



Minutes of the
19th Meeting
of the joint meeting of the
Baltic Earth Science Steering Group (BESSG)
and
Baltic Earth Senior Advisory Board (BESAB)

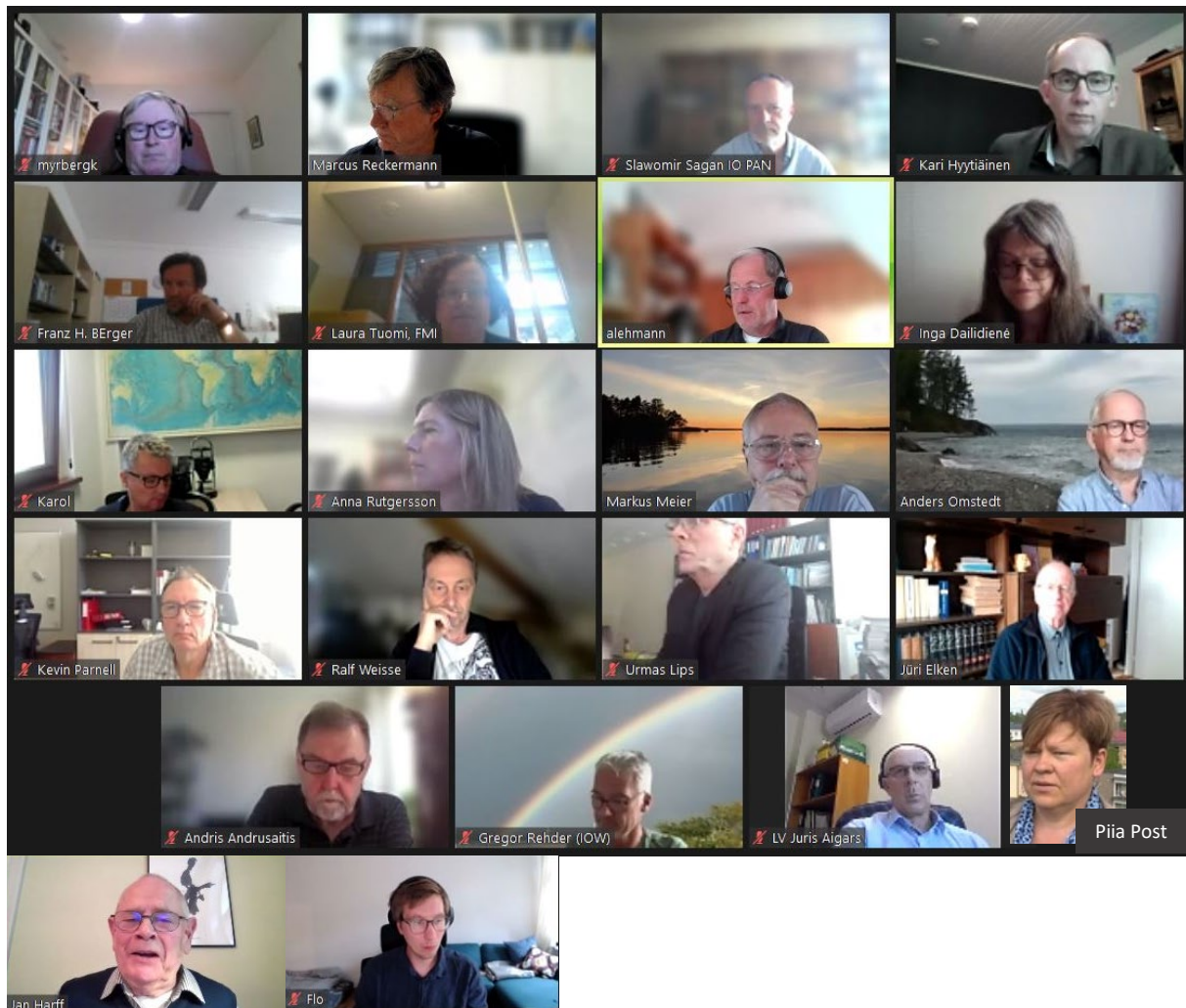
18 September 2023
Online

Edited by
Marcus Reckermann

Participants at the 19th Baltic Earth Science Steering Group (BESSG) meeting and Baltic Earth Senior Advisory Board (BESAB) meeting

Last name	First name	Affiliation	Function
Aigars	Juris	Latvian Institute of Aquatic Ecology, Riga, Latvia	BESSG member
Andrusaitis	Andris	BONUS EEIG, Helsinki, Finland	BESAB chair
Berger	Franz	Deutscher Wetterdienst, Lindenberg Meteorological Observatory, Germany	BESSG member
Börgel	Florian	Leibniz Institute for Baltic Sea Research Warnemünde, Germany	Guest, WG chair
Dailidienė	Inga	Marine Research Institute, Klaipeda University, Lithuania	BESSG member
Elken	Jüri	TalTech, Tallinn, Estonia	BESAB member
Harff	Jan	University of Szczecin, Poland	Guest, prospective WG chair
Hyytiäinen	Kari	University of Helsinki, Helsinki Institute of Sustainability Science	BESSG member
Kulinski	Karol	Institute of Oceanology IO-PAN, Sopot, Poland	BESSG vice chair
Lehmann	Andreas	GEOMAR Helmholtz-Zentrum für Ozeanforschung	BESSG member
Lips	Urmas	TalTech, Tallinn, Estonia	BESSG member
Meier	Markus	Leibniz Institute for Baltic Sea Research Warnemünde, Germany	BESSG chair
Myrberg	Kai	Finnish Environment Institute SYKE	BESSG member
Omstedt	Anders	University of Gothenburg, Sweden	BESAB member
Parnell	Kevin	Laboratory of Wave Engineering: Department of Cybernetics, TUTech, Tallinn, Estonia	BESSG member (as of this meeting)
Post	Piia	Institute of Physics, University of Tartu, Estonia	BESSG member
Reckermann	Marcus	International Baltic Earth Secretariat at Helmholtz-Zentrum Hereon, Germany	IBES, BESSG member
Rehder	Gregor	Leibniz Institute for Baltic Sea Research Warnemünde, Germany	BESSG member
Rutgersson	Anna	Department of Earth Sciences, Uppsala University, Sweden	BESSG member
Sagan	Slawomir	Institute of Oceanology IO-PAN, Sopot, Poland	BESAB member
Weisse	Ralf	Institute of Coastal Science, Helmholtz-Zentrum Hereon, Germany	BESSG member

19th Baltic Earth SSG Meeting Minutes



Participants in the 19th Baltic Earth Science Steering Group meeting

Summary of Decisions and Action Items

Decisions

1. Kevin Ellis Parnell of TalTech in Tallinn, Estonia was approved as new BESSG member. Kevin had been proposed by Ralf Weisse and Markus Meier
2. It was decided to start the activity of a regular online, public Baltic Earth colloquium.

Action Items

1. Mike Elliott was suggested to be approached as future Baltic Earth Senior Advisory Board member (Action Item to BESSG chairman).
2. BESSG members to rank the candidates for a young scientist member in BESSG and send this by e-mail to the secretariat, by 16 October.
3. The Secretariat to place a Doodle to find the best slot for a first colloquium in November. Markus Meier volunteered as the first speaker. Date and title of the talk will be published as soon as possible.
4. A Call for Papers and 2nd Announcement for the 5th Baltic Earth Conference in Latvia will be published in November, for which a more detailed description of sessions will be required; that will be prepared together with BESSG members.

List of Annexes

1. Minutes of the Meeting of the BESAB
2. Marginal Seas – Humans and Environment - A planned new working group in Baltic Earth

Introduction

The 19th Baltic Earth Science Steering Group Meeting was a full day online meeting. The meeting was split into two sections: plenary and separate BESSG and BESAB sessions. BESSG and BESAB members jointly participated in the plenary parts, and WG representatives were invited to the final plenary slot when the future set of Baltic Earth activities were presented and discussed. BESAB members were provided a breakout room for their separate meeting.

Markus Meier, chairman of BESSG, welcomed all participants to the meeting. Before the start of the meeting, a 1 minute silence was granted for Ehrhard Raschke, co-founder of the Baltic Earth precursor network BALTEX, who had passed away shortly before the meeting.

Then there was a short introductory round for a short self-introduction of all participants.

Following the introduction, the two meetings separated and BESAB had their separate meeting in a breakout room.

The BESSG meeting is summarized below, the separate BESAB meeting is summarized in **Annex 1**.

TOP 1: Organizational Issues

1.1 Approval of the agenda

The agenda was approved.

1.2 Approval of the previous 18th Baltic Earth SSG meeting minutes

The previous meeting minutes were approved.

1.3 Review of previous action items

The decisions/action items of the previous meeting were shortly recapitulated, see below:

Item/Decision 1: The SSG chair, co-chair and secretariat to initiate an open call for new members in the SAB in order to attract new members. This call may be preceded by actively approaching selected scientists which may be asked to join the SAB. An open call may then be an option to attract more members. Still, the number of SAB members should be kept reasonable. Deadline: June 2023. *In the process*

Item/Decision 2: To amend the Terms of Reference of the BESAB so that advice is given by SAB to SSG only upon request by SSG. <https://baltic.earth/besab> *Completed*.

Item/Decision 3: Markus Meier, Karol Kulinski and Marcus Reckermann to initiate an open call for attracting a new young scientist member to joining BESSG. A call procedure and definition of eligibility should be prepared. Deadline: February 2023.
Completed

Item/Decision 4: Working Groups suggested to be terminated or modified; two new WGs proposed; acceptance pending (see item 1.7 below). Deadline: March 2023.
Completed

Item/Decision 5: The two new proposed WGs on Teleconnections and Marginal Seas have been accepted, pending approval of WG descriptions by BESSG. Deadline: March 2023
Completed

Item/Decision 6: A clear plan and responsibilities with milestones concerning the preparation and writing of the Science Plan 2024 should be prepared by chairs/co-chair and secretariat in the first weeks of 2023. Deadline: January 2023
Completed

1.4 Membership issues

Kevin Ellis Parnell of TalTech in Tallinn, Estonia was approved as new BESSG member. Kevin had been proposed by Ralf Weisse and Markus Meier (**Decision 1**).

Kevin is Research Professor at the Laboratory of Wave Engineering, Department of Cybernetics, at Tallinn University of Technology (TalTech) in Estonia. His scientific interest and expertise lies in sediment dynamics, coastal processes and coastal management.

The BESSG welcomed Kevin to the group.

1.5 Advisory Board issues

It had been suggested to invite more members to the BE Senior Advisory Board (BESAB). Three names had been suggested, which were shortly discussed:

Erik Bonsdorff, Professor emeritus of marine biology (mainly Baltic Sea and coastal ecology and environment). Structural and functional biodiversity and food web ecology; eutrophication and climate change; aspects of decision support systems to society in marine environmental matters

Mike Elliott, Professor of Estuarine and Coastal Sciences at the University of Hull, UK, a marine biologist with wide interests in marine and estuarine ecology, human impacts, marine and estuarine management and policy.

Matti Leppäranta, Professor emeritus in geophysics, Institute for Atmospheric and Earth System Research (INAR), University of Helsinki, Finland

All three were considered excellent choices, however, preference for a first approach was given to Mike Elliott, due to his experience in the international Earth system research landscape and international networking. Thus it was suggested to approach Mike first (**Action Item 1**).

Furthermore it was suggested to look for potential female new members to improve the gender ratio in the SAB.

1.6 Young Baltic Earth Scientists issues

A consequence from the feedback provided by the Young Scientists group at the 4th Baltic Earth Conference in Jastarnia, it had been suggested to issue an “open call” for young scientists for a candidate to join the BESSG.

The call was published via the Baltic Earth E-Mail list and the Baltic Earth website, and the deadline was 1 August. 4 eligible candidates had applied for the post:

19th Baltic Earth SSG Meeting Minutes

Date of Application	First Name	Last Name	Gender	PhD When	PhD Where	Affiliation	PhD Thesis title	Link
21 February 2023	Lorenzo	Minola	M	Dec 2020	U Gothenburg, Sweden	Department of Earth Sciences University of Gothenburg, Sweden	Changes in near-surface winds across Sweden over the past decades – Observations and simulation	https://www.gu.se/en/about/find-staff/lorenzominola
27 February 2023	Lu	Zhou	F	Dec 2021	Tsinghua University (TSU), China	Department of Earth Sciences University of Gothenburg, Sweden	Simultaneous retrieval of Arctic sea ice thickness and snow depth and their related research	https://www.gu.se/en/about/find-staff/luzhou
09 March 2023	Daniel	Rak	M	2018	Physical Oceanography Department Institute of Oceanology, PAS, Sopot, Poland	Physical Oceanography Department Institute of Oceanology, PAS, Sopot, Poland		https://www.researchgate.net/profile/Daniel-Rak
15 March 2023	Marc	Silberberger	M	Jul 17	Faculty of Biosciences and Aquaculture, Nord University, Jul 17 Norway	Chemical Oceanography Department Institute of Oceanology, PAS, Sopot, Poland	Spatial scales of benthic ecosystems in the sub-Arctic Lofoten-Vesterålen region	https://old.iopan.pl/ekologia/MarcS.html

All candidates were considered very good choices. It was discussed which candidate would be the best supplement to the group in terms of research focus. Two candidates were preferably discussed, due to their backgrounds, however, a decision was not taken.

It was given to the BESSG as task to make a ranking of the three candidates and send this by e-mail to the secretariat, by 16 October ([Action Item 2](#)).

1.7 Review of existing and potential new Working Groups

The review and the discussion on these items were shifted to TOP3.

1.8 Baltic Earth Colloquium

It was suggested to initialize an international, open Baltic Earth colloquium, or seminar. This should be a series of online presentations (total duration 1h) by members of the Baltic Earth network and beyond, on Baltic Earth issues. The colloquium could be given every two months and exclude the holiday seasons. The idea was discussed positively although there was the concern that there would be an additional work load. However, as presentations would be given by volunteers and only about 5 to 6 dates will be feasible in a year, the work load was deemed feasible. The colloquium could add significantly to the scientific exchange and discussion in the Baltic Earth community. Speakers will be recruited from the SSG first, and then extended to the wider Baltic Earth community, but also invite speakers from other parts of the world.

The idea was generally taken up positively and it was decided to start this activity ([Decision 2](#)). The secretariat should place a Doodle to find the best slot for a first colloquium in November. Markus Meier volunteered as the first speaker. Date and title of the talk will be published as soon as possible ([Action Item 3](#)).

1.9 EOS (or similar) article on the new Baltic Earth phase and scope

It was suggested to write an overview article in an international journal on the new Baltic Earth phase. As EOS (a publication of the American Geophysical Union, <https://eos.org/>) had been the home of a previous very well received article on Baltic Earth, this was proposed again, but this is open. The article should be written after the Science Plan 2024 has been published in May 2024. All BESSG members will be invited to contribute.

Link to the EOS article on Baltic Earth from 2014:

<https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1002/2014EO130001>

TOP 2: Activities in 2022 and 2023

2.1 Short report by BESAB chair Andris Andrusaitis

The minutes of the separate meeting of the Baltic Earth Senior Advisory Board are available in **Annex 1**. The recommendations were discussed by SSG members.

2.2 Past and anticipated Baltic Earth activities in 2023 and 2024

Current publication projects

- Special Issue in *Oceanologia* on the 4th Baltic Earth Conference Jastarnia contributions: 26 (31) expressions of interest, submission deadline: 28 February 2023; no fees, open access *almost finalized*. <https://www.sciencedirect.com/journal/oceanologia>
- Special Issue in *Estuarine Coastal and Shelf Seas* on River mouth systems conference; in process; extended submission deadline: 30 Sept 2024. <https://www.sciencedirect.com/journal/estuarine-coastal-and-shelf-science/about/call-for-papers#river-mouth-systems-and-marginal-seas-natural-drivers-and-human-impacts>
- *Oxford Research Encyclopedia* "Climate of the Baltic Sea", overview papers; 21 published or in review/accepted; 25 more proposed. https://oxfordre.com/climatescience/browse?t0=ORE_CLI:REFCLI036
- Baltic Earth website and social media (young scientists Facebook page). <https://baltic.earth>
- Baltic Earth publication database updated and in new format. https://baltic.earth/publications/publication_library/index.php.en

Past Baltic Earth events in 2023

- Winter term 2022/2023 (October 2022 - January 2023): International master course on "Climate of the Earth System", Rostock University (lectures, exercises, project work, 6 ECTS credits in total, 4 lecture hours per week, hybrid format)".
- 4th International Baltic Earth Winter School for Young Scientists on "Earth System Science for the Baltic Sea Region", Warnemünde, Germany, 27-31 March 2023
- GEWEX GHP Meeting in Maynooth, Ireland, July 5- 7, 2023. *GEWEX is a global project of the World Climate Research Programme (WCRP) and encompasses different so-called Regional Hydroclimate programmes (RHPs) from around the globe. BALTEX had been a member of this club from its beginning in 1994, and Baltic Earth is still a member. GEWEX has evolved from a purely water and energy related programme to opening up to the wider Earth system, i.e. the anthroposphere and biogeochemistry. Recent*

Baltic Earth activities (BEAR, Climate Change Fact Sheet) are now considered as good examples.

- Baltic Sea Science Congress (BSSC) 2023, Helsinki, 21-25 August 2023.
Kai Myrberg shortly reported about the congress. 250 participants came to the conference in Helsinki for this 1 week conference. The next BSSC will be held in 2025 in Sopot, Poland, organized by IO-PAN.
- 9th International Baltic Earth Summer School, Askö, 21-28 August 2023

Upcoming Baltic Earth events in 2023 and 2024

- Marine Geology: Marginal Seas - Past and Future; online conference, Digital Deep Earth, 28-30 November 2023; Guangzhou Marine Geological Survey, China Geological Survey (co-organized by Baltic Earth; news item on website to follow
- Winter term 2023/2024 (October 2023 - January 2024):
International master course on "Climate of the Earth System", Rostock University
- 5th International Baltic Earth Winter School for Young Scientists on
"Earth System Science for the Baltic Sea Region", Sopot, Poland, 18-22 March 2024
- Baltic Earth Session at EGU 2024: "Human and other drivers of change: Impacts and interlinkages in marginal seas and their coastal regions", Vienna, 14-19 April 2024
- **5th Baltic Earth Conference, 13-17 May 2024, Latvia**
Logistical preparations are well on track. A Call for papers will be published in November, for which a more detailed description of sessions will be required; that will be prepared together with BESSG members (Action Item 4). We have negotiated very good room rates so that single room rates will hopefully fall within the allowances of public institutions. See updated news on: <https://baltic.earth/jurmala2024>
- 9th GEWEX Open Science Conference, 7-12 July, Sapporo, Japan
This conference brings together Earth system scientists from the whole globe. Main topics are: Water, Climate, Anthropocene; Extremes and Risks; Water, Energy and Carbon Processes. A participation of Baltic Earth scientists would be beneficial for the global visibility of our activities. <https://www.gewexevents.org/meetings/gewex-osc2024/>
- 10th International Baltic Earth Summer School, Askö, 25 August – 1 September 2024
- 2nd Baltic Earth Workshop on Multiple Drivers, Hamburg or Helsinki, autumn/winter 2024
Due to time constraints and many other commitments, and the too short preparation time in 2023, this workshop was postponed to the latter half of the year 2024.

Anticipated events in 2025

- Baltic Earth-GEWEX joint GHP Conference and GHP meeting, in the Baltic Earth region, open.
It had been long planned to organize a joint conference for all the GEWEX activities under the umbrella of the GHP Hydroclimatology Panel (GHP). GHP comprises four different types of projects: (1) Regional Hydroclimate Projects (RHPs), aiming at understanding and predicting hydroclimatology in a specific region; (2) Crosscutting Projects (CCs), encouraging knowledge mobilization and global synthesis of knowledge around a specific topic; (3) Networks, maintaining collaboration and building capacity for activities relevant to GEWEX science; and (4) Global Data Centers, collecting and distributing hydrologically-relevant data. Baltic Earth

has volunteered to act as host region. Time and place need to be negotiated in due time. The year's GHP meeting would be attached to that conference. <https://www.gewex.org>

- Baltic Sea Science Congress 2025; Sopot, Poland

TOP 3: New set of Grand Challenges and Science Plan 2024

Review of existing and potential new activities

Terminated activities (see minutes of 18th BESSG meeting)

- GC1 and WG on Salinity dynamics in the Baltic Sea
- GC5 and WG on Regional variability of water and energy exchange
- WG on Coupled Regional Earth System Modelling
- WG on Outreach and Communication

Continuing activities, updated and modified

- **GC2 and WG on Land-Sea biogeochemical linkages** (Karol Kulinski, Gregor Rehder)
The suggested focus of the revised GC2 is "Biogeochemistry of the Baltic Sea – Linking observations and modelling".

A network of collaborators was established through the BEAR Paper "Biogeochemical functioning of the Baltic Sea". WG chairs Karol and Gregor act as co-chairs of the upcoming HELCOM scoping workshop on Acidification (November 27th), an activity of the EN Clime – Baltic Earth cooperation.

Vision of the updated WG is to work with a larger group of people over the upcoming period (the *Sea Level Dynamics* example). Suggested focus of the new WG is: „Biogeochemistry of the Baltic Sea – Linking observations and modelling“, which is in line with first workshop back in 2013

Suggested time line:

- HELCOM scoping workshop on Acidification (November 27th)
- Invite and initiate an online workshop on Baltic Sea Biogeochemistry (online 2nd half of November)
- Identify additional members for the WG, (potentially extension of the WG chair group)
- Discuss potential outline of the GC for the next years likely with focii on
- Identified gaps of knowledge (BEAR report)
- Potential of integration of lab and field observations, modelling and remote Earth observations
- Best modes of bridging modelling and observations towards the filling of knowledge

The first draft of the new GC and WG is projected to be ready by mid-December.

https://baltic.earth/working_groups/biogeochemical_linkages/

- **GC3 and WG on Natural hazards and extreme events** (Anna Rutgersson, Martin Stendel)
An updated description will be published later.
https://baltic.earth/working_groups/natural_hazards/
- **GC4 and WG on Sea Level Dynamics** (Ralf Weisse, Kevin Parnell)
Ralf Weisse stated that the extension towards sediment dynamics, coastal processes and impacts on coasts was important and emphasized that the updated activity would profit from the engagement of Kevin Parnell, new BESSG member as of this meeting, and expert in the matters regarding sediment dynamics and coastal processes related to climate change in the Baltic Sea region.
https://baltic.earth/working_groups/sea_level_dynamics/
- **GC6 and WG on Multiple drivers of Earth system changes** (Marcus Reckermann, Kari Hyytiäinen)
A large workshop is planned as the 2nd Baltic Earth Workshop on Multiple Drivers of Earth system changes in the Baltic Sea region. That workshop should give a clue which activities are feasible towards a more concrete approach towards understanding important interrelations between different human drivers and climate change, with a focus on models. Scientists which have already been active in the modelling of these interrelations shall be invited to the workshop. The workshop is intended to take place in autumn 2024 on site in either Helsinki or Hamburg.
https://baltic.earth/working_groups/multiple_drivers/
- **WG on Education** (Markus Meier)
The following regular Baltic Earth courses are planned in 2024
 - 10th International master course on “Climate of the Baltic Sea Region”, Askö Laboratory, Trosa, Sweden, 26 August – 2 September 2024, 3 ECTS
 - 4th International Baltic Earth Winter School for Young Scientists on “Earth System Science for the Baltic Sea Region”, Sopot, Poland, 18 – 22 March 2024
 - International master course on “Climate of the Earth System”, Rostock University (lectures, exercises, project work, 6 ECTS credits in total, 4 lecture hours per week, hybrid format), October 2024 – January 2025, Wednesday 13:00-17:00
https://baltic.earth/working_groups/education/
- **WG on the "Baltic Sea Model Intercomparison Project"** (Matthias Gröger)
A publication was finalized. Further activities will be discussed within the working group. Gröger, M., Placke, M., Meier, H. E. M., Börgel, F., Brunnabend, S.-E., Dutheil, C., Gräwe, U., Hieronymus, M., Neumann, T., Radtke, H., Schimanke, S., Su, J., and Väli, G., 2022: The Baltic Sea model inter-comparison project BMIP – a platform for model development, evaluation, and uncertainty assessment. Geosci. Model Dev., 15, 8613–8638, <https://doi.org/10.5194/gmd-15-8613-2022>
https://baltic.earth/working_groups/model_intercomparison/

New activities

- **WG on Teleconnection between the North Atlantic and Northern Europe and the Baltic Sea region** (Florian Börgel, Itzel Baroni)

Florian Börgel gave a short summary of the WG's intentions and scope. The WG wants to understand the influence of the North Atlantic on the Baltic Sea region. Hence, it is intended to bring together global and regional modeling, as well as observations, assess CMIP6 simulations and develop regional climate criteria to increase the quality of models involved, and investigate climate predictability and forecasts for Northern Europe.

The first WG meeting took place on 03/05/2023. Itzel and Florian are elected as speakers of the WG. 24 people attended and joined the group. It was decided to start with a review paper. Moreover, a DFG proposal was submitted that fits well with the goals of the working group. More infos and the current membership in the WG can be viewed on the WG web page:

https://baltic.earth/working_groups/teleconnections/

- **WG on Small scale processes not yet resolved and their impact on the large scale dynamics and patterns** (Urmas Lips)

Urmas Lips presented the scope and intentions of this new activity.

In the ocean, the main forcing components defining the general circulation and stratification are the fluxes of momentum, heat and water through the sea surface and mostly their planetary scale differences. Similarly, the main physical forcing components for the Baltic Sea system are the atmospheric forcing, exchange of heat energy and freshwater through the sea surface, and input of freshwater from rivers and saltier water through the Danish Straits. The input of energy at a large scale is balanced by kinetic energy dissipation at a metre centimetre scale.

Observations of submesoscale processes are challenging due to their small spatial (100 m to 5 km) and temporal (hours to days) scales. While the measurements are challenging, more and more powerful modelling systems, allowing fine enough grid spacing and setups for experiments with varying background conditions and parametrization, are used to reveal the nature and large scale impacts of submesoscale processes. The models reaching the relevant resolution need appropriate in situ data for their validation. Recent studies have suggested that misrepresenting submesoscale dynamics could be one source of uncertainties in future climate predictions.

The main objective of the working group is to summarize the knowledge on the submesoscale dynamics and their large scale impact (or internal variability of the Baltic Sea system and its predictability) and suggest ways forward.

Expected outcomes are a review paper state of the art and knowledge gaps, a roadmap of actions to advance the knowledge, a seminar or workshop to involve larger/relevant research community, and joint (bilateral or international) project proposals. The duration of this working group could be 3 or 6 years, depending on the ambition (to stop after the reviews of knowledge gaps and potential actions are published or to implement the plans as well).

https://baltic.earth/working_groups/small_scale_processes/

- **WG on Philosophy** (Anders Omstedt, Hans von Storch)
Anders Omstedt shortly discussed the scope of this new activity. It should be treated how complex matters can be evaluated and treated in science and management. The role of the scientist will be discussed in the area of conflict regarding scientific neutrality and activism. Furthermore it should be evaluated how people see Baltic Earth and what can be expected from Baltic Earth. There is a workshop meeting planned in September, and an abstract will be submitted to the conference in Latvia.
https://baltic.earth/working_groups/philosophy/
- **Proposed WG on Marginal Seas** (Jan Harff)
Jan Harff had submitted the draft description of this proposed WG on marginal Seas. Scope (see **Annex 2**). Main goal of this activity which is closely related to the existing DDE Marginal Seas Task Group, should be to contribute to a taxonomy of marginal seas based on the human-environment relationship and the various possibilities of sustainable development. In a first step it is planned to invite researchers as a preparatory group from the Baltic Sea region and especially from outside this region. A first meeting of this group is planned for November. The approval as a Baltic Earth activity and WG is envisaged at the next BESSG meeting, and the work should start at the 5th Baltic Earth Conference in Latvia.

Preparation of the Science Plan 2024

The scope and the content of the science plan was discussed. It was suggested (taking up the input by the BESAB) to make the science plan more readable for non-scientists; the descriptions should emphasize on two “burning” issues related to the research topic. Also it was discussed what the difference between a Working Group and a Grand Challenge was. The term “Grand Challenge” was dropped in favour of a less “grand” term (“*Research Topic*”).

Furthermore it was suggested that the “burning issues” of the environmental state of the Baltic Sea should be reflected in the cover of the science plan.

The proposed time line was criticized as too short term, so that a revised time plan was created and sent to BESSG members (see also below).

The updated science plan should undergo an internal and an external review round. As external reviewers, representatives from ICES, HELCOM, CORDEX, GEWEX or similar were suggested.

Updated time line for Science Plan 2024

- **18 Sept 2023:** 19th Baltic Earth Science Steering Group meeting. Research topics to be identified, presented and discussed
- **15 January 2024:** First draft of topic descriptions by WG chairs to Writing Team (WT). WT to assemble 1st draft
- **13 Feb 2024:** 20th Baltic Earth Science Steering group meeting
1st Draft available for discussion
WG chairs and WT to revise according to discussions
- **25 March 2024:** Deadline for WG chairs contributions to WT for Final Draft
- **26 March 2024:** Final Draft ready and sent for Internal Review
- **5 April 2024:** Internal reviews available
WG chairs and WT to revise according to internal reviews

- **10 April 2024:** Revised Draft ready and sent for external review
- **2 May 2024:** External reviews available
WG chairs and WT to revise according to external reviews
- **8 May 2024:** Revisions finalized and Science Plan ready for final formatting
- **13-17 May 2024:** 5th Baltic Earth Conference and presentation/publication of the Science Plan 2024

TOP 4: Any other issues

The next joint BESSG and BESAB meeting shall be online in February 2024. Time and date will be identified by a doodle poll in September 2023.

1st Draft, MR, 21 September 2023

2nd Draft, MR & MM, 28 September 2023

Final Draft, MR, 23 October 2023

Final with Annexes, 15 November 2023

Annex 1

Minutes of the Meeting of the Baltic Earth Senior Advisory Board

Baltic Earth Advisory Board meeting, 18.09.2023, remote

Summary

Time: 18.09.2023 10:15-11:30 CEST

Place: remote via Zoom

Participants:

Elken Jüri, Tallin University of Technology
Anders Omstedt, Gothenburg University
Slawomir Sagan, Institute of Oceanology PAS
Andris Andrusaitis (chair), Latvian Institute of Aquatic Ecology

Discussion focussed on the requests submitted to BE AB by BE SSG Chair Prof. Markus Meier.

Q1: Renewed BE Science Plan

Do you have comments on the planned new science plan?

Is something missing?

Do you have ideas on how to implement the revised plan and how to attract Baltic Earth scientists to get actively involved in the work related to the new Grand Challenges?

- While compiling the new Science Plan, the AB suggests paying more attention to presenting the “big picture”: the overall vision and mission of the Programme. There are plenty of important bits and pieces, but insufficient message of the overarching purpose of Baltic Earth.
- Practical suggestion: each BE WG could be asked to formulate a few “burning questions” in their area of study that could then constitute the basis of the BE Vision statement.
- Broad society and policy actors often confront BE scientists with questions about future projections and adaptation options that require “simple” but still scientifically sound answers. BE has established a good collaboration with HELCOM, e.g. producing the fact sheets on climate change in the Baltic Sea (BSEP 180). Otherwise, however, many practical questions remain unattended. Baltic Earth experts do not participate much in the debates on the development of marine renewable energy installations in the Baltic, in particular, on the impact on wind patterns and ecosystems, or the climate change impact on biodiversity, in particular, in changes of migratory patterns and distribution of populations that would be taken into account while designing areal protective measures, e.g. Marine Protected Areas. While renewing the Science Plan, it is advisable for BE to clearly formulate its standing regarding solving the applied problems. It must be taken into account that even if the organization as such refrains from getting involved in disputes on practical issues, at the national level the individual scientists and institutions involved in BE often are obliged to do so.

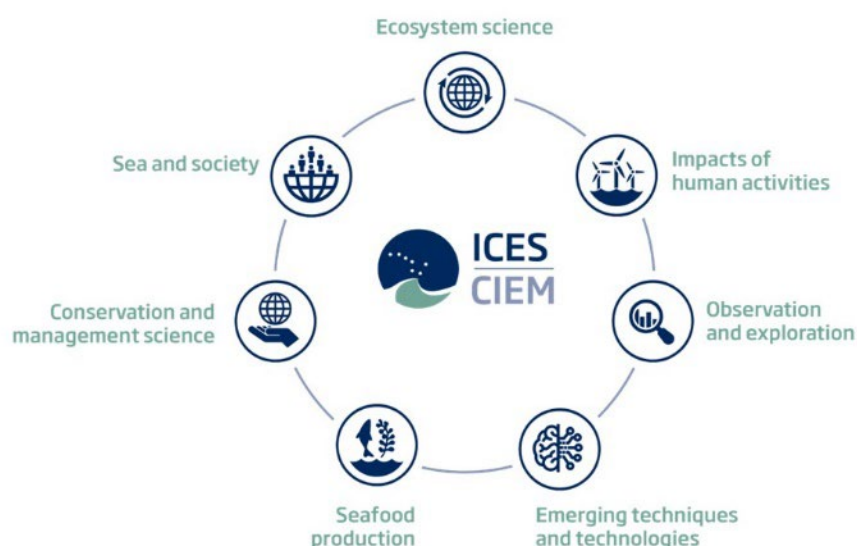
- The AB suggests considering the issues of abrupt vs. gradual climatic changes in the BSR. Although not yet sufficiently elaborated for formulating a Grand Challenge or establishing a dedicated WG, this issue deserves further discussion within the network.
- The whole style of the Science Plan text could be made more accessible for the broad spectrum of experts within the multidisciplinary BE network and non-expert stakeholders beyond the network. Possibly, the output of now terminated BE WG on Outreach and communication may be useful in this sense. Also, an option could be producing a separate “Popular summary” of the new BE Science Plan.

Q2: International networking

Do you have ideas on how to get Baltic Earth internationally more visible?

In which international science networks should Baltic Earth be more active?

- Firstly, the AB suggests capitalizing on the global Marginal Seas network coordinated by Prof. Jan Harff.
- Secondly, it is worthwhile to strengthen the ties between the BE and ICES – “an intergovernmental marine science organization, meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans.” ICES operates in the northern Atlantic area. Its member countries include all Baltic Sea states as well as Belgium, Canada, France, Iceland, Ireland, The Netherlands, Norway, Portugal, Spain, the United Kingdom as well as United States of America. Several key BE scientists are already active in ICES. Some of the ICES science priorities seem quite relevant to BE (see the figure below).



ICES research priorities. Source and explanations at

https://www.ices.dk/Science/Pages/Science_priorities.aspx

ICES runs a dedicated Ecosystem Processes and Dynamics Steering Group (EPDSG) hosting 21 study groups of which several are thematically relevant to BE.

Ecosystem Processes and Dynamics Steering Group

Affiliation: SCICOM-ACOM

Chair: Steven Degraer

Insights into the drivers and consequences of ecosystem processes and dynamics are required to understand and project the responses of ecosystems to human and environmental pressures.

The Ecosystem Processes and Dynamics Steering Group is responsible for guiding and supporting expert groups that study the state and resilience of marine ecosystems and food webs, as well as the life histories, diversity and interactions of component biota.

Topics covered include:

- oceanographic characteristics of marine systems and their influences on population, food web and ecosystem dynamics
- origins and transformations of matter in biogeochemical and production cycles.
- measuring, understanding, reporting and forecasting the dynamics of populations, food webs and ecosystems
- life histories, diversity and ecology of microbes, phytoplankton, zooplankton, benthic invertebrates, cephalopods, crustaceans, fish, and other top predators
- ecosystem services
- ecosystem resilience

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Steven Degraer, Chair of EPDSG

LINKS

Source: <https://www.ices.dk/community/groups/Pages/EPDSG.aspx>

- Finally, the international visibility of BE could be strengthened by inviting renowned international scientists as members to join its AB. In particular, the members active in pertinent international organizations and networks could be helpful.

Q3: International projects

*In which international calls could projects that fit well with Baltic Earth be successful?
Can you recommend specific calls within JPI Oceans, JPI Climate, and Horizon?*

- Regarding JPIO and JPIC government, the AB stresses that these initiatives work based on national representation. A way of getting more involved with them would be establishing better communication with the respective national representatives in JPIO and PJIClima and promoting the study themes within the scope of BE. A good example is the involvement of BE scientists in formulating the JPIO joint action on marine lightscapes (see below).

Annex 2

Marginal Seas – Humans and Environment - A planned new working group in
Baltic Earth

Marginal Seas – Humans and Environment

A planned new working group in Baltic Earth

Background and Objective

As highly sensitive areas of the ocean, the marginal seas, are particularly exposed to the pressures of climate change but also to anthropogenic impacts due to the increased economic use of the seas and their coasts and drainage areas. This makes it all the more important to protect these fragile ecosystems and habitats, while ensuring the sustainable use of the valuable marine resources. Hereby are the goals described by the UN's Decade of Ocean Science for Sustainable Development (2021 - 2030) program. These goals require new holistic approaches which comprehensively describe the regulation of industrialized coastal and marine areas' functioning.

First attempts to develop advanced concepts in this sense base on environmental monitoring up to real-time data collection, which, however, does not capture the long-term evolution (trend) of the human-nature relationship over thousands of years. For sustainable approaches however, we need data that describes this relationship on integrated time scales provided by new interdisciplinary collaboration chains. These chains include real-time and longer series of monitoring data as well as historical data derived from transfer functions - the interpretation of proxies. Due to high sedimentation rates, laminated sediments in marginal seas provide high-resolution archives of regional environmental and climatic history to be deciphered by reading these archives as proxy-data. The marginal seas' seafloor, which is part of the continental shelf, was available to humans as a habitat during the sea-level low-stand of the last glaciation. Today's seafloor contains artifacts and traces of it that, as valuable proxies for humans –environment interaction, have been protected from decay by post-glacial sea-level rise.

The Baltic Sea is one of the best studied marginal seas, rich in prehistorical and historical data, unique oceanographic, hydrological and meteorological monitoring surveys over decades documented in comprehensive publications such as the BACC reports and the BEAR report. These data sets and the deep understanding of the development of the Baltic Sea and the interaction of its ecosystem with the users of its natural resources require a generalization, a classification of the Baltic Sea in a taxonomy of the marginal seas, that support the development of generalizing concepts for sustainable management. Approaches for such comparisons have been successfully carried out by Baltic Earth in cooperation with the DDE Marginal Seas Task Group, which is part of the Deep-time Digital Earth program of the IUGS (International Union of Geological Sciences), by various jointly organized international conferences and corresponding publications since 2020. These promising results have led to the plan to establish a dedicated marginal seas working group within Baltic Earth to continue and foster this co-operation.

In a first step it is planned to invite researchers as a preparatory group from the Baltic region but especially from outside this region, who represent various disciplines of marine sciences, humanities and social sciences, but also computer science and

engineering, to elaborate a work program for a generalization of understanding the effect of anthropogenic drivers on ecosystem services. This generalization should be achieved through comparative studies, which aim to establish a systematic scheme (classification) describing cause-effect relations for marginal seas with regard to the human-environment relationship. The new Baltic Earth Group shall cooperate closely with its partner, the DDE Earth Marginal Seas Task Group, whose program it complements. The next international conference on marginal seas that DDE and Baltic Earth are jointly co-organizing is planned for November 2023.

A work program of a Baltic Earth Marginal Seas Working Group should be officially introduced and discussed during the 5th Baltic Earth Conference, May 2024, to advertise the Working Group as invitation to join. Particular emphasis will be placed on involving students and young scientists in the initiative.

Once established, the working group is planned to be announced as UN's Decade of Ocean Science for Sustainable Development initiative.

Description of tasks (or Terms of Reference)

The main goal of the working group in the first phase is to contribute to a taxonomy of marginal seas based on the human-environment relationship and the various possibilities of sustainable development.

This is provided for:

- Targeted discussion at scientific conferences and meetings co-organized by the working group to be prepared together with the DDE Marginal Seas Task Group,
- Initiate a comprehensive (review) publication about Marginal Seas and Society to open the discussion of a general concept of marginal seas sustainable development ("upscaling of knowledge").

After the 1st year the group's achievements should be reviewed in order to update the work plan.

Jan Harff / 15.9.2023