SCOR Working Group Proposal Template
(max. 6250 words, excluding Appendix)

Title: Marine Sediment-Water Interface Interdisciplinary Studies

Acronym: MarSWIIS

Summary/Abstract (max. 250 words)

Evidence is mounting that processes in the uppermost sediments dynamically effect the biogeochemistry of the oceans. The importance of the sediment-water interface (SWI) is not reflected in our state of understanding about upper sedimentary processes nor their impacts on the overlying water column and marine environment/ecosystems. SWI research is an interdisciplinary field and recent advances demonstrate the importance of the SWI both marine science as well as in broader terms that range from sea floor mining of strategic metals to potential for natural products for the health services industry. This WG will have practical and actionable goals: Develop a roadmap that will aim to determine and offer plans to tackle the most outstanding gaps in understanding, specifically: ***What are the (biological, thermodynamic) sedimentary processes driving positive benthic geochemical fluxes? Do these constitute "reverse weathering" and "ocean weathering"? How significant are these processes to oceanic and global budgets?*** The WG will strongly involve younger scientists to pursue this area of research; with particular WG goals of sharing experience and knowledge on the practicalities of working in this very remote environment.

1. Scientific Background and Rationale (max. 1250 words)

The largest interface in the world is that between the ocean and the sediments [1]. Essentially due to challenges of accessibility, however, a preponderance of research focuses on more accessible interfaces (e.g., surface ocean, estuaries) while deep sea sediments remain disproportionately disregarded. The seafloor is diverse and complex, and, notably, largely well oxygenated (at least at the SWI) [2] and much prior work in sub/anoxic basins does not readily apply to most of the ocean's area. Thus, despite notable advances in our understanding of the SWI [3,4], gaps in our knowledge of the global SWI persist. This proposal aims to address the critical role played by the SWI in whole-ocean marine biogeochemical cycling – beyond that simply as a terminal sink.

Some of the clearest signals of SWI processes are seen in trace metals and their isotopes[3]. The source of these signals – possibly the direct result of microbial action, either via organic carbon (OC) or geophysical/mineralogic transformations – is largely undetermined. International programs such as the SCOR-supported GEOTRACES program have provided key insights into geochemical 'connectivity' [5], and a growing number of these global-scale findings are being attributed to influences of the seafloor on the water column [6,7]. Unfortunately, these GEOTRACES studies have not provided *direct* observations of SWI geochemistry. The relatively few direct studies of SWI geochemistry – e.g., Fe, Be, Nd, Ni isotopes – have confirmed significant benthic influence on water column trace metals [6-9]. From these studies it appears that even *oxic* deep sea sediments are a potential source of these trace metals, and, when globally integrated over the area of oxic sea floor, could constitute the largest marine input fluxes. Interestingly, these sediment element sources are possibly linked to the formation of authigenic clay minerals that may couple with chemical weathering of lithogenic sediments, i.e., reverse marine silicate weathering [10]. Forward and reverse marine weathering may have important implications as a geoengineering tool to reduce atmospheric CO_2 concentrations for the former [11] and as a CO_2 source for the later process [12], although such a conjecture is not certain [13]. In either case, sedimentary processes are likely an important component in the balance of ocean alkalinity, and thus the long-term chemo- and thermo-stat of the Earth, as well as an immediate influence on the biology at the SWI and likely the greater ocean [14].

It is likely that organismal organic carbon mineralization drives much of the elemental cycling in seafloor sediments. Sedimentary OC is largely determined by microorganisms through a network of metabolic reactions [15,16]. Although genomics approaches have revealed the diversity and metabolic potentials of these microbes [17], their ecological roles in the environment remains uncertain. For example, novel organisms, such as cable bacteria, have been discovered as important players in elemental cycling in sediments [18,19], while another recent study revealed that macrofaunal activities control microbial community structure in the sediment [17]. Despite these discoveries, we lack a quantitative understanding of the roles of living organisms in OC transformation in seafloor sediments.

The key outstanding questions we seek to address are:

Q1. What are the biologic/chemical (thermodynamically) processes in the sediment that drive elevated pore water trace elemental concentrations that lead to positive benthic fluxes? How can we account for the biological contributions within geochemical models?

Q2. How are the oceanic elemental budgets effected by benthic sources? Are SWI processes of global budgetary importance e.g., via "reverse weathering" and "ocean weathering"?

Q3. What are the tools we have and tools we need to better understand the SWI?

<u>*A primary goal of this SCOR WG proposal is to synthesis existing knowledge, identify outstanding topics of interdisciplinary research through answering the three questions posed, and promote an organized and skilled community to advance the field forward. This proposal will build network, develop common themes and design technologic solutions that can answer these questions.*</u> Our WG is envisioned as following the sequence of two other programs:

First, we intend to pick up from the original GEOTRACES plan to explore the "sediment-water boundary" and "regeneration at the seafloor" (Themes 1 and 2) [5] that to date has largely been "shelved" due to technical issues of contamination potential and conflicting sampling goals inherent for water column versus sedimentary work. Second, based on insights from GEOTRACES, and the more recent BioGeoSCAPES, we intend for this WG to actively incorporate, from the start, microbiologists. There is ample evidence that microbes and biology are critical in the early diagenetic processes, and can impact the geochemistry of the SWI through important shifts in pH and alkalinity via carbon remineralization [16].

In order to answer the questions posed, the WG will first need to compile existing data of all types (biologic, geologic, and chemical) into a structured database. This initial data set is necessary to be able to begin a comprehensive analysis and begin to answer Q1 and Q2. There are many published studies, but these are all anecdotal and would offer better explanatory power when synthesized – much like water column data prior to GEOTRACES. Moreover, the data types – biologic, chemical, geologic – are often isolated. We hope to use an integrated data base to better answer Q1 and Q2.

Disciplinary Integration:

This WG will be proactive in bridging disciplinary gaps between geology, chemistry and biology. In addition, we hope to include experts in other disciplines to help answer the three questions we have posed. These experts include physical oceanographers, geophysicists and modelers, as follow:

Wind and tides impact the fundamental physical properties of the upper ocean and shallow, near-shore sediments [20], and it is becoming clear they also influence the SWI to much greater depths [21-23]. For example, internal waves have recently been observed penetrating deep (thousands of meters) and physically stirring slope sediment in the South China Sea [24].

Early marine diagenesis has potentially dramatic impacts on magnetic mineral diagenesis and authigenesis [25,26], especially if the processes involve microbial targeting of Fe, S and (more indirectly) C bearing minerals [27]. At oxic sediment-water interfaces, Fe-bearing magnetic minerals form and transform, resulting in complex magnetic mineral assemblages with minerals of detrital, authigenic and biogenic origin [28]. Biogenic magnetic minerals, produced by magnetotactic bacteria, actively cycle Fe^{3+} and Fe^{2+} in porewater, resulting in iron mineralogies that have unknown impacts on sedimentary mineral assemblages and thus natural sedimentary magnetism [25,27 29-32].

There is an increasing ability to incorporate biogeochemistry into Earth system and global circulation models that aim to heuristically understand and predict larger ecosystems [33,34]. Only fairly recently have these models begun to include the SWI, focusing primarily on the water column. Those that do [35] mostly consider the seafloor as a generalized source/sink term, without any detailed mechanistic representation of the exchange processes involved. Recent efforts have attempted to improve this situation, through (1) new approaches that allow flexible construction of dynamic, rather than static, pH models for pore water based directly on biogeochemical reaction rates in sediments [36,37], and (2) improvements in seawater models that aim to provide a thermodynamic foundation for calculations of pore water TEI speciation [38,39] – the one being developed by SCOR Working Group 145.

2. Terms of Reference (max. 250 words)

1. Create a database structure for sediment data, and populate it with existing published data, with particular objective to aid modelers; To include chemical data, physical data, biological data in solid phases and fluid phases. Analogous to the situation for water column data before the advent of programs like GEOSECS and GEOTRACES, there is a clear need for systematic data structures and archiving of SWI data. The WG would seek to develop an initial database suitable to use by scientist in all disciplines and that will facilitate future modeling and potentially AI-based work.

2. Develop a "Standard Operating Procedure" (SOP) for SWI observations. The intention is two-fold; First, to develop the best possible sampling protocols for diverse (biologic/geologic/chemical) sampling of the SWI, defining the operation, requirements

and limitation of equipment used by the various discipline scientists. Second, to aid in development of novel equipment, as described next.

3. Identify potential systems for in situ and remote sampling of biologic, geophysical and geochemical data, utilizing remote systems or deep-sea cabled network nodes. Researchers are generally still reliant on various coring devices and shipboard sample recovery: with notable exceptions [40]. Novel technologies aimed at overcoming these observational hurdles – e.g., Lyu, et al. [24] - and the potential of integration of such technologies with deep sea cabled networks (e.g., Ocean Observatory Initiative in the USA; National Undersea Scientific Observation Network in China led by Tongji University) will be addressed in this WG.

3. Deliverables (state clearly what products the Working Group will generate. Should relate to the terms of reference. Max 250 words). A workshop is not a deliverable. Please note that SCOR prefers that publications be in open-access journals.

The WG deliverables will largely follow the goals outlined in the Terms of Reference.

1. The WG will publish a manuscript describing "state of the science" for publication in *EOS* or another open-access journal.

2. Website database – or module of existing databases, to be made open-access and integrated with visualization applications, such as ODV. It is unlikely a comprehensive database will be made, rather a universal template will be made that might be populated by extant or future data. This database will be used to investigate the questions described above.

3. Creation of a SOP type document to be made available to everyone on the web-page (see below). We also will populate SWI data collected following this SOP to test the website database utility.

4. The WG will initiate a web-page for the community. Hosted by SCOR (https://scor-int.org/work/groups/), the website will make available (downloadable or otherwise) a White Paper for use by greater community and funding agencies, explaining the broader themes and goals of the community to advance the science and technology on SWI observations. The website will also serve to host the SOP documents and database template information as well as connect researchers, particularly those in different disciplines and interested in SWI research.

4. Working plan (logical sequence of steps to fulfil terms of reference, with timeline. Max. 1000 words)

The following outlines our plan for the WG agenda for three years. Only rough timelines are given, such that we can plan meetings to coincide with international conferences (e.g., AGU) to better facilitate participation of the WG members and associate members. All meetings will focus on answering the three questions posed, and produce the deliverables listed.

0 to 6 Mo: Organize Meeting 1. Initially, the full and associate members will meet through email/online meetings, focusing on canvassing the larger community for interest and to advertise the meeting. A website will be made – hosted by GitHub or other - for the meeting to post information and request input from the community. (If funded, we will also seek support from other sources to develop the website.) This will provide the basis for organization of Meeting 1.

Meeting 1(hybrid in-person/online): Meeting 1 will begin with an introduction, then separate into smaller working groups. These will begin along disciplinary lines to generate lists that will:

- evaluate the state of the science per discipline
- delimit key known precepts and targets for future research
- identify cross-overs between disciplines
- outline published data sets available for data mining and discuss their structures

A second breakout of working groups will then seek to inspire mixing of disciplinary groups, to foster connections and collaborations.

The meeting deliverable will be a synthesis of all the working group findings, compiled and presented towards the end of the meeting and discussed with respect to a publication that summarizes the results of the meeting.

6 to 12 Mo: Synthesize the results of Meeting 1, draft a paper for circulation/editing amongst the WG. Then submit this paper for publication, after comments are received, in EOS/EOS buzz or other open-access journals. Work will begin on developing an online database, in conjunction with existing entities (BCO-DMO, Zenodo, Pangaea, ODV).

12 to 24 Mo: Organize and hold Meeting 2. Meeting 2 will focus on identifying the needs for technological improvement of seafloor in-situ observations and sampling, as well as developing the appropriate structure of the database on all sorts of SWI data.

Additionally, in accompany with Meeting 2, we will attempt to organize a short (2 or 3 days) cruise to train – or expose – the participants to sampling equipment, including CTD, coring devices, ADCP, trawl. The handling and treatment of samples will also be demonstrated (e.g., for DNA samples, nutrient samples, trace metal samples etc.). The collected biological, geochemical and geophysical dataset will also be uploaded to our database as an example of the integrated dataset. This cruise will be used as a trial run of the SOPs developed by the working group. Following the cruise, a handbook of SOP information will be made available on the website for the equipment.

24 to 30 Mo: Organize Meeting 3. Advertising and requesting input from the community via the established website. We aim to provide a beta version of the data archives for feedback purposes. Inclusivity and involvement of younger scientists will be actively pursued.

Meeting 3 (hybrid in-person/online): In this meeting, we plan to polish ideas generated in the prior two years of the WG, and write a White Paper designed for funding agencies. Our key objective here is to present a comprehensive plan of research goals that will lead to funding further basic research. This plan will specifically include ideas for novel sampling equipment, and we hope to include key personnel in this WG meeting from the OOI cabled networks to help guide designs. The meeting deliverable will be draft a White paper for circulation/editing among the WG.

30 to 36 Mo: Make publicly available a finalized White Paper, based on comments/edits received.

5. Capacity Building (How will this Working Group build long-lasting capacity for practicing and understanding this area of marine science globally. Max 1500 words)

The SWI is one of the most logistically challenging environments on Earth to study. Mastery of this domain requires more than theoretical knowledge; it demands hands-on expertise in specialized sampling, expensive infrastructure (e.g., ship time), precise analytical techniques, and the ability to integrate disparate data streams. Our vision for this WG is to build a global and capable community of SWI scientists by building a network of experts that might work together to share critical resources and hands-on expertise, which have historically been limited. The most significant barrier to advancing SWI science is not a lack of interest, but lack of an effective network of people sharing disparate ideas and resources that might lead to further collaborations and broader understanding.

Therefore, our capacity-building philosophy is centered on direct, immersive experience and the creation of enduring, open-access resources. We will implement a program built around: (1) Development of Open-Access Infrastructure, including standardized protocols and an open-access data portal; (2) Global Knowledge Exchange through a dedicated webinar series; and (3) Targeted Support for Scientists in Developing Nations. This integrated strategy is designed to create a lasting legacy, empowering a new generation of researchers worldwide to ask and answer the most pressing questions at the sediment-water interface.

1) The SWI Cruise Program

Key to capacity-building is hands-on training designed to share and transfer the valuable skills required for successful SWI research in all disciplines. We will attempt to organize an intensive 2 or 3-day SWI Training Cruise during the WG's tenure, in any available location where a full member can offer access to a research vessel and equipment. Cruise opportunities will be pursued at OSU and Tongji, and we will be open to opportunities via other members as well. For example, Tongji University, where Prof. Kai Deng (co-chair) is based, operates a brand-new (built in 2025) research vessel named "Tongji." With a displacement of ~2500 tons, the ship is equipped with all the instrumentation required for SWI sampling, including a CTD, multi-corer, box corer, gravity corer, ADCP, and more. Prof. Deng has spoken with the chair of the ship management committee, Prof. Shouting Tuo, who is happy to discuss the details of organizing such training cruises if this WG is funded. The training cruise will offer an immersive experience for participants, with a strong focus on Early-Career Scientists (ECS) from developing countries. The curriculum will be a masterclass in SWI operations, covering the full workflow from planning to data recovery. Key training modules could include:

Coring and Sampling Techniques: Participants will gain direct experience deploying and recovering a suite of coring devices, including multi-corers for high-integrity sediment-water interface samples, gravity corers for deeper penetration, and box cores for larger sediment volumes. They will learn the critical art of core handling on a moving vessel. *Shipboard Measurements*: Training will cover the measurement of parameters such as water oxygen, pH, current velocity, biodiversity, and so on. *Porewater Processing*: Participants will learn best practices for sectioning cores, extracting porewater using rhizons and/or squeezers, and preserving samples for a range of chemical and biological analyses. *Data Management*: A dedicated session will focus on real-time data logging, metadata standards, and the immediate steps required to ensure data quality and usability.

Being synchronized with a WG meeting will facilitate participation costs for WG members; other participants will be welcome depending on space and independent funding. We will actively advertise these opportunities through networks like ECOP Programme, POGO, IODP, GEOTRACES, and regional marine science associations. To ensure broad geographic representation, we will urge of applicants from developing countries and emerging economies. This direct investment in human capital is the most effective way to build global capacity and foster truly international collaborations.

2) Open-Access Infrastructure – SOPs and a Centralized Data Portal

We will create two key, enduring resources that will serve as the foundation for global SWI research for years to come.

Publication of SOP for Seafloor Sampling: A primary deliverable of our WG will be the open-access and comprehensive SOP for Sediment-Water Interface Sampling and Analysis. This manual will be a living document, co-authored by the WG's members. It will provide detailed, step-by-step, illustrated guides for all major SWI techniques, including: detailed checklists for pre-cruise planning and equipment preparation, procedures for the deployment, recovery, and immediate processing of different corer types, standardized methods for measurement of selected parameters, and data templates and metadata standards to ensure consistency and interoperability. By hosting it on our website, we will lower the barrier to entry for labs worldwide, reducing the learning curve and improving the quality and comparability of global SWI data. Additionally, the document generated will be translated into a number of languages for greater utility.

A Publicly Available SWI Dataset and Portal: To catalyze new science, data must be findable, accessible, and usable. We aim to create a centralized online portal that will serve as the world's premier repository for all sorts of SWI data. This portal will have two key functions.

1. A Curated SWI Dataset: All data generated during our training cruise—including physical, chemical and biological parameters—will be quality-controlled, standardized according to our new SOP, and made publicly available with a DOI. This will serve as an immediate, high-quality resource for modelers and researchers globally.
2. A Community Data Hub: The portal will be designed to accept data contributions from the wider SWI community. It will feature a user-friendly submission interface and a searchable catalog of existing SWI datasets from spatially distributed and time-series stations compiled by our WG members. This will not only prevent valuable data from being lost in "file drawers" but will also facilitate large-scale synthesis studies.

3) "SWI Spotlight" Webinars

Webinars offer unparalleled breadth and accessibility. We will leverage this tool to maintain a constant dialogue within our community and ensure our benefits reach those who cannot participate in person. We will organize and host a free webinar series every other month. Each session will feature a presentation from a leading expert on a cutting-edge SWI topic or from an ECS on their current research project, followed by an interactive Q&A session. Topics will emphasize both scientific and technological perspectives. We will actively invite speakers from a diverse range of countries and institutions. All webinars will be recorded and archived on a media platform and indexed in our data portal, creating a permanent and growing library of educational resources accessible to anyone with an internet connection.

The spotlight seminars will be organized in different time zones to ensure equitable access for our global audience, accommodating regional work schedules. These seminars will also be promoted through region-specific communication channels, including social media, academic networks, and professional societies, to maximize visibility.

4) Proactive Involvement of Developing Countries

Our commitment to developing nations is woven into the fabric of the WG. Beyond the cruise, we will use our webinars and virtual meetings to connect researchers from developing countries with our global network of experts, providing them with opportunities to seek advice on research design, data interpretation, and proposal development. Additionally, all our deliverables—the SOP manual, the webinar recordings, and the data portal—will be designed to be accessible in public.

This WG will create a powerful and self-sustaining ecosystem for capacity building. We will not just be studying the sediment-water interface; we will be building the global community and infrastructure needed to understand it for generations to come.

6. Working Group composition (as table). Divide by Full Members (10 people) and Associate Members (max. 10 people), taking note of scientific discipline spread, geographical spread, gender balance, and participation by early-career scientists. Proponents may also include a short rationale for the composition and balance. (max. 500 words)

Full Members (no more than 10, please identify chair(s))

Name	Gender	Years since degree*	Country and institution of affiliation(s)	Expertise relevant to proposal
Haley, Brian (Co-Chair)	M		Oregon State Univ., USA	Geochemistry
Deng, Kai (Co-Chair)	M	6	Tongji Univ., China	Geology
Noble, Tayrn	F		Univ. Tasmania, Australia	Geochemistry
Hong, Wei-Li	M		Stockholm Univ., Sweden	Modeling
Wang, Fengping	F		Shanghai Jiao Tong Univ., China	Microbiology
Singh, Sunil Kumar	M		National Institute of Oceanography, India	Geochemistry
Vásquez, Ana Cristina	F	2	Latin American University of Science and Technology, Costa Rica	Modeling and geochemistry
Lessin, Gennadi	M		Univ. Plymouth, UK	Modeling
Chen, Yunru	F	3	MARUM, Germany	Microbiology/Chemistry
Morales, David	M		INVEMAR, Colombia	Geochemistry

* Field only required for members identified as early career: 10 years or less post-degree, not counting time off for family leave.

Associate Member (no more than 10)

Name	Gender	Years since degree*	Country and institution of affiliation(s)	Expertise relevant to proposal
Haulofu, Mayday	F		Univ. of Namibia, Namibia	Biology
Mahmoudi, Nagissa	F		McGill Univ., Canada	Microbiology
de Mahiques, Michel	M		Univ. de Sao Paulo, Brazil	Physics/Chemistry
Dionisi, Hebe	F		CESIMAR, Argentina	Biology/-omics
Sulpis, Oliver	M		CEREGE, France	Modeling and geochemistry
Zhang, Yanwei	F		Tongji Univ., China	Physical Oceanography
Abbott, April	F	8	Coastal Carolina Univ., USA	Geochemistry
Kars, Myriam	F		Plymouth Univ., UK	Geophysics/Magnetics
Nmor, Stanley	M	3	NIOZ, Netherlands	Modeling

* Field only required for members identified as early career: 10 years or less post-degree, not counting time off for family leave.

7. Working Group contributions (max. 750 words)

Detail for each Full Member (max. 2 sentences per member) why she/he is being proposed as a Full Member of the Working Group, what is her/his unique contribution? General role of the Associate members (e.g., connections to related efforts, mentorship, geographic reach, etc)—can be per person or in general.

Haley has over 10 years sampling and studying pore water geochemistry, with special expertise on the rare earth elements and their isotopes. He has recently been a proponent of a "bottom up" or benthic-control hypothesis for the biogeochemistry of these, and possibly other, trace metals.

Deng has over 10 years experience in marine geology, with special expertise in sediment and element source-to-sink processes. He combined field observations on land and at the seafloor, and utilized numerical modeling approaches to develop the 3-dimentional model of oceanic element cycling.

Noble has over 10 years of experience studying sediment and seawater geochemistry, with specific expertise in radiogenic isotopes (Th, Pb, Nd and Sr) and past carbon cycling in the Southern Ocean. She has recently led multiple Antarctic field programs to investigate benthic flux processes at the ice-ocean-sediment interface in East Antarctica.

Hong has an extensive track record of investigating how early diagenetic reactions affect the turnover of carbon, sulfur, boron, iron, and silicon in shallow marine sediments. He has applied advanced reactive transport modeling to downcore porewater and sediment profiles to quantify benthic fluxes and biogeochemical reaction rates.

Wang has worked on marine sedimentary microbes since 2003, she has contributed in understanding the roles of microbes, especially the uncultivated sedimentary archaea in degrading recalcitrant organic carbon and alkane transformation.

Singh has 20 years of experience in dealing with biogeochemical cycling of trace elements and isotopes in the Indian Ocean focussing on determining their sources, sinks and various water column and sedimentary processes impacting their distribution. His studies on the key trace elements, such as Fe, Mn, Zn, Ni, Cu, Co, Cd and isotopes such as Sr, Nd, Mo and Si in the Indian Ocean suggest large-scale contribution of many of these elements and isotopes from the continental shelf sediments, deoxygenation, atmospheric deposition, etc.

Vasquez has 15 years of experience bridging climate science and policy, including extensive DEIJ initiatives. Her expertise mainly focuses on Cu-Fe-C isotope cycling in source-to-sink processes and deep-sea environments. She recently began adapting the sediment transport module of SERGHEI to incorporate salinity-nutrient-metal interactions and redox-driven Fe dynamics.

Chen has been working on mineral-organic carbon-microbe interactions in marine sediments since 2017, with special expertise in the microbial transformation of iron-associated organic matter. She combines spectroscopy and mass spectrometry with modelling approaches to characterize and quantify the partitioning of organic matter between mineral phases and porewater.

Lessin has 20 years' experience developing and applying coupled hydrodynamic-biogeochemical models, with special interest in biogeochemistry of benthic zone and benthic-pelagic interactions. He is involved in a range of projects quantifying natural dynamics and anthropogenic disturbances at the seafloor to support informed decision-making, and is currently one of the leading developers of ecosystem-biogeochemical model ERSEM.

Morales-Giraldo has over 10 years experience in marine geology, with broad expertise on marine and coastal geomorphology, and sediment characterization on colombian regions of interest. His observations contribute to the baseline for environmental interest of the National Hydrocarbon Agency of Colombia - ANH, and in the knowledge for geobiological association of MPAs.

The general role of the associate members is to provide strategic mentorship and facilitate connections to complementary research initiatives and relevant expertise. Individually, they strengthen the project's geographic diversity and help bridge gaps between our work and the wider scientific community. For example, **Kars** is an expert in sediment magnetics and mineralogy and brings invaluable insight based on these kinds of observations to the WG. Similarly, **Zhang** is a physical oceanographer that can facilitate incorporation of physical observations (tides, internal waves, etc) to better answer the questions facing this WG. There is some overlap in the institutional distribution of the associate members to accommodate these experts.

8. Relationship to other international programs and SCOR Working Groups (max. 500 words)

This WG will have close ties with:

- GEOTRACES with respect to geochemistry;
- SCOR Working Group 145 with respect to geochemical modeling;

- SedMIP (part of OC&B)

In that the sediment-water interface is part of the sedimentary records, there will be obvious ties with drilling programs, such as the Deep Ocean Drilling Program (DODP) by China or the International Ocean Drilling Programme (IODP[3]) by Japan-EU. Moreover, there are clear ties of the aims of the WG with more logistical/sampling groups such as MARSSAM or MISO, and we hope to inspire tighter bonds with the US OOI and the Chinese National Undersea Scientific Observation Network.

9. Key References (max. 500 words, abbreviated formatting can be used)

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Appendix

For each Full Member, indicate 5 key publications related to the proposal.

Brian Haley

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