

# 2020 InterRidge Update for SCOR

## I) InterRidge – International Cooperation in Ridge-Crest Studies

Since its creation in early 1990's, InterRidge has been an international forum for mid-ocean ridge (MOR) scientists, expanded to regions beyond ridge crests to include deep-sea basins and other plate boundaries as well as biological processes in those extreme environments. InterRidge promotes interdisciplinary studies by creating a global research community, planning, and coordinating new science programs that no single nation can achieve alone, exchanging scientific information, and sharing new technologies and facilities. InterRidge plays a dual role. Its primary aim is to favor the emergence of new concepts and makes possible ambitious experiments at international level. InterRidge also supports community-wide initiatives such as the definition and dissemination of a code of conduct for scientific studies in relation to chemosynthetic hot-spot ecosystems and their vulnerable environments. More recently, with the growing interest of countries and industries for deep-sea mineral resources, including seafloor massive sulfide (SMS) deposits at MOR, InterRidge has become a voice of expert scientists in different fora. Through its observer status at the International Seabed Authority (since 2012), particularly, InterRidge developed formal interactions with this organization created under the United Nations Law of the Sea (UNCLOS).

InterRidge scientific activities are currently led under the frame of the 3rd Decadal Plan 2014-2023 'From Ridge Crest to Deep-Ocean Trench: Formation and Evolution of the Oceanic Crust and Its Interaction with the Ocean, Biosphere, Climate and Human Society' launched in 2012. Thus InterRidge expands its focus beyond the ridge crests and basically covers the entire ocean basins. Beside its affiliation with SCOR, InterRidge program has links with international research programs such as the International Ocean Discovery Program and the International Lithosphere Project. InterRidge activity includes meetings and workshops where the advancement of scientific knowledge, new issues, methodological improvements and standardized protocols are discussed. InterRidge also dedicates itself to interact with the public, scientists and governments, and to provide a unified voice for ocean ridge researchers worldwide. While committed to the advancement of fundamental science, an increasing role for InterRidge is our involvement in compiling information and advice for policy makers. The multidisciplinary coverage of InterRidge working groups give the organization a key role in future discussions concerning the exploration and exploitation of mineral resources associated with ridges, volcanic arcs, back-arcs, deep-sea basins and associated hydrothermal systems.

InterRidge has a Steering Committee comprising representatives of the member countries and of working group chairs that are scientists nominated for their expertise in a particular field. The Steering Committee meets at least once a year (the last meeting was held on 20-22 June 2018 in Bergen (Norway), the next one is planned on 13-14 June 2019 in Tokyo (Japan). The Steering committee considers updates to its Science Plan, endorses InterRidge memberships, approves the budget, decides on membership fees, oversees the operation of the InterRidge Office, reviews bids for the InterRidge Office and nominates the Program's chair. It also evaluates working group progress, assesses and admits/rejects working group proposals, and nominates the working group leaders.

The InterRidge contribution is 25 000 US\$ for a Principal Member country and 5 000 US\$ for a Regular Member country. Considering the present membership (China, Japan, Norway, and Republic of Korea as

Principal members and Canada, Germany, India, Norway, Poland, and UK as Regular members) and the double contribution for the host country, the resulting annual budget is c.a. 155 000 US\$.

As a result of COVID-19 global pandemic, many past activities of InterRidge has to be changed in 2020. Many workshops and meetings will have to be done online. At present, as of June 2020, many countries cannot send their research vessels beyond their borders, because of the entry restrictions enacted at foreign ports.

## II) Achievements and changes during the last year

### 1) InterRidge Office

Every three years the InterRidge office transfers to a new host institution in a new host country. This year the InterRidge office transferred from the Institut de Physique du Globe de Paris (IPGP) in France, to InterRidge Korea (IR Korea), in Republic of Korea managed under Seoul National University (SNU).

The InterRidge Office is hosted in Republic of Korea by InterRidge Korea, an organization formed under Seoul National University to take responsibility of budget management and administration of the program. Sang-Mook Lee ([smllee@snu.ac.kr](mailto:smllee@snu.ac.kr) SNU, marine geophysics) is the chair of the program. Erik Sevre ([interridge@gmail.com](mailto:interridge@gmail.com)) is the InterRidge Coordinator since 1<sup>st</sup> January 2020. Seongjun “Kyle” Park ([seongjun.kyle.park@gmail.com](mailto:seongjun.kyle.park@gmail.com)) is the InterRidge Logistics Coordinator since 1<sup>st</sup> January 2020.

### 2) Steering Committee Meetings

#### a) Steering Committee Meeting, Tokyo Japan 13-14 June, 2019.

The Steering Committee held the annual meeting to cover the usual auditing of the running of InterRidge. Additionally, we discussed the future hosting of InterRidge, which would eventually transfer host nations from France to the Republic of Korea.

#### b) Steering Committee 2020 Remote Meeting

On 21, May 2020 we held an online meeting for the IR Steering Committee.

During the Steering Committee meeting we discussed the possibilities of holding more meetings online during the travel restrictions and complications that have been presented in 2020. We are hoping to expand on using the online format to host more talks that people can participate in online. In particular, a suggestion was made to build an online InterRidge lecture series in this time of COVID-19.

During this meeting we discussed adding Seung-Sep Kim was introduced as a prospective new Steering Committee member for Korea. After the meeting, the committee was asked to vote on him joining the Steering Committee, and all votes affirmed his joining the Steering Committee so he is now a member of the Steering Committee.

A new working group candidate was introduced to the Steering Committee. The MacroCHESS proposal was presented to expand on the current IR Vents Database, by expanding the data that will be available to scientists. A vote was held over email, and all votes were in favor of adding the MacroCHESS WG, so it has been added as a new IR WG.

### 3) ISA 25<sup>th</sup> Session – DeepData

July 2019: Attendance to the 25<sup>th</sup> session of the ISA Council (Part 2) and General Assembly

The second part of the 25<sup>th</sup> annual session of the International Seabed Authority (ISA) was held in Kingston (Jamaica) between 15 and 26 July 2019. This Session included meetings of the Authority Council and Assembly, focused on the draft regulations on exploitation of mineral resources in the Area and on the ISA Strategic Plan, respectively.

Of major importance for the scientific community was the launch of the DeepData database, which will serve as the principle repository of all deep-seabed related data collected in the international seabed area (Area). In its current state, the database contains biological, physical and geochemical parameters of the marine ecosystems from the seafloor to the ocean surface, submitted by ISA's 29 contractors and covering approximately one per cent of the Area. The database can be accessed at: <http://data.isa.org.jm>.

Delegates from more than 70 countries commemorated the 25<sup>th</sup> anniversary of the ISA with a special session on Thursday, 25 July. Dr. Maurício Shimabukuro from the Institute of Oceanography at the University of São Paulo (Brazil) was granted the ISA Secretary-General Award for Excellence in Deep Sea Research.

#### **4) InterRidge Working Groups**

This year IR approved a new WG to focus on biological issues. InterRidge was founded initially with an interest in geophysical issues, however biological issues have expanded the interest in seafloor studies. This year a new MacroCHESS WG was proposed to explore the global distribution, composition, and relationship of species occurring in chemosynthesis-based-ecosystems (CBEs) at both global and regional scales. The goal is to expand the IR Vents Database by compiling a distribution of species occurring on hydrothermal vents, cold seeps, and organic remains.

#### **5) Report on InterRidge Sponsored Meetings**

##### **a) Euromarine Foresight Workshop: Advances in Ocean Biological Observations**

The workshop "Advances in ocean observations – sustained system for deep-sea meroplankton" took place at Aveiro University (Portugal) from May 27<sup>th</sup> to 29<sup>th</sup> 2019. The objectives of the workshop were: 1) to summarize knowledge and recent progresses on the distribution and biology of deep-sea larvae (the major part of meroplankton), and available instruments and technologies dedicated to the observation of plankton in surface and deep waters; 2) to develop a strategy to implement technological innovations for in-situ observations allowing larval distribution characterization at multiple scales.

##### **b) Seamounts and Islands Associated with Mid-Ocean Ridges (Lisbon, 19-21 September 2019, Portugal)**

Short report from the workshop of the WG on Seamounts and Islands associated with MOR. During the three days of the workshop of the Working Group on Seamounts and Islands associated with Mid-Ocean Ridges, held on 19-21 September in the Instituto Hidrográfico in Lisbon (Portugal), the international participants discussed the main scientific and logistic challenges related to research of seamounts and islands. They reshaped the definition of the working group so that it will act as an umbrella for fundamental and applied research on large edifices that formed in the proximity of Mid-Ocean Ridges. The main research questions to be addressed deal with the cycling of energy and materials in these

enigmatic environments and the interaction between processes related to solid Earth and those in the hydrosphere, biosphere and atmosphere. The possibilities of a larger networking proposal will be evaluated in the near future in a subsequent workshop to be held in 2020.

Final report here: [https://www.interridge.org/files/interridge/MORISreport2019\\_final.pdf](https://www.interridge.org/files/interridge/MORISreport2019_final.pdf)

c) **Hydrothermal Ore-forming Processes and the Fate of Seafloor Massive Sulfides Deposits along Slow and Ultraslow Spreading Mid-Ocean Ridges, Hangzhou 19-21 September**

Sept. 2019: InterRidge Workshop on Hydrothermal Ore-forming Processes and the Fate of Seafloor Massive Sulfides Deposits along Slow and Ultraslow Spreading Mid-Ocean Ridges, Hangzhou 19-21 September (Final Report here: <https://www.interridge.org/node/17905#attachments>)

[Short report from the workshop of the WG on Seafloor Massive Sulfides Resource along MOR] More than 150 SMS-related international scientists and students participated in this workshop, organized by the Working Group on SMS resource along MOR and held on 19-21 September in Hangzhou (China), and had in-depth discussion with focus on the theme of "hydrothermal ore-forming processes". The participants exchanged ideas in various ways – primary/early career presentations, posters, plenary and break-out brainstorm. The most important outputs of this workshop are: the summary of the known/unknown BIG questions existing in the SMS formation, distribution and preservation; and the collected ideas on how to solve the questions of great significance to guide the subsequent SMS exploration and the related research along MOR. The Working Group has agreed to organize the next Workshop in 2020 to further promote the progress of SMS resource related disciplines.

d) **InterRidge Theoretical Institute “Hydrothermalism in 4D”**

The Theoretical Institute “Hydrothermalism in 4D” InterRidge was held on November 18-20, 2019 in Banyuls (France). Organized by the InterRidge office (CNRS-SU-IPGP), it was hosted at the Sorbonne University Marine Station and Oceanological Observatory of Banyuls. 33 participants from 9 countries (Canada, Chile, France Germany, India, Japan USA, Norway, Republic of Korea) attended the event, including 12 students and early carrier scientists.

Recent advances in fundamental research and exploration have raised new interest and scientific challenges concerning hydrothermal processes, their links with tectonic complexities and interactions with magmatic activity, contribution to ocean element budgets, role in deep-sea biodiversity and ecosystem functions, temporal dynamics and resilience to disturbance. Along with these emerging themes, the current scientific momentum is supported by methodology and knowledge transfer needs for mineral resource assessment and environmental and ecological status monitoring. In this context, building an integrated vision of hydrothermal processes over space and time, on which quantitative approaches and predictive models should be based, reveals crucial.

Invited lectures on the first two days, addressed fundamental issues at the forefront of current hydrothermal research. Lectures targeting young scientists from different disciplinary fields proposed syntheses of recent works, bridging methodological and theoretical advancement.

Following lectures, workshop sessions were organized on four emerging themes: **Session 1 ‘Export of vent derived chemicals: from near-vent reactivity to long-range transport’, Session 2 ‘Chemosynthetic**

**carbon: drivers of productivity at active and inactive vents, Session 3 ' Basin scale distribution of hydrothermally driven processes from ridges to subduction zones, Session 4 'Massive Sulfide deposition, alteration and biological diversity'**. Keynote talks introduced sessions focusing on state-of-the-art and recent advances from geoscience and ecology-biology perspectives, complemented by short talks and an early career poster session.

The discussions allowed to identify key issues and future topics and help structuring the writing groups and precise their objectives. Exchanges on new technologies, interdisciplinary challenges (including capacity building and methods/tools sharing across disciplines) contributed setting up the scene for the next decade plan of InterRidge, underlining critical knowledge gaps and perspectives from the current research momentum. The ultimate goal of discussions and writing sessions of the Theoretical Institute was to draft a position to suitable paper to strengthen the fundamental frame and develop strategies to fill remaining gaps, while sharing recent advances in basic knowledge with the growing community of scientists interested in vent systems.

Final Agenda and abstracts here:

[https://www.interridge.org/files/interridge/IR\\_Theoretical\\_Institute\\_2019\\_Programme%20and%20Poster%20abstracts\\_Vf.pdf](https://www.interridge.org/files/interridge/IR_Theoretical_Institute_2019_Programme%20and%20Poster%20abstracts_Vf.pdf)

### III) InterRidge Outreach and Community Support

#### a) InterRidge Fellowship:

As every year the InterRidge Student and Postdoctoral Fellowship Program continues to play an important role in the careers of young ocean scientists. There was a high number of proposals submitted this year and we are pleased to award two early-career researchers in this call.

The recipients of InterRidge Fellowships in 2019 were:

Jakub Ciężela - a post-doc at Polish Academy of Sciences, Wrocław, Poland

Guilherme Weber Sampaio de Melo - a graduate student at Federal University of Rio Grande do Norte, Brazil

(See here for CVs and Report from the two awardees:

<https://www.interridge.org/2019awards>)

#### b) InterRidge Cruise Bursaries:

In 2019 three bursaries were awarded to talented students.

Dominik Palgan, Poland, participated with Fernando Martinez from Hawai'i USA . Dominik Palgan participated on a cruise to research the formation and elimination of segmentation and transform faults on the Reykjanes Ridge.

Nicole Morgan, USA, participated with Dhugal Lindsay from Japan. Nicole Morgan joined a cruise funded by JAMSTEC to study characterize undersampled oligotrophic waters of the South Pacific.

Gabriella Alodia, UK, Joined Henry J. B. Dick, USA on scientific cruise to the Marion Rise, SW Indian Ridge, February-March 2019. This cruise investigated the hypothesis that the Marion Rise is isostatically supported by ancient residues of a prior melting event.

Three awarded in 2019, see Here: <https://www.interridge.org/node/15913>

**c) Update of the IR Vent Database**

The InterRidge Vent database has been continuously updated by Kamil Szafranski and Stace Beaulieu in 2019. The database is currently be transferred to the Korea office, where Erik Sevre will take over for Kamil in assisting Stace in the maintenance of the database. The InterRidge Cruise database was updated as information was made available to the Coordinator. In the coming year we are planning to update the database with new information that will be coming in from the newly formed MacroCHESS working group.

**IV) Plans for the future development of InterRidge**

It is our goal to maintain InterRidge as an efficient scientific forum of experts. We hope to expand online communities to facilitate communication during travel restrictions caused by COVID-19. We hope to open new working groups and co-organize workshops with our current working groups.