ROV Victor 6000. BICOSE (P.I.s M.A. Cambon and M. Zbinden), scheduled for early 2014 on the Pourquoi Pas?, also with the ROV Victor 6000, will study the ecology of the TAG and the Snake Pit hydrothermal fields.

The Indian Ocean mid-oceanic ridges were also important targets for the French community. The OHA-SIS-BIO experiment aims the monitoring of the seismic activity of the three Indian ridges as well as whale vocalizations through an array of hydrophones, moored between Réunion Island and the French Austral and Antarctic Territories (TAAF). The network is annually serviced during the R/V Marion Dufresne cruises for maintenance of the TAAF stations in Crozet, Amsterdam and Kerguelen islands. This year, due to technical

problems with the ship, the cruise took place in February-March. This site is also considered as one of the priorities for French ridge studies. Another important experiment is RHUM-RUM (P.I.s G. Barruol and K. Sigloch), a collaboration between France and Germany for the study of the deep mantle of the Indian Ocean, including imaging the Réunion plume and ridge-hotspot interactions with the Central Indian Ridge. 55 OBS were deployed in 2012 using the R/V Marion Dufresne and will be retrieved in October-November 2013 using FS Meteor. Still in the Indian Ocean, SISMOSMOOTH cruise (P.I. M. Cannat), to investigate the structure of the SWIR using OBSs, as part of the effort to study this ultraslow spreading center, and STORM (P.I. A. Briais), to investigate the structure of the ridge between Tasmania and Antarctica and the mantle flow between the Pacific and Indian oceans, were ranked as priority cruises for the next years.

No cruises took place in the Pacific Ocean in 2013, after a year of intense efforts, especially on the exploration of hydrothermalism and mineral resources in the French EEZ of Wallis and Futuna Islands, (Futuna cruises) supported by the industry. It is expected a continuation of this project for the following years.

Concerning deep-sea mineral exploration, France has asked ISA for a permit to explore mineral resources in an area on the Mid-Atlantic Ridge south of the Azores.

Completed in the end of 2012 and beginning of 2013		Scheduled for the end of 2013 and beginning of 2014	
RHUM-RUM 21/09-26/10/2012 Réunion-Réunion	Marion Dufresne	MOMARSAT 2013 23/08-07/09/2013 Horta-Horta	Pourquoi Pas ?
COLMEIA 23/01-28/02/2013 Recife-Recife	L'Atalante	ODEMAR 15/11-20/12/2013 Cap Vert-Point à Pitre	Pourquoi Pas ?
OHA-SIS-BIO (MD 139) 02-03/2013 Réunion-Réunion	Marion Dufresne	BICOSE Early 2014	Pourquoi Pas ?
OCEANOGRAPLU 04/06-03/07/2013 Ponta Delgada-Ponta Delgada	L'Atalante	Expected in 2014-2015	
BIOBAZ 02/08-21/08/2013 Horta-Horta	Pourquoi Pas ?	MOMARSAT 2014, SISMOSMOOTH, HYDROBSMOMAR 2, OHA-SIS-BIO, STORM	

Germany National Update 2013:

Report by C. Devey

As in 2012, Germany still has no centrally-organized ridge program since the SPP1144 ended in 2009, nevertheless there is significant ridge-related research occurring and planned in the near future. The possibility of Germany being able to continue paying IR fees in the future (and even in 2013) is becoming increasingly unlikely, however, both because of this lack of a centrally-organized project and also because of the limited visibility of InterRidge in the German ocean science community at present.

Ridge-related cruises carried out since the last report include: MSM25 (with RV Maria S Merian, PIs Colin Devey and Maren Walter) to the Southern Mid-Atlantic Ridge (33-13 °S) using AUV and CTD to investigate the linkages between volcanism, hydrothermalism and tectonics and the influence of ridge structure on deep-water oceanography; a recent cruise with RV "Sonne" to the Mariana back-arc (PI Karsten Haase, Erlangen) investigating volcanism and hydrothermalism there.

German ridge research in the polar regions increased with several cruises with the RV Polarstern taking place or planned: a) Vera Schlindwein from the AWI will lead a second cruise to the ultra-slow spreading Southwest Indian Ridge in Dec 2013, b) Gerhard Bohrmann from MARUM led a cruise to the Sandwich Plate/Scotia arc in March 2013.

Ridge research in Germany (and other EU countries) received a boost with funding through EU initiatives related to marine mining and its environmental impacts. Particularly the Blue Mining consortium (involving industry partners mainly from the Netherlands and scientists from UK, Germany, Portugal and elsewhere) which will examine possible sulphide mining processes and their impacts, will bring attention to bear on the TAG area of the Mid-Atlantic Ridge.

Japan National Update 2013

Report prepared by Kyoko Okino; presented by H. Kumagai

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

Domestic Meeting

We designated the incoming IR steering committee member, Toshiya Fujiwara (JAMSTEC), as Hidenori Kumagai's successor. He will be in charge from 2013 to 2016.

We had a business meeting on May 22, 2012, at a Japan Geoscience Union Meeting 2013, where we shared information on a budget of the IR, cruises, workshops and international affairs, and discuss the InterRidge-Japan annual activity plan. We are forced to get along without an umbrella project supporting the annual contribution to IR in FY2013 and try to find a way to continue our activity. We held a research meeting entitled "Ecology of Hydrothermal System: Ecosystem Research and Environmental Impact Assessment" on May 27,28 2013 at AORI, University of Tokyo.

Closure of Project "TAIGA"

The interdisciplinary research project TAIGA, Trans-crustal Advection and In-situ biogeochemical processes of Global sub-seafloor Aquifer, funded by MEXT (Ministry of Education, Culture, Sports Science and Technology), ended March 2013.

During 5 years project, we focused on subseafloor fluid advection which carries huge heat and chemical fluxes from the interior of the earth and supports growth of biosphere (beneath and on the seafloor). Three integrated study sites were selected: the southern Mariana Trough as TAIGA of sulfur and iron, the Indian Triple Junction as TAIGA of hydrogen, and the Okinawa Trough as TAIGA of methane. More than fifty scientists joined the project, and many seagoing studies were conducted, mainly in the integrated study sites. Further information can be checked at the project web site (<http://www-gbs.eps.s.u-tokyo.ac.jp/~taiga/en/index.html>). A part of our results was presented in last AGU Fall meeting and we are preparing an open access e-book that compiles our achievements in the project. The book will be published on-line from Springer in March 2014.

Finished and ongoing cruises FY2012-2013

The R/V Yokosuka cruise in the Indian Ridges were conducted in Jan. to Mar. 2013. Dives of Shinkai 6500 are planned to clarify the characteristics of geology, geochemistry and ecosystem around the hydrogen-rich Kairei hydrothermal site and two newly discovered hydrothermal sites in Central Indian Ridge Segment 15/16. Although we were forced to downscale the dive plan significantly due to bad weather condition, we could get many valuable data sets and samples. We also conducted the crust and upper mantle imaging around the triple junction by OBSs and OBEMs. This cruise is dedicated to the memory of Prof. Kensaku Tamaki, the former IR chair, and his pioneering works in Indian Ridge system. Several short cruises in the hydrothermal areas in the Okinawa Trough and the Izu-Ogasawara-Mariana arc/backarc are also conducted.

The R/V Yokosuka with Shinkai 6500 is now going on a cruise around the world. The outline and recent results (including the surveys at Indian Ridges in March) are posted at the web site (<http://www.jamstec.go.jp/quelle2013/e/index.html>). The ship is now in the world deepest ridge, the Mid-Cayman.

A new 1200t-class multi-purpose research vessel Shinsei-Maru has just been launched. The ship is owned by JAMSTEC and is used as an inter-university research facility in academic community. The ship is equipped state-of-art instruments, various winches and onboard laboratories. The Shinsei-Maru will be dedicated mainly for surveys in off-Sanriku area, where M9 large earthquakes and the following tsunami and nuclear plant accident destroyed the marine environment and ecosystem. But we have a chance to use the new ship for backarc and hydrothermal studies near Japan.

UK National Update 2013

Report by R. Hobbs

A major change this year is the transfer of the InterRidge office from the UK to China. So Bramley Murton at Southampton is free of duties! The work of the past three years whilst the office has been based in the UK is summarised in InterRidge News volume 21 but I highlight a few items here:

enlarged InterRidge membership;

broadened remit to include arc and backarc systems;

fellowships and bursaries to encourage young researchers and give them experience on cruises.

Also we have had a new funding arrangement for the UK subscription. The UK research council (NERC) withdrew its direct funding of schemes like InterRidge. Bramley approached the universities and institutes that had a strong interest in ocean ridge research and we now raise a Principal Member subscription direct from those that benefit from interaction with InterRidge (\$5k from each of Universities of Durham, Plymouth & Southampton, National Oceanographic Centre and the NERC)

Mid-Cayman Spreading Centre

In February Jon Copley and Bramley Muton (NOC/Southampton) were aboard the RRS James Cook on research cruise JC82 which spent 18 science days at the Mid-Cayman Spreading Centre (MCSC). The cruise was the sequel to RRS James Cook research cruise JC44 in April 2010, which pinpointed and sampled the two confirmed hydrothermal vent fields of the MCSC (Connelly et al., 2012, Nature Communications, 3: 620) based on water column plumes indicated by previous CTD casts by our US colleagues. Cruise JC82 completed 6 ROV dives at the Von Damm Vent Field (depth ~2300 m) and 5 dives at the Beebe Vent Field (depth ~5000 m), with the UK's Isis ROV achieving a total of 196 hours of bottom time. During which time Isis collected: data to make ultra high-resolution bathymetry maps; samples of the mineral deposits and vent fauna; water and gas samples from the vents; and deployed temperature loggers. The deepest hydrothermal activity was observed at 5015m. Other JC82 activities included CTD profiles, plume sampling, and rock dredge sampling at the base of an Oceanic Core Complex. The cruise is part of the multidisciplinary NERC project on "Hydrothermal activity and deep-ocean biology of the Mid-Cayman Rise" and on-going collaborations with US and Japanese colleagues studying the MCSC. Cruise JC82 also included the first live video links from RRS James Cook at sea to outreach audiences ashore, at the Natural History Museum and schools in the UK and France. Parts of the cruise were filmed by a BBC news team, with live broadcast and commentary from the ROV control van being fed to the two most popular news slots at 6pm and 10pm. Footage was also incorporated in a BBC documentary by BBC Science correspondent David Shukman discussing the issue of deep-sea resources and their potential impact from future exploitation. Work is now underway by a dedicated research team at the National Oceanography Centre to unravel the biogeography of the fauna, the origin of the unusual fluid composition and the nature of the mineral deposits at the two sites. Dr Jon Copley was the chief scientist for the cruise, the master of the James Cook was Captain Peter Sarjent, and

the research was funded by two NERC research grants awarded to Copley and Murton (NE/I01442X/1 and NE/F017758/1).

Figure caption. The figure shows 3D perspective views of the bathymetry (at 20cm resolution) of (i) the Beebe Vent Field, viewed towards the southeast, with areas of vent fluid emissions and sulphide deposits indicated by the black arrows; (ii) the Von Damm Vent Field, viewed towards the west, with hot vent fluid emissions indicated by the white arrows.

East Scotia Ridge

Results from the NERC funded consortium grant ChEsSO (NE/DO1249X/1) and cruises JC042 and JC055 that studied the vent ecology on the East Scotia ridge, continue to be published and presented at conferences. The latest cruise, JC080 (December 2012 – January 2013), used the Isis ROV to map site E2 (56 °5.3' S, 30 °19.1 W), using multibeam together with CTD casts (see www.bodc.ac.uk/data/information_and_inventories/cruise_inventory/report/11599/ for a full cruise report). Abstract to report reads “JC 80 was to sample the vents sites at E2 and E9 on the East Scotia Ridge, and the Kemp and Adventure craters at the southern end of the South Sandwich Islands. The sampling programme at E2 was very successful completing all the objectives assigned to that site. In addition, we found evidence of an additional vent site at E2 north. It was not possible to access the southern sites at E9 and the Kemp and Adventure craters because the sites were covered in ice as a result of the very hard austral winter, although we were optimistic this would be possible before the end of the cruise. As we were about to complete the study at E2 a crew member became ill and after 24h observation it was decided to evacuate him to land. The ship set sail to Montevideo, considered the most convenient port, which effectively ended the JC80 scientific programme.”

An international 3-day meeting took place in Grenada, Spain, to discuss geodynamic and multidisciplinary topics related to the evolution of the Scotia Sea was held in May 2013. The region is of critical importance because of its role as a major ocean gateway which opened during Eocene-Miocene times, and because of its impact on global ocean circulation, with possible importance for Palaeogene-Neogene palaeo-environmental change, early phases of development of Antarctic ice sheets, gene flow, and resulting biodiversity. The Scotia Sea includes several major spreading centres, minor ocean basins and volcanic arcs, whose evolutions are the subject of ongoing debate.

Other research

Palaeomagnetic constraints on lower oceanic crustal processes (IODP Expedition 345 Hess Deep Plutonic Crust (Antony Morris, Plymouth, Andrew McCaig, Leeds). Generation of ocean lithosphere by seafloor spreading at mid-ocean ridges is one of the fundamental geological processes operating on Earth. One of the most important yet most intractable problems is to understand how the magma reservoir beneath ridges generates the lower crust, especially at fast spreading rates. Gabbroic rocks from the lower crust are normally inaccessible, but are exposed tectonically on the flanks of the Hess Deep rift in the Pacific Ocean. IODP Expedition 345 aims to provide a unique suite of lower oceanic crustal samples from this locality that will yield insights into magmatic and tectonic processes involved in seafloor spreading. (gtr.rcuk.ac.uk/project/7C9FF93B-A37F-4B5E-9032-B6612C6184FB).

Hydrothermal systems, thermal boundary layers and detachment faults in slow-spread ocean crust Andrew McCaig (Leeds). Over the last 12 years improved sonar surveys of the mid Atlantic Ridge have revealed a new mode of seafloor spreading where a significant part of the plate divergence is taken up by slip on long-lived, convex upward detachment faults, rather than mainly by magmatic intrusion. In this project we are investigating this boundary layer more thoroughly, as well as the complex interrelationships between faulting, magmatism and hydrothermal circulation at slow spreading ridges. We are addressing this problem by building thermal and hydrothermal numerical models to predict both the asymmetric thermal structure produced by detachment faulting and the hydrothermal circulation patterns associated with permeable fault zones and localised magmatism. complex interactions between the ocean and the crust that occur as a result of this process. The project is also modelling the Lost City Hydrothermal Field. (gtr.rcuk.ac.uk/project/A9EBE81E-4438-4B88-A28D-669154B7FB9C)

The evolution of mid-ocean ridge magma chambers and the growth of slow-spreading oceanic crust (Johan Lissenberg (Cardiff), MIT & University of Hawaii). Recovered sections of lower oceanic crust have provided much information on crustal accretion mechanisms, but the key element of time has remained largely unconstrained due to the absence of precise dating tools. As a result, the temporal evolution of the accretion process has remained enigmatic. Combining high-precision zircon dating with trace element analyses, we will reconstruct how long magma chambers along a slow-spreading ridge segment were active, how they evolved over time and how quickly they cooled by analysis of samples from the lower oceanic crust recovered from the Vema Lithospheric Section (11 degrees N, Mid-Atlantic Ridge). This will provide an unprecedented view of the evolution of mid-ocean ridge magmatic systems over time. The pattern of the age variation of the samples with distance from the spreading ridge will constrain where magma was delivered to the crust. This allows a test of our hypothesis that slow-spreading oceanic crust forms in two fundamentally different modes, one dominated by symmetric spreading and melt delivery at shallow levels (inferred for Vema), and the other by asymmetric spreading, detachment faulting and deep magma emplacement. (gtr.rcuk.ac.uk/project/2CC07F42-1FDC-490C-8CC3-20F2A401B9AB).

Reactive melt migration in the lower oceanic crust and its implications for the evolution of mid-ocean ridge basalt (Johan Lissenberg (Cardiff)). Mid-ocean ridge basalt (MORB) is the most abundant magma on Earth. It is generated beneath mid-ocean ridges by decompression melting of upwelling mantle, and, following processing in lower crustal magma chambers, erupted onto the seafloor. For more than four decades igneous petrologists and geochemists have relied upon MORB as their major window into the mantle, deriving its composition, melting processes and melt migration mechanisms from the erupted lavas. However, this approach assumes that modification of melts in crustal magma chambers occurs exclusively by fractional crystallisation, and can thus be easily corrected for. Within the last decade evidence has emerged that melt may react extensively with existing cumulus crystals as it migrates through mid-ocean ridge magma chambers. If so, this requires a fundamental reassessment of MORB petrogenesis and its use as a messenger from the mantle. Thus, in order to understand MORB petrogenesis, and its implications for mantle studies, a robust model that fully characterises the nature and extent of reactive flow in oceanic magma chambers is required. I will obtain extensive textural and mineral chemical analyses, acquiring the first systematic dataset on reactive melt migration in the lower oceanic crust. The melt-rock reaction history as deduced from the rock record will then be modelled, allowing its role in MORB evolution to be quantified. Combined, the data and models will provide an unprecedented view of reactive melt migration through mid-ocean ridge magma chambers and its role in the evolution of MORB. Ultimately, this will determine the fidelity of MORB as recorders of mantle properties and processes. (gtr.rcuk.ac.uk/project/9BAA5C4D-67A4-4F34-AA70-F89BC18EF9F5)

The Louisville Ridge-Tonga Trench collision: Implications for subduction zone dynamics Christine Peirce (Durham) & Tony Watts (Oxford) with IGNS New Zealand and Universite Pierre and Marie Curie Paris. Subduction zones provide the mechanism for the destruction of oceanic lithosphere but are also responsible for the construction of arc lithosphere whose features include some of the largest and most active volcanoes on Earth and the majority of large earthquakes. Understanding the dynamics of this system is complicated by the diversity in the age, morphology and tectonic setting of the material that is entering the subduction zone, and yet it is the influence of this material which is a major factor in determining the architecture and composition of the entire trench, island arc, and back-arc system. Between ~5S-35S in the SW Pacific, the Tonga-Kermadec Trench subduction system has a deep, linear topographic depression at which Cretaceous Pacific oceanic crust is subducting beneath the Indo-Australian plate. However, at ~25S the Tonga Trench intersects with the Louisville Ridge, a linear chain of seamounts that runs obliquely to and is being subducted at the fastest rate of plate convergence on Earth (~80 mm/yr). Subduction of this ridge locally deforms the trench, and the point of collision is progressively moving north-to-south at ~118 mm/yr due to the oblique subduction geometry. Geophysically derived images of the crust, uppermost mantle and seabed will allow us to determine how the crust was constructed, modified and deformed, and how the plate boundary system is evolving over time in response to the subduction of significant plate topography. (gtr.rcuk.ac.uk/project/617D42A8-21AC-4E05-86AF-722896DA874D)

Upcoming Cruises and projects

OSCAR - Oceanographic and Seismic Characterisation of heat dissipation and alteration by hydrothermal fluids at an Axial Ridge. NERC consortium grant (NE/I027010/1) (Richard Hobbs & Christine Peirce (Durham); Miguel Angel Morales Maqueda, David Smeed & Alexis Megann (NOC); Vincent Tong (UCL); Christopher Ballentine (Oxford); together with international partners Marion Jegen (Geomar), Bob Lowell (Virginia Tech), Rob Harris (Oregon State) & Sue Humphris (WHOI)) has been scheduled for January/February 2015. This two-ship programme will investigate the the heat and mass transfer through the seabed at the Costa Rica Ridge and its flanks out to crustal age of about 6 Ma using both geophysical and oceanographic measurements. The geophysical model will be tied to the ODP hole 504B (about 200 km from the ridge). The geophysical data will focus on two 3D Ocean Bottom Seismometer (OBS) surveys at the ridge and hole 504B tied together with three long-offset (>9 km) controlled source seismic profiles with MT (electrical resistivity) and potential field data (gravity and magnetics). The oceanographic data will sample the water inflowing into the basin along the Ecuador trench, current/tidal flows over the Carnegie ridge, map the temperature/salinity structure and turbulence within the Panama Basin. (gtr.rcuk.ac.uk/project/F6313720-CB84-47E4-A2A5-8B167A6C5170)

Role and extent of detachment faulting at slow-spreading mid-ocean ridges Chris MacLeod (Cardiff), Tim Reston (Birmingham), and Christine Peirce (Durham) (together with Roger Searle, technically as 'consultant'). We will utilise a variety of seismic techniques, at the Mid-Atlantic Ridge axis in the 13°N area, to test competing models for the nature and significance of detachment faults and associated oceanic core complexes. We will combine a passive micro-earthquake study with active source experiments to attempt to document the sub-surface geometry and continuity of detachment faults at depth and the spatial/temporal relationship between melt emplacement and faulting. The project will require two cruises, in order to give sufficient duration for the passive experiment. The cruises are not yet scheduled. (gtr.rcuk.ac.uk/project/B6389C92-8A3E-4DEB-83A1-D913492FFB6F)

Volatile Recycling at the Lesser Antilles Arc: Processes and Consequences (NE/K010824/1) (a project involving UK Universities of Durham, Southampton, Liverpool, Bristol, Imperial, East Anglia & Leeds with international partners University of the West Indies, ETH Zurich, Potsdam & the NSF-funded GeoPRISMS program, project is led by Jon Davidson at Durham) proposes an innovative multidisciplinary experiment to track volatiles at a subduction zone. Questions to be answered include: How do volatiles influence the types and amounts of magmas generated? How do they control where volcanoes, such as Le Soufriere, Montserrat and Mt Pelee, Martinique, are located and how explosive they are? How do volatiles dictate where ore deposits are formed? How do volatiles mediate the seismogenic behaviour of subduction zones - whether there are large "megathrust" earthquakes like Japan and Sumatra or whether slip is less violent? The plan is to use novel seismic approaches complemented by geochemical analyses and integrated using numerical models to identify and quantify where volatiles are in the down-going plate, where they are released at depth, and how they are transported from the subducting plate through the mantle wedge to the arc. Together with a unique suite of rocks from deep in the crust which have been carried up in volcanoes to help understand how magmas evolve, and what allows them to concentrate ore metals. Mapped water pathways will be compared with seismic and volcanic activity, as well as with those inferred at other subduction zones. (gtr.rcuk.ac.uk/project/B98BE408-BEA0-43EB-B069-B7FCBD04BC43)

USA National Update 2013

Reported orally by Raymond Lee

4.b Associate and Corresponding Members

Canada National Update 2013

Reported by K. Juniper.

India National Update 2013

K. Raju – report to follow.

Korea National Update 2013

Report submitted by S-H. Park

Korea Polar Research Institute (KOPRI) had 3rd cruise on Australian-Antarctic Ridge, easternmost Southeast Indian ridge in January this year (2013) using RV Araon. The one of purposes of this cruise was to locate the hydrothermal vent site more precisely, which was found and briefly located by former two cruise. As well as locating the vent site, we did more mapping on the ridge including the seamount in the south of the ridge and got the magnetic data using proton magnetometer. We also did dredging and rock coring to get rock and biological samples.

The cruise was very successful. Using CTD Tow-yo, we confined the vent site (“Araon vent field”) with in 2 km circle. CTD Tow-yo was very effective because we attached OBS and ORP sensors into seabird in collaboration with NOAA. The CTD water samples were analyzed and strong ^3He , CH_4 , Mn, and Fe were detected, confirming OBS and ORP anomalies originated from hydrothermal vent. We also found very interesting features in the bathymetry, gravity and magnetic anomalies. In the geochemistry, very unique mantle heterogeneity was found. Highlight of this cruise is finding of new hydrothermal vent biology using dredging: Kiwa crab and seven arm starfish. DNA analysis was done for these biology and we can confirm they are new species. Probably these vent biology were taken for the first time from the long mid-ocean ridge system in southern ocean from Rodriguez triple junction in Indian Ocean to western end of Pacific Antarctic ridge. We think these new species have similarity with the vent biology reported in East Scotia Sea rather than western Pacific one.

We think first stage of KOPRIDGE project successfully complete its mission and it should advance to next step. We are planning ROV cruise on the new vent site “Araon” and expand the research area to further east where still only a few research survey was done.

Norway National Update 2013

Report by R. Pedersen

In Norway, researchers from the Centre for Geobiology (CGB) at the University of Bergen continue to undertake most of the ongoing ridge research activity. The ridge research carried at CGB comprises studies of crustal accretion processes and hydrothermal systems - including seafloor and subseafloor geomicrobial activity and vent fauna ecosystems. The

ultraslow spreading Arctic ridges are the primary field area. The research on ridge accretion processes is currently focusing on: 1) interactions between the multiple mantle domains present below the Arctic ridges; 2) dynamics of oblique spreading and core complex formation; and 3) the evolution and architecture of axial volcanic ridges. The latter is partly based on the acquisition of microbathymetry using AUV. Our studies of hydrothermal activity have for the last years focused on the Soria Moria, Troll Wall and Loki's Castle vent fields that were discovered in 2005 and 2008. The cruise this summer aimed at locating new vent fields, and at estimating the hydrothermal activity over larger ridge segments. By searching for bubble plumes using hull-mounted multibeam echo sounder systems, two new vent fields were located at the relative shallow parts of the ridge system close to the Jan Mayen. In the deeper parts of the ridge system to the north, three other venting areas were found by searching for chemical signatures in the water column.

Studies of water-rock-microbe interaction and geomicrobiology are presently focused on low-temperature Fe-oxyhydroxide and baryte deposits that are associated with the Arctic vent fields. These studies involve microbial growth experiments, metagenomics, microtextural and geochemical analyses - including heavy stable isotope systematics. A comparison of these modern deposits with Archaean examples is also ongoing. This year, two bioprospecting projects that target novel enzymes in the thermophiles and hyperthermophiles are starting up with industry support.

Following the 2008 discovery of the Loki's Castle vent field and an associated novel vent fauna, a major objective for the Norwegian ridge research program has been to characterize and document this vent fauna. As of today, 20 new species have been found at the Loki's Vent field. With this year's discovery of several new vent fields occurring at water depth from 150 to 2500 m, the diversity of this Arctic vent fauna province will be further explored in the coming years.

In early August this year, the Norwegian Minister of Environment visited the University of Bergen to learn more about the deep-sea and the part of the ridge systems that is present within Norwegian waters. One of the issues that were raised at the meeting was whether Norway should and could proceed towards establishing deep-sea marine sanctuaries at some of these vent fields.

Portugal National Update 2013

Report to be followed.

5 Current working groups – Updates

In 2013, there are 7 active IR working groups.

5.a Arc-backarc Systems

Chair: Maria Seton (USYD, Australia)

Co-chair: Cornel de Ronde (GNS Science, New Zealand)

Members: Richard Wysoczanski (NIWA/U. Victoria), Richard Arculus (ANU, Australia), Michael Gurnis (Caltech, USA), Jo Whittaker (USYD, Australia), Dietmar Müller (USYD, Australia), Colin Macpherson (Durham, UK), Erin Todd (Munster, Germany), Jim Gill (UCSC, USA), Sven Petersen (GEOMAR, Germany), Jonny Wu (NUT, Taiwan), Yoshihiko Tamura (JAMSTEC, Japan), Hiromi Watanabe (JAMSTEC, Japan), Jonathan Aitchison (USYD, Australia), Martin Patriat (Ifremer, France)

No report received from this work group.

5.b Circum-Antarctic

Co-Chairs: Anne Briais (OMP Toulouse, France), Jian Lin (WHOI, USA), Sung-Hyun Park (KOPRI, Korea)

Group members - Ed Baker (USA); Doug Connelly (UK); Dave Graham (USA); Hide Kumagai (Japan); Phil Leat (UK); Yoshi Nogi (Japan); Daniel Sauter (France); Chunhui Tao (China); Huaiyang Zhou (China); Vera Schlindwein (Germany); Russian representation tbd

Short report by Sung-Hyun Park.

Korea Polar Research Institute (KOPRI) had 3rd cruise on Australian-Antarctic Ridge and they are working on a paper.

5.c Hydrothermal Energy and Ocean Carbon Cycles

Co-Chairs - Nadine Le Bris (IFREMER, France), Christopher R. German (WHOI, USA)

Group Members - Wolfgang Bach (Univ. Bremen, Germany); Loka Bharathi (National Institute of Oceanography, India); Nicole Dubilier (Max Planck Institute Marine Microbiology, Germany); Katrina Edwards (Univ. Southern California, USA); Françoise Gaill (CNRS, Paris, France); Toshi Gamo (Univ. Tokyo, Japan); Peter Girguis (Harvard Univ., USA); Xiqiu Han (Second Institute of Oceanography, SOA, China); Julie Huber (Marine Biological Laboratory, Woods Hole, USA); Louis Legendre (LOV-UPMC, Villefranche, France); George W. Luther III (University of Delaware, USA); William E. Seyfried Jr. (Univ. Minnesota, USA); Stefan Sievert (WHOI, USA); Ken Takai (JAMSTEC, Japan); Andreas Thurnherr (Columbia Univ., USA); Margaret K. Tivey (WHOI, USA).

The WG had no meeting activities this year. The organisation of a larger event, a workshop to bridge with the oceanograph community, was postponed as well, as a consequence of major commitments of the two co-chairs. Nevertheless the synthesis and writing phase is progressing. Modelling has been more advanced on the issue of organic carbon and iron export from vents to the water column and two related communication are presented at Goldschmidt 2013 (German et al. 2013, Legendre et al. 2013). A first approach to the quantitative modelling of the seafloor vent

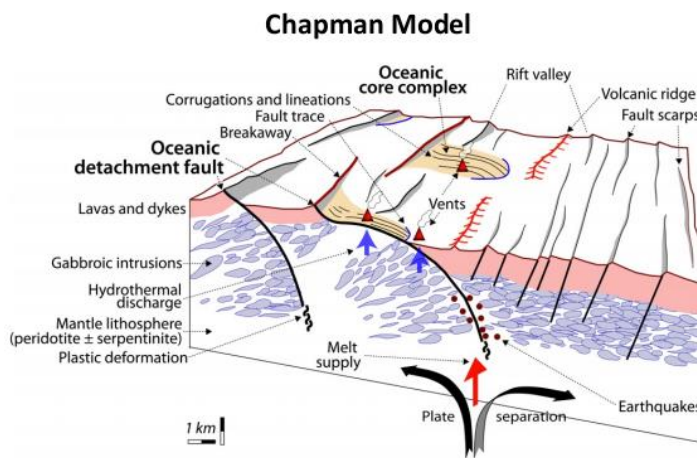
ecosystem chemosynthetic carbon production emphasized the need for a better assessment of the constraints and drivers of C-fixation in these environments. A review paper discussing these controls is now under progress, and will be integrating insights from recent experimental approaches and further exploration of chemoautotroph habitats, some of which lead by group members. We may also mention a session at ASLO last Aquatic Science meeting (New Orleans, Feb. 2013) that was convened by one of the WG member on chemoautotrophy in the ocean, though not strictly organized by the WG.

Coupled Cycling of Fe and Corg in Submarine Hydrothermal Systems: An Ocean Biogeochemistry Perspective. German C, Legendre L, Sander S, le Bris N and the SCOR InterRidge WG135. Mineralogical Magazine, 77(5) 1158

Coupled Cycling of Fe and Corg in Submarine Hydrothermal Systems: Modeling Approach. Legendre L, German CR & Sander SG (0) Mineralogical Magazine, 77(5) 1576

5.d Oceanic Detachm

Co-chairs: J. Pablo Canales (Univ. of Wyoming, USA), Andrew Schoonmaker (Birmingham, UK), Deborah Kelley
 Reported by J. Canales
 Background
 Oceanic core complexes:
 detachment faults formed



John (Univ. of
 m (Univ. of
 ong-lived oceanic
 es.

ODFs and OCCs have increasingly attracted the interest of a diversity of bio- and geoscientists because they represent or provide access to

- 1) Tectonic windows providing access to deep-seated rocks and processes such as mantle flow, melt generation and migration, strain localization, and crustal accretion at mid-ocean ridges;
- 2) A fundamental process that may be responsible for >50% of lithospheric accretion along slow and ultra-slow spreading centers;
- 3) A unique setting for sustaining both long-lived, high-temperature hydrothermal circulation as well as low-temperature, hydrogen-rich, serpentinite-related hydrothermal systems, and their associated mineral deposits and micro- and macro-biota;
- 4) A fault zone, containing weak hydrous alteration phases, that localizes strain over extended periods of time, with associated flexure and rotation of the footwall;
- 5) A key to understand continental metamorphic core complexes formed in settings of extreme tectonic extension, as well as to detachment faults associated with extensional magma-poor continental margins.

2013 Working Group Activities

1. Foster and strengthen links to other efforts and programs towards the study of oceanic detachment faults (e.g., GeoPRISMS, IODP, other IR WGs, etc.)
2. Advance in the understanding of these structures through the planning of sessions at international meetings (EGU, AGU), and convening of a topic Workshop in the future.

3. Through e-mailing/web site share information regarding on-going projects, planned cruises, and facilitate exchanges and cooperation among scientists.
4. Playing a coordinating role for specific sites and projects if requested by the scientific community.
5. Promote further contributions to the G-cubed Theme, which we expect will become a reference and key compilation of research results in the topic.

2013 AGU Fall meeting

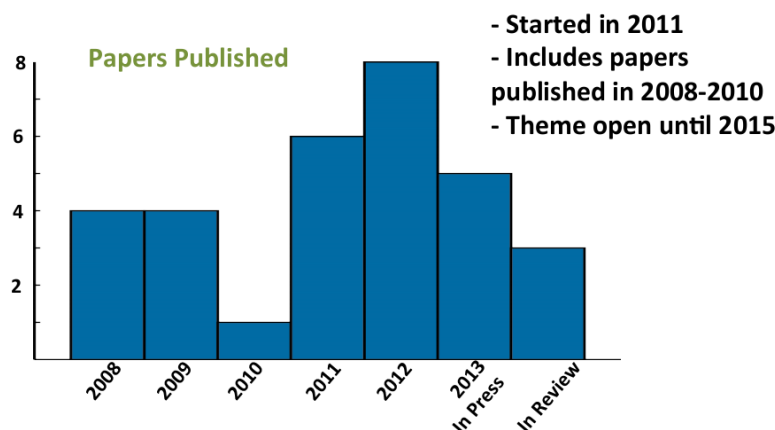
T026: Oceanic Detachment Faulting and Associated Processes at Mid-Ocean Ridges

Conveners:

- (1) J. Pablo Canales, Woods Hole Oceanographic Institution, USA
- (2) Javier Escartín, CNRS/IPG Paris, France
- (3) Andrew McCaig, University of Leeds, UK
- (4) Nick Hayman, University of Texas, USA,

24 Abstracts Received

G-Cubed Theme: “Oceanic Detachment Faults”



Future Planned Activities

- Organize a 2-3 day InterRidge Theoretical Institute on a specific topic related to oceanic detachment faulting (Spring or Fall 2014).
- Convene a session in the EGU meeting in Spring 2015.
- Encourage the younger generation of scientists to organize/convene a topical Conference (AGU Chapman or similar) in oceanic detachment faulting to wrap up the theme (2016?).

5.e Seafloor Mineralisation

Chair - Maurice Tivey (USA)

Group Members - Fernando Barriga (Portugal), Georgy Cherkashov (Russia), Yves Fouquet (France), Mark Hannington (Canada), Yasuhiro Kato (Japan), Jonguk Kim (Korea), Lisa Levin (USA), Rachel Mills (UK), K. A. Kamesh Raju (India), Xuefa Shi (China), Ingunn Thorseth (Norway), and Cindy Van Dover (USA).

Received an email from Maurice Tivey.

I have nothing to report this time from the Working Group on Seafloor Mineralization. I would note though that International Seabed Authority recently discussed applications for 6 groups: COMRA, JOGMEC, Russia, UK Seabed Resources (Lockheed Martin), India and Ocean Minerals Singapore, at their annual meeting in July.

Hopefully the IR-StComm can discuss the possible impact of these increasing applications and claims on marine scientific research. The ISA also plans to move ahead with defining regulations for "exploitation" of seafloor resources in 2016.

5.f SMART (South Mid Atlantic Ridge Targeted Exploration)

Chair: Colin Devey (IFM-GEOMAR)

Group members: Chris German (WHOI, USA), Sidney Mello (Univ. Federal Fluminense, Brazil), Lucia Campos (Univ. Federal do Rio de Janeiro, Brazil), Anton le Roex (Univ. Cape Town, South Africa), Cindy Van Dover (Duke University, USA), Gwyn Griffiths (NOC, Southampton, UK), Koichi Nakamura (AIST, Japan), Shinsuke Kawagucci (JAMSTEC, Japan), Jiabiao Li (2nd Inst. of Oceanog., China), Marcia Maia (Univ. Brest, France), Andrey Gebruk (Moscow, Russia) Nicole Dubilier (Max-Planck Inst., Bremen, Germany)

Report to follow.

5.g Vent Ecology

Co-Chairs: Stephane Hourdez (France) and Yoshihiro Fujiwara

Group Members (Austria, Canada, China, Germany, Japan, Korea, Portugal, Russia, UK, USA) - Maria Baker, Monika Bright, Ana Colaço, Nicole Dubilier, Sergey Galkin, Peter Girguis, Jung-Ho Hyun, Crispin Little, Anna Metaxas, Katsuo Fujikura, Xiang Xiao.

Reported by Stephane Hourdez

Third decadal plan

The Vent Ecology WG has been active in drafting the InterRidge third decadal plan (2014-2023). The contribution of the WG is entitled 'Past, present, and future of vent ecosystems'. Exploration rights granted to different mining companies has raised concerns in our community. A lot remains to be learned about these ecosystems and the species that are part of it to better understand their susceptibility to perturbations. The third decadal plan therefore focuses on the history and the resilience of the vent communities. The primary questions on which the plan focuses are:

- 1) What are the molecular bases for physiological and life history adaptations to hydrothermal vent conditions? When did these adaptations occur?
- 2) How did these adaptations affect and yield the diversity of vent organisms?
- 3) How did past global environmental changes (e.g. global deep-sea anoxia) affect the evolution of vent species?
- 4) How does the dynamic nature of hydrothermal vents affect the evolution of species?
- 5) How resilient are vent species/communities and how may they be affected by deep-sea mining?
- 6) Could global change affect vent species and their function in the ecosystem? On what time scales?

The whole decadal plan can be found at this address

<http://www.interridge.org/thirddecade>

Deep-sea Mining

In November 2012, Nautilus has announced that the construction of its seafloor production system was terminated as a result of a commercial dispute with the government of Papua-New Guinea (see <http://www.nautilusminerals.com/s/Projects-Solwara.asp> for a statement from Nautilus Minerals). Other Nations in the Western Pacific may still proceed with hydrothermal vent minerals mining.

High-throughput

The high-throughput page is dedicated to sequencing efforts on hydrothermal vent species, and includes species of invertebrates and bacteria (free-living and symbiotic), for a total of 23 entries. To have a look at the list of projects, go to <http://www.interridge.org/highthroughput>, and if you would like to add to the list, go to <http://www.interridge.org/node/add/highthroughput>. The goal is to promote exchanges between researchers in the community and to avoid duplicating efforts.

Meetings

Two main meetings to which the vent biology community participates take place this year.

The 13th International Deep-Sea Biology Symposium was held in Wellington, New Zealand 3-7 December 2012. Held every 3 years, this general deep-sea meeting includes presentations on hydrothermal vents and cold seeps. The vent biology community was well represented.

The 5th International Symposium on Chemosynthesis-Based Ecosystems will be held in Victoria, BC Canada August 18-23, 2013. For more details, see <http://www.neptunecanada.ca/cbe5/>

5.h Discussion future of Working Groups

Discussion to be led by J. Chen.

✓ Hydrothermal Energy and Ocean Carbon Cycles:

NL: Need to finish this group, the problem is whether we need a new working group in biochemistry or can this community in different working groups. This WG has been very active.

RH: I think it's shift emphasis to how the heat is dissipating on the ridge.

JC: This WG need to wrap up in one year or two year. Do you need a workshop?

NL: We will have a meeting about 50 people, in about one year. Before June 2014, will have this meeting. Will have to write a proposal apply for additional support.

RH: Could be in the EGU meeting.

✓ Seafloor Mineralisation

SH: we need review this working group. We need to write to Maurice Tivey.

MM: This is one of the core questions in the next few years especially if we want to get grants from the government.

Restructure of this workgroup. Add more disciplinary issues to this WG.

SH: Need a new direction. The Steering Committee need do some Steering.

RH: Highly focused maybe a New Chair. Stop the activities and give a new name.

MM: Most have people in different fields in order to have work done. Need geology, ecology et al. besides fluid geochemistry.

SH: Need more younger and energetic people in the working group.

JC Summarize: This WG is so important. We need revitalized this WG and we suggest a new leader of the Working Group.

✓ Vent Ecology

SH: The focus will change and the WG and the leadership will change as well. I will be happy to hand it over to someone. Bio-geo-working group. We should still have WG in Biology.

RH: effect on the sea creatures.

JC Summarize: This WG need to change to new WG and new leader. We will expect a report.

✓ Arc-Backarc System

JC: From the name, it seems very interesting.

JC: We want to keep this WG, we need a minimum report to be list as a WG.

✓ Oceanic Detachment Faults

This topic is very important. We should ask them about the Plan. We should encourage them to have more activities. And we should encourage them to more open. We can find more people in this topic.

✓ SMART

RH: if they don't have report in two years, to me this WG is dead.

MM: This group has been very inactive.

RH: we should have a letter for warning.

JC Summarize: if we don't have a report before the newsletter, we will consider this working group dead.

✓ Circum-Antarctic Ridges

SP: will work with Jian Lin on this WG.

JC: For this WG it is very difficult to involve the southern.

ACTION: contact the Chair asking for update and their future plan.

6 Workshop and meetings

6a Request for speaker travel support for the AAAS Symposium: Deep-Ocean Industrialization: a New Stewardship Frontier (Feb. 2014) by Lisa Levin.

NL: what is the major funding source?

RL: They just want to ask funding to get speaker to the symposium.

SH: There topic is very broad. One problem is they are funded by industry.

Summarize: We would like to support students and young scientists to attend this symposium.

JC: InterRidge are calling for proposals for ridge-related workshops for up to ten thousands.

ACTION: send to the WG group leaders and put ads in EOS calling for ridge-related workshops.

7 Discussion about the mandate of the industry Liaison Committee

Discussion is led by Kim Juniper.

KJ: During the last year the StComm meeting in San Peterberg, the StComm decide to form the industry Liaison Committee and KJ volunteered to chair it. Had an evening meeting during the underwater mining meeting in Tongji University in Shanghai, China. About half of the StComm member came and the industry people are invited. Two extreme: a) Use science and technology to help industry; b) should be protect environment. Next meeting will be held in Brazil in October. How do we interact with industry? We don't contract directly with industry. We have to acknowledge the underwater mining industry is coming. We have to do something. The position we take is that we will involve but we will not direct work for the industry.

NL: R/V is come from the industry.

SH: Mexico gave money to US government, and the government funds the scientist to do research.

KJ: The industry wants the scientist to help them to do it efficiently.

NL: We just do independent research, then explore possibility to transfer the knowledge.

KJ: Don't see industry found up a foundation to do research.

NL: keep independent is very important.

KJ: Instead of helping individual company, it is better for interRidge to sponsor some coordinated international research independently.

MM: Must be independent to get sponsorship from InterRidge.

RH: In the UK, as individual researcher can work for the industry for project, but interRidge should stay away from the interridge. We can set up Workshop for environmental impact. We can be an umbrella organize workshop industry and scientist together rather than industry academic lower level.

MM: It is also possible for agency to get money to pay for the fee of InterRidge.

RL: Could InterRidge be like UN IPCC?? InterRidge can generate objective report!!

NL: We can work towards that.

RL: Status of the ocean, sea floor, how that can be used by the government and industry.

JC: The committee have 6-8 member, you can have a workshop.

KJ: Underwater technology. State of the Ridge?

SH: it is our responsibility to provide unbiased voice in between!

Toshi: Independency if very important.

NL: South Pacific islands are eager to the knowledge.

JL: We can invite someone in ISA to this committee.

KJ: mining industry is the only industry, should we have other industry?

8 Future of InterRidge – The Grand Mission

What would the world be missing without InterRidge?

The Problem

- global scientific community is supportive, national funding agencies are not
- how do you respond to “There’s nothing new here”?

Who is InterRidge? (and why should IR be important to national funding agencies?)

- Need data to document growth of IR as truly international organization, including recognition by ISA (observer status since 2012).
- Is IR contributing to the drafting of international regulations?
- Not an environmental advocacy organization
- An independent source of scientific expertise related to mid-ocean ridges/arcs/backarcs – particularly relevant with respect to mining of polymetallic sulphides and evaluation of genetic resources at hydrothermal vents

What does InterRidge do?

- Coordination and promotion of interdisciplinary research on large-scale questions that require international cooperation (eg. mapping and sampling of Antarctic ridges, bringing geological perspective to the study of broader scale deep ocean processes)
- Training and networking opportunities for students and scientists (berths on cruises, bursaries (developing countries), workshops) – need to quantify (‘research coordination networks’ in U.S.)

New Ideas

- new working groups (eg. Subduction zone processes) – launch new WG with workshop in strategic locations.

- prepare global 'State of the ridges' evaluation of sulphide mineral resources and current opportunities/risks related to ocean mining

9 InterRidge Finances

9.a InterRidge Budget 2013

Refer to Appendix II pg. 38 for the estimated budget for 2013.

9.b. Status of payment of billed nations

Full membership fees were received in 2012 and China, USA and UK have paid for 2013 (as of July 2013). Z. Ge sent invoices to all Principal and Associate Members.

DISCUSSION

1. Should we lower the level of membership fee?

Now, many countries are facing problems getting the fund for the membership fee. The amount of funding is not a problem. We have to face the same situation no matter the amount is.

Japanese may separate the membership fee to the individual universities, and each member may pay about 1000-2000 dollars.

The StComm members contents to keep the level of the membership fee.

If the membership fee is too low, nothing can be done.

Working Group in subduction zone may gain interest.

ACTION: Call for a Working Group on subduction zone.

10 Next StCOM meeting location and date

Recent StCOM meetings: 2012 Russia, 2011 China, 2010 UK, 2009 France, 2008 USA, 2007 Brazil, 2006 Russia, 2005 Germany, 2004 Korea, 2003 Japan, 2002 Italy, 2001 Japan.

ACTION

The 2014 StComm meeting will be in Beijing, China, 27-28 September 2014.

11 Meeting Adjourns

JC led thanks to our Canadian hosts.

InterRidge Steering Committee Meeting 2012

Appendices

APPENDIX I

InterRidge Chairs and Coordinators – Past and Present

InterRidge Chairs

John Chen(Chair) 2013-2015
Jiabiao Li,co-chair(China) 2013-2015
Bramley Murton (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 (Germany) 2004 - 2006
Kensaku Tamaki (Japan) 2000 - 2003
Mathilde Cannat (France) 1997 - 1999
Roger Searle (UK) 1994 - 1996
John Delaney, co-chair (USA) 1991 - 1993
H. David Needham, co-chair (France) 1991 - 1993

InterRidge Coordinators

Zengxi Ge From Jan 2013
Debbie Milton Jan 2010 – Dec 2012
Stace Beaulieu Oct. 2007 – Dec 2009
Rhian Waller Jan. - Oct. 2007
Sabine Lange July -Dec. 2006
Val érie Eppl é May - July 2006
Kristen Kusek (Education & Outreach) March 2004 - Dec. 2007
Katja Freitag March 2004 - May 2006
Agnieszka M. Adamczewska Nov. 1999 - March 2004
Cara Wilson March 1997 - Nov. 1999
Ruth Williams (acting) Oct. 1996 - March 1997
Heather Sloan Oct. 1993 - Oct. 1996
Trileigh Stroh 1991 - Oct. 1993

InterRidge Steering Committee Members - Past and Present

Canada

Steve Scott 2004 - 2006

S. Kim Juniper 1998 - 2003
2012 -

China

Jiabiao Li 2008 - present

John Chen 2004 - present

France

Marcia Maia 2013

Nadine Le Bris 2009 - present

Jérôme Dymont 2001 - 2013

Françoise Gaill 2004 - 2008
ad hoc 1998 - 2003

Javier Escartin, *ad hoc* 2002 - 2003

Mathilde Cannat 1997 - 2000

Catherine Mével 1999 - 2003
ad hoc 1997 - 1998

Daniel Desbruyères, *ad hoc* 1997
1991 - 1996

Jean Francheteau 1991 - 1998

H. David Needham, *ad hoc* 1995 - 1996
1991 - 1994

Germany

Nicole Dubilier 2005 - present

Colin Devey 1999 - present

Peter M. Herzig 1996 - 2000

Roland Rihm 1995 - 1998

India

K. A. Kamesh Raju 2005 - present

Abhay V Mudholkar 2002 - 2004

Ranadhir Mukhopadhyay 2000 - 2001

Italy

Enrico Bonatti 1998 - 2002

Japan

Toshiya Fujiwara, 2013

Michinari Sunamura 2009 - present

Hidenori Kumagai 2009 - 2013

Jun-ichiro Ishibashi 2006 - 2010

Nobukazu Seama 2005 - 2008

Masataka Kinoshita 2002 - 2004

Toshitaka Gamo 2001 - 2004

Kantaro Fujioka 1999 - 2001

Hiromi Fujimoto 1997 - 2000

Tetsuro Urabe 1994 - 1998

Kensaku Tamaki 2000 - 2004
1992 - 1997

Korea

Sung-Hyun Park 2007 - present

Sang-Mook Lee 2001 - 2006

Norway

Rolf Pedersen 2001 - present

Eirik Sundvor 1996 - 2000

Portugal

Pedro Ferreira 2009 - present

Fernando Barriga 2001 - 2008

Ricardo Santos, *ad hoc* 2002 - 2003

Miguel Miranda 1996 - 2000

Spain

Rosario Lunar 2005 - 2008

Juan José Daño Beita 1995 - 1998

Miquel Canals 1995 - 1998

UK

Richard Hobbs 2011 - present

Alex Rogers 2007 - 2011

Tim Henstock 2004 - 2011

Paul Dando 1999 - 2006

Damon Teagle 2002 - 2003

Christopher R. German, *ad hoc* 2002
1997 - 2001

Philippe Blondel, *ad hoc* 1997 - 2002

Lindsay Parson, *ad hoc* 1996 - 1998

Roger C. Searle 1994 - 1998

Martin Sinha 1991 - 1996

USA

Daniel Fornari 2009 - present

Jian Lin, chair 2007 - 2009

ad hoc 1999 - 2003

Chris German, co-chair 2007 - 2009

Donna Blackman 2005 - 2008

Charles Fisher 2002 - 2005

Deborah Smith 2003 - 2004

Spahr C. Webb, *ad hoc* 2002 - 2003

Christopher G. Fox, *ad hoc* 1998 - 2001

David Kadko 1999 - 2001

Alan Chave, *ad hoc* 1997 - 2001

Dave Christie 1997 - 2002

Karen Von Damm 1996 - 1998

Lauren Mullineaux, *ad hoc* 1996 - 2000

Robert S. Detrick 1992 - 1995

John Delaney 1991 - 1994

P. Jeff Fox 1991 - 1995

Charles H. Langmuir 1991 - 1996

InterRidge National Correspondents - current

Principal Members:

China – J. Chen (2004 - confirmed in 2008)

France – Jérôme Dymont (2004 - confirmed in 2008)

Germany - Colin Devey (1998 - confirmed in 2008)

Japan – Kyoko Okino (2005 - confirmed in 2008)

UK – Richard Hobbs (2011 -)

USA – Dan Fornari (2009 -)

Associate Members:

Canada – Kim Juniper (2012 -)

India – K. A. Kamesh Raju (2002 - confirmed in 2008)

Korea – Sung-Hyun Park (2007 - confirmed in 2008)

Norway - Rolf Pedersen (2001 - confirmed in 2008)

Portugal - Pedro Ferreira (2009 -)

Corresponding Members:

Australia – Jo Whittaker (2010 -)

Austria - Monika Bright (2001 - replied to email 2009)

Brazil - Suzanna Sichel (1997 - confirmed in 2008)

Bulgaria – Vesselin Dekov (2009 -)

Chile – Juan Diaz-Naveas and Luis Lara (2007 - confirmed in 2008)

Chinese Taipei – Saulwood Lin (2008 -)

Denmark – NO correspondent

Iceland - Karl Grönvold (1992 - NOT confirmed in 2008)

Italy – Paola Tartarotti (1997 - confirmed in 2006)

Mauritius - Daniel P. E. Marie (2002 - NOT confirmed in 2008)

Mexico – Alfredo Aguillon-Robles (2011 -)

Morocco - Jamal Auajjar (1998 - confirmed in 2006)

New Zealand – Richard Wysoczanski (2010 -)

Philippines - Graciano P. Yumul, Jr. (2000 - confirmed in 2008)
Russia - Sergei A. Silantyev (1998 - confirmed in 2008)
South Africa - Petrus Le Roux (2006 - NOT confirmed in 2008)
Spain – Rosario Lunar (2006 - replied to email 2007)
Sweden - Nils G. Holm (1993 - confirmed in 2006)
Switzerland - Gretchen Früh-Green (1995 - confirmed in 2006)
SOPAC – Aquila Tawake (2009 -)

**APPENDIX II
InterRidge Estimated Budget for 2013**

Income	proposed	actual	
Income for Each Financial Year	2013	2013	
Fund transferred from UK office		\$180,650.00	Include the 2013 membership fee of, UK(\$21000), USA(\$25000), ISA fellowship for 2013 and 2014(\$30000) plus Contingency(\$104,650),
Membership contribution (current 6 principal and 5 associate members)	\$175,000.00	\$29,000.00	China(25000), UK(4000)
Host Nation's Additional IR Subscription (one extra principal membership fee)	\$25,000.00	\$25,000.00	
ISA Fellowships	\$15,000.00	0.	This amount was transferred from UK office
Total Income by Financial Year	\$215,000.00	\$209,650.00	
Spend	proposed	actual	
Expenditure for Each Financial Year	2013	2013	
Salary for IR Coordinator	\$82,000.00	\$72,620.00	
InterRidge office's Travel and Subsistence	\$22,000.00	\$15,469.00	
InterRidge Office Set-up and Consumable Costs	\$6,000.00	\$3,500.00	
InterRidge Web Site Relocation, Computer Server, and Maintenance Costs at PKU	\$10,000.00	\$9,189.00	
Web Site Translation Services	\$5,000.00	\$0.00	
IR Sponsorship of Meetings and Workshops (\$5,000 each)	\$20,000.00	\$0.00	
IR Steering Committee Meetings	\$10,000.00	\$10,000.00	
InterRidge and ISA Fellowships	\$30,000.00	\$25,000.00	
Publishing (InterRidge News)	\$10,000.00	\$5,000.00	
Professional and Media Outreach	\$7,000.00	\$3,000.00	
IR Mobility Awards for Science Cruise Participation	\$10,000.00	\$12,600.00	
Student Prizes at International Meetings	\$3,000.00	\$1,500.00	
Total Expenditure by Financial Year	\$215,000.00	\$157,878.00	

