

iEarth

Annual Report

2023



Statements from students about being engaged in iEarth

«It has given me new friends and a closer connection to the professors. It has also allowed me to speak to different companies on the career day»

“It has given me more knowledge of geoscience subjects. It has put me in contact with people from different backgrounds and helped me build a network of contacts.”

«It is an open organisation that values a good discussion. They want to help students and the workspace connect»



Minister of Higher Education Ola Borten Moe handed out the national award for quality in education to iEarth Focus Area leader Bjarte Hannisdal with the words; “It doesn’t get better than this!” In Trondheim 8 May 2023.

Contents

Summary	4
Abbreviations/Acronyms	6
Introduction.....	7
1. Results.....	8
1.1 Vision of the centre, focus areas and activities	8
1.2 Important accomplishments and activities.....	8
Focus area 1 – Shaping the Future	8
Focus area 2 – A learning environment for students.....	11
Focus area 3 – A learning environment for teachers.....	12
Focus area 4 – Field-based learning.....	15
Focus area 5 – Alumni and outreach.....	16
2. Dissemination of knowledge and practices.....	19
3. Further progress	21
4. Appendices.....	23
Appendix 1: Awards	24
Appendix 2: iEarth Digital Learning Forum (iEDLF) & Journal Clubs (iJC).....	25
Appendix 3: iEarth Workshops.....	26
Appendix 4: iEarth Student Meetings, activities, and Seminars.....	28
Appendix 5: iEarth publications (peer-reviewed) 2023	30
Appendix 6: iEarth scientific conferences (peer-reviewed).....	31
Appendix 7: iEarth dissemination and outreach	33
Appendix 8: Educational Research Group Activities	37
Appendix 9: Other relevant activities in iEarth	38
Appendix 10: iEarth external funding.....	39
Appendix 11: iEarth personnel	40
Appendix 12: iEarth core group meetings	49
Appendix 13: Accounting.....	50



Summary

iEarth experienced a remarkable year in 2023, marked by numerous activities and significant milestones. There is a noticeable increase in engagement in teaching development among our colleagues, and we take great pride in expanding our course offerings that employ student-active learning techniques and formative assessment. We are pleased to present this annual report, reflecting on the past year's achievements. As always, this was achievable with the dedication and innovation of the individuals involved in iEarth. To sustain this momentum, it is crucial to recognise that iEarth is an innovation project to revolutionise Earth science education in Norway and beyond. Below, we summarise the key activities undertaken in 2023:

- iEarth student organisations remain active, organising vital workshops and gatherings to foster student engagement. We value their enthusiasm and appreciate their efforts to enhance teacher and student communication. Within iEarth, we acknowledge students as pivotal change agents, and their involvement is integral to our success as a SFU.
- Work is underway to develop several new courses intended to become national offerings, following the success of the geohazards course, which is now in its third iteration this year.
- Across the iEarth consortium, we have been involved in over 20 course redesign projects since the inception of the SFU, marking a significant legacy of our initiative.
- Efforts are being made to integrate the Sustainable Development Goals (SDGs) into our curriculum, with workshops conducted on this topic at all participating institutions.
- Students are actively engaged as partners in our teaching development endeavours, with course representatives becoming a standard feature in courses. This marks the initial steps towards fostering a culture of co-creation within the iEarth consortium.
- Teachers are increasingly interested in undertaking Scholarship of Teaching and Learning (SoTL) projects in their teaching practices. Shared workshops on teaching portfolios are scheduled to follow up on this trend in 2023.
- GeoPraxis Day has become firmly established as a national gathering, bringing together staff, students, industry representatives, and stakeholders. This year's event, the third of its kind, was held in Bergen in late October.
- We deliver an increasing number of publications resulting from our activities, with eight journal publications in 2023.
- The 6th national GeoLearning Forum was organised, attracting 110 participants. The theme for this year's event centred on integrating the UN's Sustainable Development Goals into teaching and promoting equality, diversity, and inclusion in Earth science education.
- Changes have been made to our seed project program, including increasing the maximum grant amount and removing a fixed application deadline. These adjustments aim to enhance adaptability and allow previously funded projects to apply for follow-up funding, resulting in a lower application rate and the financing of 10 projects in 2023.
- The iEarth Research Group on educational research continues its work, albeit with fewer group activities in 2023 due to the retirement of Anders Ahlberg. Towards the end of the year, Maria Weurlander was appointed as the group's new leader.
- Lastly, we have observed an increased dialogue among colleagues regarding teaching practices.

A personal note from the iEarth leader

It has been a year marked by uncertainty, commencing with the prolonged reporting to HK-dir in February. Subsequently, upon reviewing the proposed state budget, it became evident that the additional reporting and efforts exerted yielded little tangible alterations. The rationale that the SFU program had limited dissemination effects beyond the centres ultimately led to the complete closure of the program when the budget was ratified in early December. Throughout the autumn months, concerted efforts were made alongside the other 16 Centres of Excellence in Higher Education to lobby and sway opposition views, albeit without success. Despite extensive discussions and compelling arguments advocating for the preservation of critical work among the SFUs, no politicians deemed it a cause worth championing, instead affirming that the responsibility (and funding) should be delegated to the host institutions.

The pervasive uncertainty of the past year has undeniably impacted us, engendering protracted and unnecessary deliberations. As we navigate through the onset of 2024, we endeavour to chart a course forward. Our ambitions within iEarth cannot be reconciled within a five-year timeframe, and we earnestly hope that our host institutions will recognise the value of our endeavours and provide the necessary funding to sustain our work. However, this necessitates continued engagement in local, national, and international dissemination efforts. Moreover, it prompts a critical reassessment of our trajectory. Should we persist along our current path? Or should we contemplate restructuring or downsizing our program, conceding that its ambitions may exceed feasibility as a national consortium? Alternatively, should we consider expansion and extend invitations to remaining institutions with an Earth science curriculum to join iEarth? I advocate for the latter option, as our collective experience has demonstrated the value of collaboration and yielded positive outcomes through local pilot initiatives that can be scaled across institutions. Two prime exemplars are the national geohazards course and the GeoIntern course, which were successfully implemented with high student participation rates.

Let us initiate this discourse! In the interim, we have applied to HK-dir for an extension of our project period until the conclusion of 2026, affording us ample time to complete seed projects and fulfil all in-kind contributions from participating institutions.

All the best,

Jostein Bakke

Abbreviations/Acronyms

Action Plan = Also called Centre Plan. The Centre Plan has been developed through discussions in the core team in iEarth since the spring of 2020 after DIKU granted us SFU status. Here, we describe the objectives and specific actions planned for each iEarth Focus Area.

bioCEED = Centre of Excellence in Biology Education. bioCEED is a consortium between the Department of Biology at UiB (BIO), the Department of Arctic Biology at UNIS (AB), the Department of Education at UiB (HERU), and the Institute of Marine Research (IMR) (2014-2024).

Education Chair = The education chairs oversee project progress and manage the development of FAs at their respective institutions, thus ensuring implementation of iEarth policy throughout the consortium.

GeoLearning Forum = annual conference gathering all iEarth teachers and students. A program committee is responsible for the program and designing the event alternating between Bergen, Oslo and Tromsø.

GeOrakel = GeOrakel is inspired by biOrakel (bioCeed, 2021¹) and is a service where the students in some courses can get help with assignments or in preparation for exams from teaching assistants in selected courses.

GEO-UiB = Department of Earth Science (GEO) at the University of Bergen

GFI-UiB = The Geophysical Institute (GFI) at the University of Bergen

HK-dir = The Directorate for Higher Education and Skills

iEarth = Centre for Integrated Earth Science Education. iEarth is a consortium between the Department of Earth Science at UiB, The Geophysical Institute at UiB, the Department of Geosciences at UiO, the Department of Geosciences at UiT at The Arctic University of Norway, and the Department of Arctic Geophysics and the Department of Arctic Geology at UNIS.

iEDLF = iEarth Digital Learning Forum is a digital meeting place for the entire iEarth consortium and a sharing place for good ideas and best practices in teaching and learning.

MNT = Annual educational conference in Stavanger.

Pub Lectures = This year, the iEarth student organisation started with Pub Lectures, a series of lectures in an “informal” and “relaxed” environment. Each lecture will introduce different research groups at the Department of Earth Sciences.

SoTL = Scholarship of Teaching and Learning

SDG = Sustainable Development Goals

SFU = Centre for Excellence in Education funded by HK-dir.

UiO = University of Oslo

UiT = UiT The Arctic University of Norway

¹ bioCeed (05.01.2022) biOrakel. <https://biorakel.w.uib.no/>

Introduction

iEarth has taken significant steps forward according to the action plan for 2023. We are a core team of active members running the day-to-day activities at the member institutions; at the same time, we see new colleagues becoming active in iEarth. The organisational model is more mature, and we meet every Monday morning for an update on local and national activities. First, the local group gathers, and then we connect using Zoom to share information from Bergen's leader and network coordinator. Then, we do rounds to the different institutions, including updates from the students and the Educational Research Group.

In 2023, we have seen a significant cultural change among teachers engaged in iEarth. More and more of our colleagues are involved in student-active learning approaches, indicating that our local dissemination strategies have been successful. From that perspective, it is fantastic that we are also visible in the national arena. A highlight in 2023 is the Education Quality Award for Higher Education from HK-dir, handed out by the, at that time, higher education minister Ola Borten Moe to Bjarte Hannisdal and his team for their work with the introduction class to geobiology at the Department of Earth Science, UiB. This is a recognition of the revolution that has taken place in teaching practises and systematic work with formative assessment. In June, we got the great news that three of our teachers were awarded the status of Excellent Teaching Practitioners (ETP): Bjarte Hannisdal (GEO-UiB), Kjersti B. Daae (GFI-UiB) and Maria Jensen (UNIS). These awards underline the importance of the SFU scheme to stimulate innovation in higher education and show the way for others who want to develop teaching in the direction of more student-active learning forms.

We also see results of the systematic work done in the iEarth Educational Research group as they in 2023 were involved in many publications in scientific journals. Creating a vital community in educational research is challenging when the participants are placed at different institutions. The group was led by Anders Ahlberg, now retired and replaced by Maria Weurlander. We thank Anders for his outstanding contribution to iEarth during the first phase! They have established a Journal Club as an iEarth meeting place to discuss papers on educational research. This was well received, and 10 and 30 participants were gathered for discussions.

One goal of iEarth is to develop the value of field activities in our teaching portfolio. One concrete example of this is the work done by Mirjam S. Glessmer and Kjersti B. Daae, together with Linda Latuta and Francesco Saltalamacchia, on using activity bingo in various learning activities. The approach is published in a paper titled "Activity Bingo: Nudging Student to Make the Most out of Fieldwork". They have also presented the concept to the broader iEarth community, and many have started to use this as a tool to engage students in their learning situations, in the classroom and in field activities. This is an excellent example of how projects are piloted in one institution and spread to the rest of the consortium.

We can now conclude with great pleasure that we have established two successful national meeting places for Earth science education in Norway. We arranged the 6th GeoLearning Forum in Oslo in November, where the format is keynotes, workshops and sharing sessions. Due to budget constraints, we only have one night and two packed days with the program. However, everyone attending is filled with positive energy, new ideas and new friends among students and staff. The other meeting place is GeoPraksis Day, which is arranged for the third time in Bergen this year. We had it in the University Aula, which gathered around a hundred participants, including students, staff and industry contacts.

New this year is that we have hired a national student leader in a 20% paid position to ensure that we have a dedicated national coordinator. This has been a great success, and we are grateful that Elena Brattebø has taken the position for another year and secured continuity in the student organisations.

1. Results

1.1 Vision of the centre, focus areas and activities

In iEarth, we aim to establish an innovative and student-centred learning environment for aspiring Earth system scientists and citizens to address intricate societal opportunities and challenges. To accomplish this objective, we have devised the following strategies: (1) ramp national Earth science curricula by adopting a competence-oriented curriculum redesign; (2) foster an effective learning environment by engaging students as partners in the educational process; (3) establish a collaborative, innovative, and research-based culture for teaching and learning among students and staff; (4) enhance student learning in the field, on cruises and in the laboratory by systematically investigating the effectiveness of field-based learning activities; and (5) develop alum networks and internship practices as natural interfaces between students and future employers. Each of these five strategies has its own Focus Area (FA), enabling the transformation to occur in a streamlined and efficient manner.

Our objective is for all academic community members, including students and staff, to become agents of change by fostering a culture that supports transformation within their respective departments and institutions. In the subsequent section, we outline the primary objectives and initiatives for 2023 across various focus areas. Regarding outreach and communication, we have highlighted crucial undertakings that span different focus areas, including publications, presentations, digital learning forums and seed projects. These endeavours were met with success in 2023, as evidenced by the positive feedback and evaluations they received.

1.2 Important accomplishments and activities

Focus area 1 – Shaping the future

In 2023, this focus area has made some significant breakthroughs. First, we have gained new insights into the structure and functioning of teaching networks in one of the departments involved in the iEarth change initiative. These research-based insights enable us to leverage teaching networks to establish collaborative educational design and development processes. According to higher education change scholarship, these collaborative processes facilitate sensemaking and professional learning and significantly increase the chances of creating more profound and transformative change. Secondly, we have acted on this new knowledge and piloted a collegial educational development process to redesign parts of the bachelor programme at GEO, UiB.

Leveraging research to understand and enact change

As part of his PhD project, Dario Blumenschein conducted a social network analysis of a departmental teaching ecology. His study combines a network survey, which captures the entire network of teaching and research conversations at GEO, with an independent research instrument on the diffusion of innovation. He finds a strong connection between teaching and research networks, with departmental 'research groups' as hubs for teaching conversations. His results also show a clear relationship between the degree of innovativeness of teacher (their readiness to implement changes) and their network centrality (their influence in the network). Innovative teachers tend to have greater network size, reach, and interconnectedness with other innovators. These insights into a teaching and learning ecosystem and the network characteristics of crucial actors have essential implications for understanding and enacting change processes in the department.

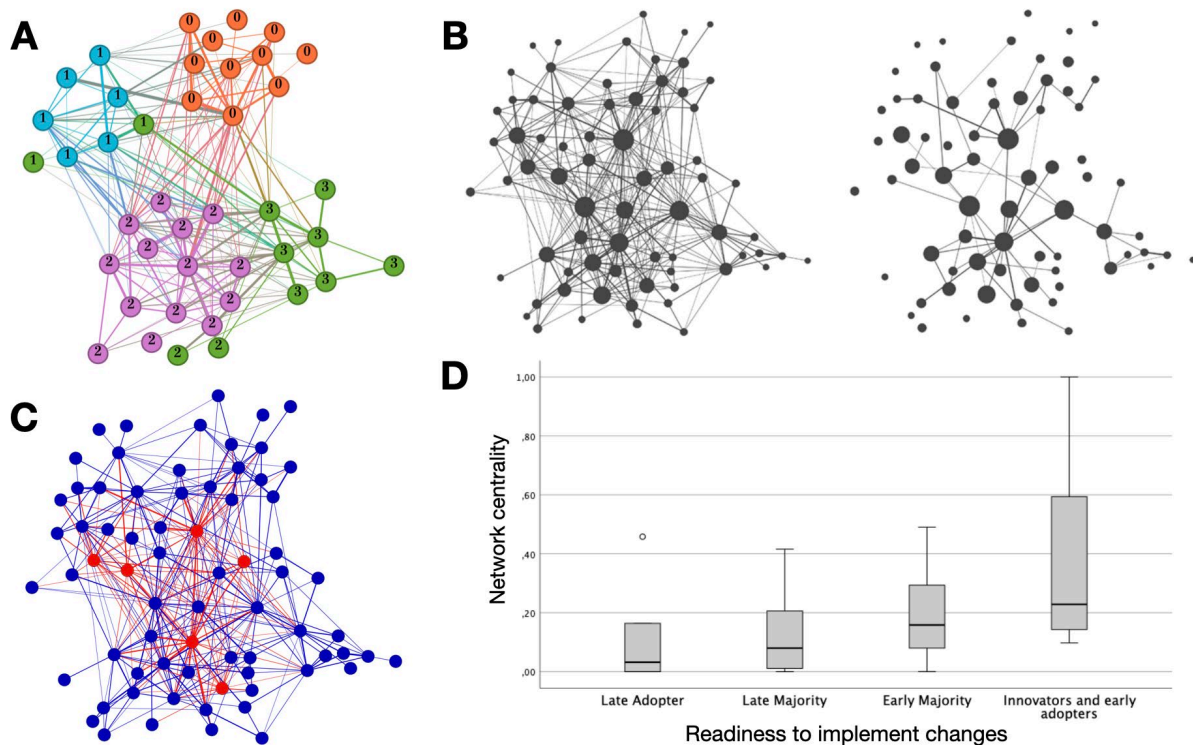


Figure 1. Empirical insights into the teaching ecosystem at GEO. (A) A community detection algorithm applied to the teaching network identifies four groupings (numbers 0 through 3), which correspond closely with the four departmental research groups (different colours). (B) Comparison of the entire teaching network with the teaching network consisting only of strong ties (frequent conversations). Node size indicates a teacher's relative influence (centrality). (C) The most innovative teachers ('Innovators and early adopters'; marked in red) have high network reach and interconnectedness. (D) A positive statistical relationship exists between teachers' network influence and their innovativeness or readiness to implement changes. Figures courtesy of Dario Blumenschein.

In preparation for a national study to understand change processes within the geosciences, we have designed a survey and plan to proceed with data collection in March 2024. This study combines a scale on the teaching climate with data on departmental teaching networks. By combining teaching climate and networks, the study aims to understand the relationship between overall teaching climate as perceived by the teaching staff and the networks of departmental teaching interactions. These results should generate actionable insights to drive informed change processes in higher education.

In 2023, we hired an external system developer to develop technical solutions for the digital infrastructure for collaborative educational design and mapping (the 'digital twin'). In addition to updating and improving the learning design app prototype that we field tested in a teacher focus group in 2022, this work has targeted three main tasks: (1) Ensuring that the technical solution is in full compliance with the regulations and standards of the university IT Division, (2) establishing a robust user access and authorisation scheme, and (3) developing a visual canvas interface for interactively creating, connecting, and rearranging components of a curriculum.

Collaborative educational design

Unlike other professions, where design and development teams can access shared concepts, models, terminology, tools, and spaces, university teams typically have only rudimentary concepts and tools. To help remedy this situation, we are developing a digital infrastructure for learning design and

mapping, which aims to become an AI-enhanced 'digital twin' of an evolving HE ecosystem. In 2023, we piloted this framework's use in a collaborative educational design process.

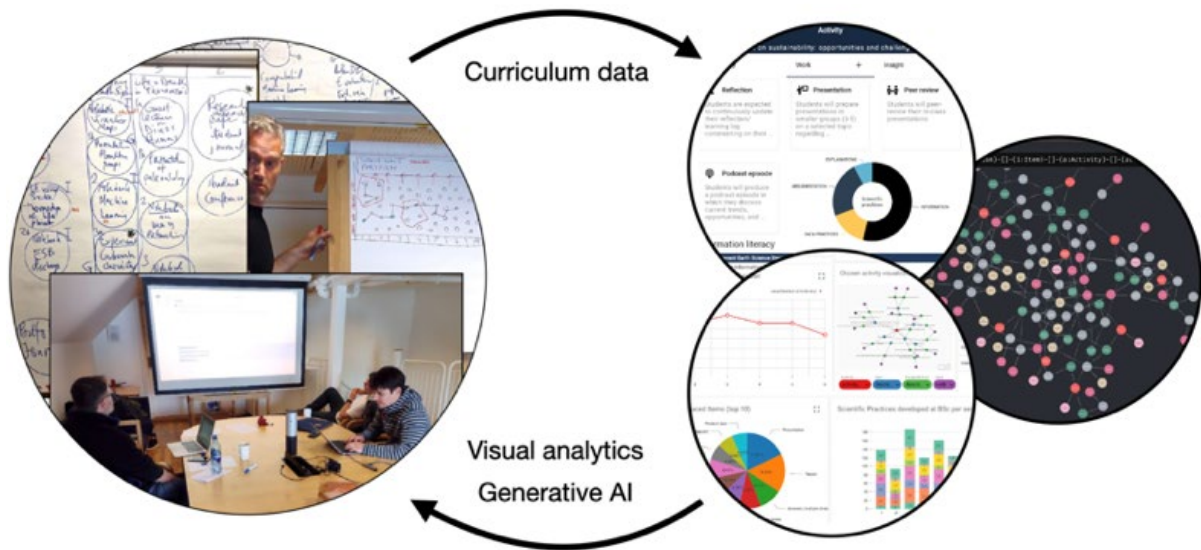


Figure 2. During collaborative educational design (left), complex curriculum data can be captured in a digital twin (right). A prototype of the digital twin features three main elements: an interactive, flexible learning design app (top), a graph database storing the evolving curriculum elements and their connections as a network (right), and real-time visual mapping and analytics on multiple scales (bottom). Future developments involve generative AI to assist in designing learning experiences.

This process, which has engaged a sub-network corresponding to one of the research groups at GEO, has proven very productive and effective, resulting in an entirely redesigned set of bachelor courses launched in 2024. These courses use collaborative teaching, active, experiential and peer learning, and local field laboratories, all of which are key strategic priorities for iEarth. Notably, other research groups have already reached out to establish similar processes consistent with network theories of organisational learning and diffusion of change. Going forward, we will pay close attention to how the process of collaborative teaching development is adopted and enacted to understand and facilitate its dissemination and spread.

To help ensure that the development of this process and the associated digital infrastructure is based on sound theory, research-based knowledge, and design principles, we have assembled an international team of experts in educational and design-based research to submit a research project proposal to the Norwegian Research Council. If successful, this project will start in 2025.

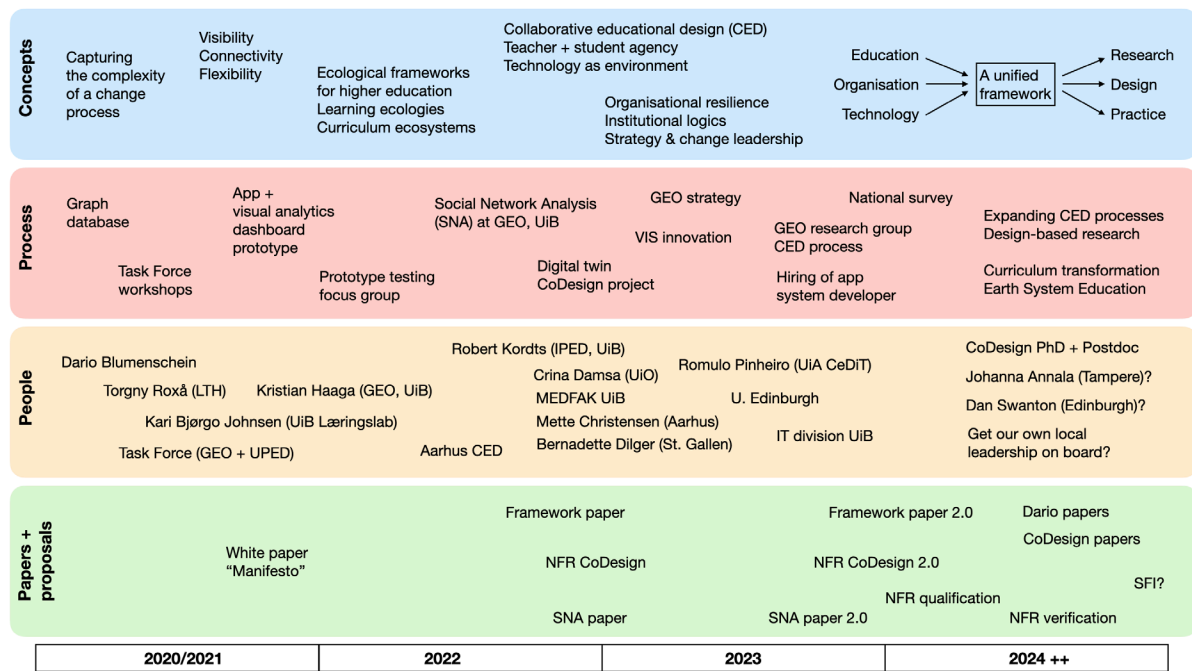


Figure 3. Visualisation of the progress and further plans in focus area 1. While re-designing the teaching portfolio, we have also worked on how to proceed with strategic thinking when developing the earth system education for the future.

Focus area 2 – A learning environment for students

During 2023, we saw continued development across iEarth. All student chapters have been active and supported by staff, with a regular programme of varied social and academic events, from GeOrakel study events to movie nights and UNIS breakfasts. Students also organised career days at UiT The Arctic University of Norway and the University of Bergen (scheduled for spring 2024 at the University of Oslo). National coordination of the student chapters has been formalised with the employment of Elena V. Brattebø at the University of Bergen as National Student Coordinator. The national student network significantly strengthens students’ capabilities for mutual support and independent knowledge sharing across the iEarth partner departments.

At the University of Oslo, course representatives are gradually being adopted. From 2024, students will run and develop the program in collaboration with the iEarth student chapters. Notably, past course representatives continue to be involved in work with iEarth. For example, former course representatives have tried out and evaluated activity bingos, introduced by Kjersti Daae and colleagues at the University of Bergen (read more about the project here; Glessmer et al., 2023), to engage students in social activities and promote learning tasks. Another former course representative is part of a team of staff and students working on a SEED project to improve the teaching of physics-related topics in geoscience. Indeed, the new iEarth Oslo student chapter leader, whom we welcomed in 2023, is a former course representative! Being a course representative can be a gateway to further engagement in teaching and learning, so it is crucial that as many students as possible get the opportunity to work closely with staff in this role.

At GFI, the HK-dir funded project ‘Co-creating GFI’ continues to involve students and staff in novel ways of co-creating teaching and learning. For example, the pilot project on across-course collaboration inspires similar efforts in the consortium (read more about the project here; Daae et al., 2023).



In June 2023, several iEarth staff and students visited the University of Edinburgh, where Students as Partners is a guiding paradigm. They spent days presenting, discussing, and exchanging experiences with the School of Geosciences staff and participated as guests at the annual teaching and learning conference ‘Investigate, inquire, innovate’. Staff from Edinburgh reciprocated by participating and contributing to the yearly iEarth GeoLearning Forum (GLF). We foresee that this is only the start of the collaboration!

Figure 4. iEarth participants are looking at different geological features around Arthur's seat after the conference in Edinburgh. Photo: Kristian B Bakken.

The weekend before GLF, the iEarth students gathered for a workshop from Friday, 3rd November, to Monday morning, 6th November. One goal of the workshop was for the students in the iEarth student organisations to get to know each other and discuss experiences. Another was student engagement and what future Earth science education should contain and organise. Elena V. Brattebø and Mattias Lundmark hosted the workshop, which was a huge success. Giving students a chance to get together across the iEarth department is incredibly valuable, but also including students in discussions about learning and teaching with staff when they return home with experiences and suggestions to share. This was the first National student workshop but will not be the last ([read more here](#))! At the GLF, iEarth students made up nearly half of the ca. 110 participants, ran two presentations/workshops and contributed posters for the poster session.

Overall, 2023 has been a very successful year that has sparked many ideas for new (SEED) projects. We look forward to students and staff co-creating an even better 2024!

Focus area 3 – A learning environment for teachers

The critical step for this focus area is to develop teaching as a collegial enterprise. The main achievements in 2023, according to the action plan, are described in the following section.

Cultural change: developing teaching into a collegial enterprise and developing a site for Educational Resources (virtual competence centre)

Since the start of iEarth in 2020, we have been working towards this goal by creating an arena for sharing knowledge: the iEarth Digital Learning Forum (iEDLF). In 2023, we held unique seminars with speakers representing the consortium (Appendix 1), creating an inspiring sharing space with vibrant discussions. We also work locally at each iEarth member institution to stimulate this cultural change. For example, the faculty at the Department of Geosciences at UiT has gathered at three seminars or workshops about organising and maintaining a teaching portfolio, training PhD students for teaching, the GeoInternInternational Project, and an ongoing revision of all education offered by UiT. In January and February 2023, iEarth hosted the workshop “Integrating Sustainability into the Curriculum” at UiB, UiO, and UNIS by Prof. Susan Kaspari, a visiting Fulbright Scholar in 2022-23 at UiT. This workshop informed faculty how to take concrete steps towards including the UN Sustainable Development Goals

in the curriculum. These activities aim to develop the teaching into a collegial enterprise with shared ownership among the faculty.

Projects that received iEarth internal funding 2023: “Seed Projects”

2023: 10 Seed Projects

- Anders Mattias Lundmark, UiO – *Dissemination and networking for the iEarth research group*
- Bjarte Hannisdal, UiB GEO – *Presenting at the “NTNU læringsfestival” and receiving “The Education Quality Award” by HK-dir.*
- Truls Aaby, UiT – *iEarth student organization UiT*
- Tiril Thielemann Try, Bendik Hjertholm Voldseth and Sebasitan Strøm-Helbekkmo, UiB GFI – *Board games in Academia*
- Marie Aas and Markus Haugen, UiO – *iEarth student organization UiO*
- Truls Aaby and Emilie Norbeck Larsen, UiT – *Career day at UiT 2023*
- Philipp Scheiner, Merle Scheiner and Lea Kneissle, UNIS – *SCOPE 2023 – Student-led Conference on Polar Environment*
- Marie Aas and Markus Haugen, UiO – *iEarth students attending GeoIntern Day in Bergen*
- Idunn Hana, Iver Løwø and Daniel Lid, UiB GFI – *Academic evening with master presentations*
- Elena Victoria Brattebø, UiB GEO – *Workshop for the iEarth student organizations in relation to GeoLearning Forum 2023.*

iEarth Seed Projects: Make teaching a scientific enterprise through evidence-based teaching practice, initiate and support SoTL activity with students as partners

The iEarth development project funds (Seed Projects) are incentives and motivations to develop teaching and learning cooperation across departments and universities, engage students in improving their learning environment, and promote scholarship in teaching and learning. In 2023, it has been possible to apply at any time (no deadlines). Eight projects received funding in 2023. We increased the maximum project amount, and applying for up to 150,000 NOK is now possible. Since the start of iEarth in 2020, 92 Seed Projects have been supported, all working with projects in education development.

The iEarth GeoLearning Forum - a national meeting place for Earth Science teaching and learning

The main national meeting event of 2023 was the 6th iEarth GeoLearning Forum. This year, the GeoLearning Forum was in Oslo on November 6-7. Of a total of 105 participants, 51 were students. The meeting was a great success, with a record number of participants. Also, this year, we exceeded our goal of 100 attendees. We have established the iEarth GeoLearning Forum as the main Norwegian meeting event for Earth Science teaching and learning. Students contributed to and took responsibility for planning and running the conference with staff, giving presentations, and participating in or leading workshops. In 2023, the theme of the GeoLearning Forum was “Sustainability and inclusivity in Earth Science Education”. The three keynote speakers were Prof. Susan Kaspari (“Creating a Sustainable Future through the Geosciences”), Prof. Katja Enberg from UiB, who shared how to educate Future Sustainability experts, and Dr. Steven Rogers, who presented the last keynote with a workshop: “You Just Look at rocks and have beards”. The participants contributed to shaping the future of education in Earth Science by joining workshops and sharing sessions focusing on hands-on co-creation and

numerous roundtable discussions. Many of the Seed Projects supported by iEarth presented, shared, and discussed their results at a poster session.



Figure 5. The GeoLearning Forum 2023 was a big success, hosting 105 participants (51 students). Photo: iEarth.

iEarth Education Research Group

The iEarth Education Research Group (ERG) hit the ground running in 2021. ERG is open to anyone within and beyond iEarth. However, the doctoral candidates and the postdoctoral fellows constitute the group's core. ERG includes the iEarth adjunct professors, several doctoral candidates' supervision team members, and other iEarth staff. The ERG is involved in geoeducational research-related activities that bridge the geoeducation research interests of individuals within the iEarth partner institutions. To some degree, ERG supports the wider iEarth community with resources, activities, presentations, and ideas.

Until August 2023, the ERG activities were organised by Anders Ahlberg, associate professor II at the Department of Geosciences, UiT The Arctic University of Norway, with support from the iEarth postdoctoral fellow Kirsty Dunnnett at the Department of Geoscience, University of Oslo. Anders Ahlberg has now retired, and we take the opportunity to thank him for his considerable contribution to FA3 and all of iEarth! From January 2024, the ERG activities will be organised by Maria Weurlander, newly appointed associate professor II at the Department of Geosciences, UiT The Arctic University of Norway. So far, the focus has been the work of the four doctoral candidates and the postdoctoral fellows who conduct the central core of research within iEarth. Participants present and discuss research plans, outcomes, and needs in the ERG. However, each iEarth early-career researcher is locally supervised. ERG can, therefore, be seen as a compensatory network that connects early-career researchers who are otherwise at risk of being isolated in their iEarth partner institutions.

Focus area 4 – Field-based learning

Focus Area 4 (FA4) aims to test and document methods to advance student field-based learning and optimise knowledge transfer back and forth between the classroom and the field. With FA4 led by iEarth members at UNIS, these aims are being addressed in collaboration with the bioCEED SFU, FieldPass, and digital learning environments in field-based geoscience teaching projects. Mark Furze (Arctic Geology) left his iEarth Education Chair in 2023, with Anna Pieńkowski (Arctic Geology) taking over this position in September 2023 and acting as *de facto* FA4 Focus Area Leader.

Document the present status of and monitor culture change in field teaching and learning

The two UNIS iEarth departments – Arctic Geology and Arctic Geophysics – saw iEarth Seed projects running during 2023, directly addressing the objectives of Focus Area 4 with references to field learning, field teaching, and integration of digital field learning technologies. Amongst these, iEarth co-funded the SCOPE conference in late 2023, a student-led and organised interdisciplinary 2-day event profiling student research, field, and teaching activities in polar environments. The development of the Field Teaching Assistant Academy, a project led by Mark Furze, Marius Jonassen, Rafael Horota, Simone Lang and Tina Dahl, also received Seed funding (see below). Another prominent and highly successful iEarth Seed Fund project was the GeoMOD digital data field school led by Nil Rodes, Sarah Mollie Cohen, Rafael Horota and Peter Betlem (all Arctic Geology), which trained participants in UAV surveying, structure-from-motion analysis, and digital elevation model creation. The project was presented at a well-received iEarth Digital Learning Forum in October 2023.

Rafael K. Horota, the iEarth PhD student, has continued to work on his main research topic, “*How digital can geosciences field-based learning be? Perceptions over digital technologies in Norway's geoscience higher education*”. Based on his PhD work, he submitted a peer-reviewed article in 2023, entitled ‘West Spitsbergen fold and thrust belt: a digital educational data package for teaching structural geology’ (*Journal of Structural Geology* 167, 104781). Another article by Rafael as the first author was accepted in late 2023 (‘VRSvalbard – a photosphere-based atlas of a high Arctic geo-landscape’; *First Break*).

Further, 2023 saw an active drive, led by Mark Furze and Anna Pieńkowski at the Arctic Geology department at UNIS, to incorporate the United Nations (UN) Sustainability Goals (SDGs) into the geology curriculum. This initiative was sparked by a workshop on the topic held at UNIS by Prof. Susan Kaspari (University of Western Washington and Fulbright Fellow in Norway) in 2023. Knowledge from that workshop was applied to the AG curriculum, and the process was outlined during a well-received poster presentation to the whole institution as part of the UNIS Learning Forum in 2023. Other UNIS departments, such as Arctic Biology, are now following the iEarth-led approach.



Figure 6. Fieldwork and excursions are essential in Earth sciences, and our goal is to integrate these activities into the classroom activities better and to make them more student-active, here from a field class in glacial geomorphology at Middalsbreen at Finse.

Develop, test, and evaluate field teaching methods and outcomes

Building on previous years (2021, 2022), the field teaching assistant course for PhDs, masters, and postdocs organised jointly by iEarth and bioCEED was further developed in 2023. The TA course will be arranged again in February/March 2024. The course was re-structured and expanded into a 5-day event, an initiative based on a successful iEarth Seed Fund application by Mark Furze and including participation from UNIS Geology, Biology, and Geophysics departments and UNIS Operations & Field Safety. The newly redesigned course will start with an introductory day on Higher Education Pedagogy by Robert Kordts and Marie van der Kloet (UiB), followed by a day on diversity and inclusivity led by Maria Jensen, Eero Rinne and Arunima Sen. Day 3, directed by Simone Lang, Tina Dahl and Anna Pieńkowski was designed dedicated to feedback strategies, group contracts, and conflict solving. In contrast, the remaining two days – led by Mark Furze and Marius Jonassen (former iEarth FA4 Leader) and with input from UNIS Operations & Field Safety were designed to involve field teaching, including skills certification.

Test and document methods to improve field learning and improve field-classroom and classroom-field knowledge transfer

A significant driver in improving field learning and classroom-field knowledge transfer was the ‘GeoMOD: teaching photogrammetry-based data acquisition’ digital data field school developed by Nil Rodes, Sara Mollie Cohen, Peter Betlam, and Rafael Horota. This initiative was funded by iEarth Seed Fund money and aimed to develop transferable skills in drone piloting, aerial digital data acquisition, processing, structure-from-motion, and digital model generation. The week-long course was held during the summer of 2023 and was open to all students and scientific and technical staff at UNIS. It was a great success, with continuing demand for its return in 2024.

To develop a framework for field skills certification

FA4 has collaborated with the UNIS FieldPass project, funded by the Olav Thon Foundation. This project seeks to develop and test field skills assessment and certification approaches at UNIS. FieldPass ended in 2023, and developmental work was transferred to iEarth and bioCEED. In particular, field skills certification has been included as a central component of the Field Teaching Assistant Academy developed in 2023 for delivery in early 2024 and funded by an iEarth Seed Fund grant to Mark Furze (see above).

Local field-teaching laboratories

A working group led by Mark Furze was established at UNIS to develop and implement a local field-teaching laboratory within the Longyearbyen-Adventdalen area. This interdisciplinary group, including members of the Arctic Geology and Arctic Geophysics departments along with Operations and Field Safety, has continued through 2023 to identify a constellation of inter-linked field sites within a clearly defined locale easily accessible by UNIS students on foot or using the institution’s e-bike fleet. Work continues to agree on a mutually accepted list of sites, to establish an operational framework for these sites, and to embed the use of the local field teaching laboratory in the curriculum.

Focus area 5 – Alumni and outreach

Maintaining contact with students after graduation is vital to enhance the work-life relevance of Earth Science education. Designing, piloting, and testing methods for educational networking with the market and society are among the goals of this focus area.

In 2023, the national GeoIntern project has run and maintained the GeoIntern course within the universities of Tromsø ([GEO-2013 | UiT](#)), Bergen ([GEOV298](#)) and Oslo ([GEO3050](#)). For 2023, 8 UiT students participated in GeoPraksis and had internships in six different businesses/organisations in Tromsø, Harstad, Sørfold and Trondheim. In total, 22 UiB students have participated in the course. The students interned with 13 businesses/organisations in Bergen, Trondheim, Rosendal, Jelsa, Brønnøysund and Førde (Figure 7). In 2023, 7 students at UiO participated in GEO3050. They had internships in 5 organisations (NVE, NGI, Met Office, Statens Vegvesen and NORSAR).

Students have reported upon their experiences in internships through blog posts reflecting upon their experiences ([GeoIntern blogs](#), [Studentblogger-GeoPraksis](#), [Geopraksis - uio.no](#)), envisioning for stakeholders, students and colleagues the variability within the internships performed. Students at UiB have also been encouraged to have [Instagram takeovers](#), creating a platform for them to showcase their work on social media. These takeovers have been a huge success and increased traffic to iEarth's and our industry partner's platforms.



Figure 7. Students during their DOF Subsea (left) and Rambøll (right) internships.

The GeoIntern course curriculum was developed and tested during its initial run in Tromsø in 2021 and has since been adapted to suit each campus. It includes a basic comprehensive mapping of competencies as a foundation for understanding one's skills as a newly educated geoscientist and an overview of the geoscientist employment market.

The course also offers training in essential transferable skills, such as communication, teamwork, reflection, networking, and social media management. The course concludes by introducing students to innovation and entrepreneurship. Continuous feedback from students and teachers has been utilised to continuously refine and optimise the learning quality across all aspects of the course.

To ensure high-quality learning experiences across all course components, each part of the course has undergone rigorous quality control measures, including detailed mapping and feedback forms from students and teachers. Throughout their internship, students have received follow-up support from the GeoIntern team through digital and physical meetings. In addition, companies hosting students have been interviewed during the internship period to facilitate desired changes. Emphasis has been placed on reflection upon the internship periods, as they provide learning opportunities in an authentic environment outside academia that cannot be controlled.

During the year, the project has been presented nationally and internationally, among the highlights being the AMPS conference in Toronto, EGU talks in Vienna, the Global Internship Conference in Berlin, and the annual GeoIntern conference in Bergen. During the Erasmus summer school Bridget ([Bridget Summer School](#)), the learnings from GeoIntern also formed the basics for a learning module on how to implement and integrate internship learning modules in higher education; a complete list of dissemination is posted at [GeoIntern-Dissemination](#).

The feedback from students and employers throughout the first national run of the GeoIntern project was overwhelmingly positive. Students and employers love the idea and the possibility of GeoIntern. Exploring work-life relevance and performing hands-on work training in geo-related businesses and organisations has been a long-time desire in the geoscience society. Institutions' managements have all been challenged in continuing the project's goals after external funding ended in Q2 2023. According to the long-term goals, the project has tested new methods and developed long-term systems to increase work-life relevance in higher education in geoscience. All the institutions have managed to prolong the positions affiliated with GeoIntern, ensuring that GeoIntern can continue to deliver desired competencies to future students, even after external financing has ended.

Throughout the year, industry mentor Katrine Godtliebsen from Equinor has been affiliated with the GeoIntern project. They have provided vital know-how in communication with business partners and feedback on processes related to business partners. Communicating academic content and processes with business partners calls for a change in the language of communication, and the industry mentors have, in addition to other things, provided just this. In October, the project gathered 86 participants for the third [GeoIntern annual project conference](#). The conference was held in Bergen at the grand hall of the University of Bergen, The University Aula. The program allowed insight into how we can increase collaboration between academia, students, and industry partners. To ensure the quality of the conference, it was planned in collaboration between the University of Bergen staff and students, together with Israel Polonio from Aker BP. The program focused on essential discussions on how increased collaboration can ensure future projects and increased work-life relevance in higher education in geoscience. The highlight of the conference was the panel debate, where Atle Rotevatn (Head of Department of Earth Science, UiB), Christian Haug Eide (Professor, UiB), Torstein Hole (HK-Dir), Catrine Hatlenes (Multiconsult) and Lina Hedvig Line (Aker BP) discussed how we can increase collaboration between industry and academia. The conference was a significant success, and 34 students, 30 academic employees and 22 industry partners participated.

This year was HK-Dir's final year of financing the GeoIntern project, and financing terminated mid-way through the year. There were various efforts to mitigate the risk factors involved in moving from an external to a self-financed project economy. However, very few of the project's business partners have left due to a lack of funding. In Tromsø, the business partner portfolio demography has changed to increase the number of local positions to compensate for the lack of funds for travel and accommodation. However, several involved companies outside the city are now onboarding more students than before and paying for travel and accommodation during the internship periods, which tells us that the results and outputs from the project are welcomed among the business partners. They feel this is paying off for them. Feedback forms and rising numbers of participating students each year especially tell us that the students welcome the course and project.

The course has also been growing in Bergen, with more industry partners and students getting involved. During the internship weeks, we attended several meetings (appendix 7) with the companies offering internships. These meetings aimed to consolidate our partnerships and ensure the internships provide valuable experiences for our students and partners. Based on these meetings, we have worked towards improving the course for the spring semester of 2024, where several changes will be made to how we prepare students and communicate with the industry partners.

In late 2022, the GeoIntern International at UiT was funded by the HK-Dir "Utforsk" portfolio. This extension to GeoIntern aims to establish international internships for geoscience students across eight countries identified by the panorama strategy: China, Japan, South Korea, Brazil, South Africa, Canada, the USA, and India. From 2023 to 2026, we aim to facilitate student exchanges between these countries and Norway, allowing them to undertake international internships in geoscience with affiliated business partners and universities. In 2023, three students were exchanged from UiT and UiO to do internships with related partners at the University of Manitoba. The feedback from students showed us how international internships offer and provide a holistic approach to problem-solving for the students.

Furthermore, as managers and coordinators of the internships, we learned a lot about arranging international internships. There is a particular focus towards transferrable skills among today's students and candidates; promoting internationalisation and the ability to work in cross-disciplinary teams is super important. However, there is a way to build a culture among Norwegian universities to provide internships for international students travelling to Norway to perform internships.



Figure 8. Business partners in the "GeoIntern" project have student for three weeks stay.

2. Dissemination of knowledge and practices

The dissemination strategy currently underway has undergone significant development since its inception in the 2020 action plan, undergoing revisions during strategy meetings held in both 2022 and 2023. This strategy is grounded in a comprehensive three-step development plan, emphasising dissemination to foster awareness, facilitate understanding, and catalyse action.

Furthermore, our focus has been meticulously directed towards three distinct spheres of dissemination:

- Local Dissemination: This involves the internal spread of knowledge and best practices within our institutions.
- Internal Dissemination: We prioritise sharing insights and practices among the consortium partner institutions, fostering a collaborative approach to dissemination. Our two main arenas are the annual GeoLearning Forum and the iEarth Digital Learning Forum.
- External Dissemination: Our efforts extend beyond organisational boundaries, aiming to disseminate knowledge and practices nationally and internationally broadly. This includes publications in peer-reviewed journals and participation in national and international conferences.

We employ diverse dissemination methods to ensure a broad reach, including face-to-face interactions, leveraging social media platforms, hosting webinars, and publishing articles in esteemed educational research journals. Every month, we send a newsletter to over three hundred e-mail addresses. Moreover, recognising the importance of stakeholder engagement, we actively involve key influencers to amplify our dissemination efforts. Notably, establishing the national arena for stakeholders, GeoPraksis Day is a testament to our successful endeavours. Significantly, we have shifted our focus towards continuously

monitoring and evaluating the dissemination strategy's effectiveness. Through robust feedback mechanisms and data analysis, we can identify areas for improvement and make necessary adjustments, ensuring that our dissemination efforts remain dynamic and responsive to evolving needs and contexts. Based on counting contributions to outreach, we see a positive trend in the contributions, showing that we are increasingly visible to the community.

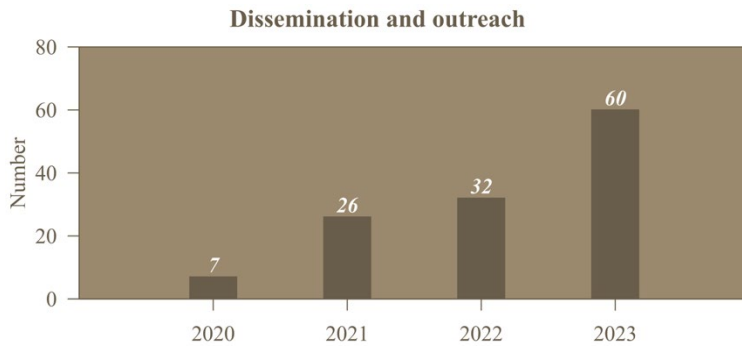


Figure 9. Overview of dissemination and outreach contributions back to 2020. Details can be found in the annual reports and for this year in Appendix 7. Note the positive trend indicating increased activity within the iEarth community.

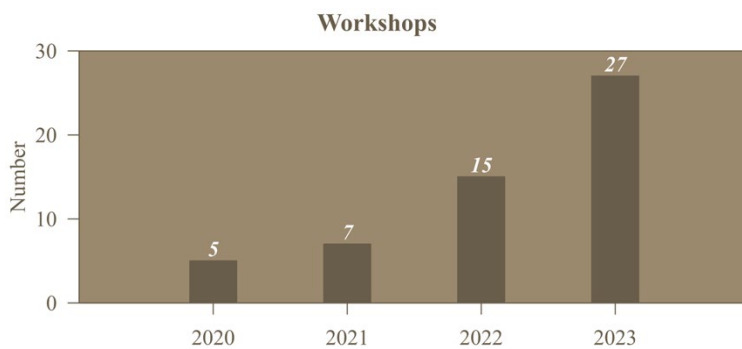


Figure 10. Overview of workshops in the last four years. This year, we arranged 27 workshops in iEarth. For details, see Appendix 3.

3. Further progress

We had a strategy meeting in Oslo after the GeoLearning Forum in November 2023 to discuss further progress in iEarth. Here, we discussed what we should focus on in the remaining time as a SFU.

1. Ensure that there is a student representative in every course. Many expressed the value of establishing student representation across all courses, aiming to foster a participatory educational environment wherein students' perspectives and interests are duly accounted for and integrated into the academic discourse.
2. Further, we agreed that we should keep on with iDLF, acknowledging the significance of technology-mediated educational modalities in the pedagogical landscapes.
3. Encourage more collaborative activities between different faculties. Such cross-faculty activities are perceived as instrumental in cultivating holistic perspectives and nurturing synergistic academic pursuits.
4. Enhance collaboration between institutions to improve bachelor programs. The imperative of amalgamating diverse institutional perspectives and resources is underscored in cultivating robust and comprehensive academic offerings by introducing more shared courses in geomatics and climate dynamics.
5. Recruit additional experts in educational research as a recognition of the pivotal role of scholarly expertise in informing pedagogical practices and advancing the frontiers of academic discourse. We can hire more adjunct professors as we only have two-year contracts with those employed today.
6. Organise more workshops where students and staff collaborate on iEarth-related issues. Such collaborative problem-solving endeavours catalyse experiential learning, nurture teamwork skills, and engender a sense of shared ownership and responsibility.
7. Implement Earth system science as a teaching and learning approach. Embracing an integrated and holistic approach to Earth sciences education, underpinned by systems thinking and interdisciplinary methodologies, is posited as pivotal in nurturing a nuanced understanding of the complexities inherent in Earth's systems and phenomena among learners.

Further, we would like to share some thoughts developed in Focus Area 1 about how we can think about Earth science departmental strategies in the future. These thoughts are essential to bear in mind when merging the work in the SFU with the department's strategies, which is one of the goals when the SFU period of iEarth ends:

Earth sciences are uniquely positioned to engage with the emerging future of higher education. Programming, GIS, and AI technologies are more prominent in our education. We have introduced a national course on geohazards, student internships, courses that address sustainable development goals, and increased emphasis on local field sites as teaching laboratories. Furthermore, we have been proactive in raising the status and quality of teaching, exemplified by a growing number of Excellent Teaching Practitioners and staff receiving education awards at the national level. We believe the way forward is to build on the momentum we have generated with iEarth. As the window for meeting the 2030 Agenda is rapidly closing, calls for higher education reform and curriculum transformation will grow louder and more urgent in the coming years. Earth Sciences will strengthen its capacity to respond to these calls without compromising the academic core. To do so, we will prioritise:

Student agency and self-regulated learning

The agency is critical to our students' ability to intentionally plan, regulate, and monitor their learning. We will support our students' self-regulated learning through the following:

- Active and experiential learning, providing field, laboratory and classroom teaching that explicitly affords students agency for their learning.

- Student portfolios are used in which students showcase their competence, progress, and achievements. Portfolios help students plan, monitor, and document their educational journey to connect the curriculum with life after university better.
- New forms of student-staff partnerships and co-creation of teaching and learning activities.

Teacher agency and collaborative curriculum design

Our curriculum needs to respond and adapt to emerging issues in science and society without compromising the integrity of our academic core. We will strengthen this capacity for adaptive resilience:

- Supporting collaborative curriculum design processes that foster teacher agency beyond single courses.
- Empowering our staff members to pursue their goals and aspirations as educators, thus making more effective use of the diversity of our research and teaching ecosystem.
- Leverage collegial teaching networks to allocate resources and effectively democratise innovation and quality enhancement.

An evolving curriculum supported by research

The success of our education strategy depends on human interactions shaped by our institutional environment and infrastructure. We will work actively to enable and sustain these interactions by:

- Supporting ongoing efforts to make our curriculum more visible (for mapping and analysis), connected (into meaningful learning progressions), and flexible (allowing for new connections and combinations).
- Using this framework to improve the fit between the evolving landscape of teaching and learning and the simplified standards required by quality assurance and evaluation systems.
- Collaborating with education researchers and social scientists to use valid and reliable methods for understanding and evaluating the effectiveness of our education strategy.

We shall continue refining our strategy beyond 2025 and arrange a forthcoming strategy meeting in late spring. However, our trajectory is largely contingent upon the decisions made regarding additional funding. Processes are underway at all partner institutions, and we hope to be allowed to advance Earth science education within iEarth over ten years.

4. Appendices

In the following chapter, we have collected 12 appendices summarising activities, members, and a financial overview.

Appendix 1: Awards

Appendix 2: iEarth Digital Learning Forum (iEDLF) & Journal Clubs (iJC)

Appendix 3: iEarth Workshops

Appendix 4: iEarth Student Meetings, activities, and seminars

Appendix 5: iEarth publications (peer-reviewed) 2023

Appendix 6: iEarth scientific conferences (peer-reviewed) 2023

Appendix 7: iEarth dissemination and outreach

Appendix 8: iEarth Educational Research Group activities

Appendix 9: Other relevant activities in iEarth

Appendix 10: iEarth external funding

Appendix 11: iEarth personnel

Appendix 12: iEarth core group meetings

Appendix 13: Accounting

Appendix 1: Awards

Awards 2023			
#	Date	Recipient	Award
1	12.06	GEOV114 – Introduction to geobiology with Bjarte Hannisdal, Dario Blumenschein, Isabela Pires Darcie, Kristian Agasøster Haaga, Tor Einar Møller, and Sven Le Moine Bauer.	The Education Quality Award The prize rewards outstanding work on the quality of education.
2	12.06	Bjarte Hannisdal	Excellent Teaching Practitioner (ETP)
3	12.06	Maria Jensen	Excellent Teaching Practitioner (ETP)
4	12.06	Kjersti B. Daae	Excellent Teaching Practitioner (ETP)

Appendix 2: iEarth Digital Learning Forum (iEDLF) & Journal Clubs (iJC)

iEDLF & iJC 2023				
#	Date	Title	Presenter(s)	Attendees
1	06.02	Collaborative Curriculum Design for Higher Education Transformation (CoDesign): a research project proposal for the Norwegian Research Council	Bjarte Hannisdal	13
2	16.02	Journal Club - Transforming the lowest-performing students: an intervention that worked	Kirsty Dunnett	5
3	23.02	What challenges do students face in introductory STEM courses, and how can instructors help?	Sondre Bolland	19
4	06.03	Student engagement why, where and how?	Anders Mattias Lundmark	19
5	16.03	Journal Club - Mandatory coursework assignments can be, and should be, eliminated!	Kirsty Dunnett	5
6	20.03	The teachers' learning environment - what can iEarth do to improve the culture?	Anders Schomacker	19
7	20.04	What do engaging teachers do to connect with students?	Catherine Bovill	15
8	24.04	How digital can geosciences field-based learning be?	Rafael Kenji Horota and Mark Furze	22
9	11.05	Diversity and inclusion in earth science education - is it a problem and does it matter?	Maria Jensen	42
10	11.05	Journal Club - From "education for sustainable development" to "education for the end of the world as we know it"	Kirsty Dunnett	12
11	05.06	Using teaching and instructional material to stimulate cognitive learning processes	Vegard Gjerde	21
12	08.06	Welcome to the GEO*logic World: A board game designed to be a versatile geological learning and teaching tool	Ingrid Anell	15
13	08.06	Journal Club - Using the history of plate tectonics to teach the nature of science.	Kirsty Dunnett	5
14	12.06	Geoscientists internships - relevant performance for the future challenges	Iver Martens	12
15	17.08	Journal Club - Chapter 6: Education as Relational Process - An invitation to Social Construction	Kirsty Dunnett	9
16	14.09	Journal Club - Activity bingo: Nudging students to make the most out of fieldwork.	Kirsty Dunnett	9
17	28.09	Cognitive Load: What is it and how can we take it in consideration when teaching?	Lex Nederbragt	15
18	12.10	Journal Club - Teaching with Rubrics: The Good, the Bad, and the Ugly	Kirsty Dunnett	9
19	19.10	Geo-MOD: Teaching photogrammetry-based data acquisition	Nil Rhodes	18
20	16.11	Journal Club - Physics Exams that Promote Collaborative Learning	Kirsty Dunnett	5
21	24.11	Meaningful learning and active teaching methods	Maria Weurlander	15
22	14.12	Journal Club - Two Models of Educational Assessment	Kirsty Dunnett	3

Appendix 3: iEarth Workshops

iEarth workshops 2023					
#	Date	Workshop	Organizer(s)	Where	Attendees
1	11.01	GFI teachers breakfast	Kjersti B. Daae	UiB GFI	12
2	17.01	Integrating sustainability into the curriculum	Susan Kaspari	UiO	25
3	19.01	Integrating sustainability into the curriculum	Susan Kaspari	UiB	13
4	20-21/1	Developing SDG613	Kerim Nisancioglu, Anders Mattias Lundmark	UiB	5
5	02.02	Integrating sustainability into the curriculum	Susan Kaspari	UNIS	8
6	06.02	Educational workshop for PhD-students at IG	Anders Ahlberg	UiT	15
7	15.02	Improving the teaching culture at IG: Organising your teaching portfolio	Anders Schomacker, Anders Ahlberg	UiT	15
8	22.02	GFI teachers breakfast	Kjersti B. Daae	UiB GFI	10
9	28.03	Teachers retreat - Doughnut Rounds	Kjersti B. Daae	UiB	30
10	10.05	GFI teachers breakfast	Kjersti B. Daae	UiB GFI	15
11	24-26.05	Collaborative curriculum redesign of BSc program, GEO UiB	Bjarte Hannisdal, Dario Blumenschein, Kristian Haaga, Desiree Roerdink, Steffen Leth Jørgensen, Eoghan Reeves	UiB GEO	6
12	06-08.06	Utdanningslederprogrammet UiO	UiO	UiO	40
13	19.06	GFI teachers breakfast	Kjersti B. Daae	UiB GFI	12
14	19.06	Skolelab workshop	Naturhistorisk museum	UiO	15
15	16-18.09	Collaborative curriculum redesign of BSc program, GEO UiB	Bjarte Hannisdal, Dario Blumenschein, Desiree Roerdink, Steffen Leth Jørgensen, Eoghan Reeves	UiB GEO	5
16	05.10	GFI teachers breakfast	Kjersti B. Daae	UiB GFI	9
17	18-19.10	Utdanningslederprogrammet UiO	UiO	UiO	40
18	26.10	GFI teachers breakfast	Kjersti B. Daae	UiB GFI	13
19	31.10	"You may already have the data - documenting your teaching development does not have to be difficult."	Sehoya Cotner, Jostein Bakke and Oddfrid Førland.	SFU, HK-dir	15
20	06-07.11	Activity Bingo for conferences	Kjersti B. Daae	GLF23	105
21	20-23.11	UNIS Learning Forum Workshop "VR Svalbard and	Mark Furze, Marius Jonassen, Rafael Kenji Horota	UNIS	22

		integrating digital tools into teaching"			
2 2	21-23.11	Collegial Sharing Session "Dealing with (dis)respect in the classroom and field"	Anna Pieńkowski	UNIS	11
2 3	27-28.11	Co-create the department's teaching and learning strategy	Kjersti B. Daae	UIB GFI	16
2 4	29-30.11	Utdanningslederprogrammet UiO	UiO	UiO	40
2 5	01.12	Collaborative curriculum redesign of BSc program, GEO UiB	Bjarte Hannisdal, Desiree Roerdink, Steffen Leth Jørgensen, Eoghan Reeves	UiB GEO	4
2 6	09.12	Improving the teaching culture at IG	Anders Schomacker	UiT	15
2 7	15.12	Collaborative curriculum redesign of BSc program, GEO UiB	Bjarte Hannisdal, Desiree Roerdink, Steffen Leth Jørgensen, Eoghan Reeves	UiB GEO	4

Appendix 4: iEarth Student Meetings, activities, and seminars

Student organisation activities 2023						
#	Date	Activity	Chapter	Organizer(s)	Presenter(s)	Attendees
1	25.01	Gründerkveld med StartupLab i Bergen	UiB	Thomas Hagen Thuesen (UiB), Åshild Aarø (Startuplab)	Christian Haug Eide (UiB), Åshild Aarø (StartupLab), Helge Jørgensen (7Analytics), Anette Broch Mathisen Tvedt and Solveig Osjord (Adepth Minerals)	73
2	14.02	GeOrakel	UiB	Elena Victoria Brattebø	Elena Victoria Brattebø, GEOV111	42
3	15.02	GeOrakel	UiT	Ronja, Vidar, Truls, Isak, Emilie, Matias		30
4	28.02	GeOrakel	UiB	Elena, Anna og Julia	Elena Victoria Brattebø, GEOV111 - Anna, GEOV104 - Julia, GEOV265	26
5	01.03	Introduction to iEarth and pizza night	UNIS	Janika Sanders		25
6	02.03	GeOrakel	UiT	Ronja, Vidar, Truls, Isak, Emilie, Matias		15
7	06.03	UNIS brunch	UNIS	iEarth and bioCEED		14
8	14.03	GeOrakel	UiB	Martha Krohn-Hansen	Martha Krohn-Hansen, GEOV111	37
9	16.03	GeOrakel	UiT	Ronja, Vidar, Truls, Isak, Emilie, Matias		15
10	28.03	PubLecture - Masterpresentasjoner	UiO	Kacper Karaszkiwicz		22
11	28.03	Quiz	UiO	Janika Sanders		15
12	28.03	GeOrakel	UiB	Synnøve	Synnøve, GEOV111	29
13	20.04	GeOrakel	UiT	Ronja, Vidar, Truls, Isak, Emilie, Matias		29
14	21.04	GeOrakel	UiB	Elena Victoria Brattebø	Elena Victoria Brattebø, GEOV111	24
15	02.05	Bedriftspresentasjon	UiT	Ronja, Vidar, Truls, Isak, Emilie, Matias	Equinor	39
16	05.05	GeOrakel	UiB	Elena Victoria Brattebø	Elena Victoria Brattebø, GEOV111	32
17	10.05	Bedriftspresentasjon	UiT	Ronja, Vidar, Truls, Isak, Emilie, Matias	Argeo	31
18	11.05	iEarth Karrieredag	UiB	iEarth Bergen, GFU og GFFU	17 businesses recruiting geoscientists	100
19	14.05	iEarth Barbeque	UiT	Emilie, Truls, Vidar og Isak		21
20	15.05	iEarth / NGF event	UiT	Emilie, Truls, Vidar og Isak	Carly Faber	28
21	17.05	Steinbiten / iEarth UiT 17th of may celebration	UiT	Ronja, Vidar, Truls, Isak, Emilie, Matias		65

22	19.05	Exam GeOracle Quiz	UiT	Matias		20
23	26.05	EksamensGeOrakel	UiO	Kacper Karaszkiwicz	GEO2110	12
24	28.05	Bonfire	UNIS	Janika Sanders		28
25	31.05	EksamensGeOrakel	UiB	Elena Victoria Brattebø	Elena Victoria Brattebø, GEOV111	49
26	01.06	EksamensGeOrakel	UiO	Kacper Karaszkiwicz	GEO2339 - Hydrologi og GEO2140 - faste jords fysikk	16
27	02.06	Sommeravslutning	UiO	Kacper Karaszkiwicz		
28	05.09	Allmøte rekruttering	UiO	Kacper Karaszkiwicz		
29	12.09	Styremøte	UiO	Marie og Markus	Planlegging H23	22
30	20.09	Styremøte	UiO	Marie og Markus	Planlegging H23	20
31	21.09	Rekrutteringsmøte UiB	UiB	Siri Tunland	Siri Tunland og Elena Victoria Brattebø	49
32	28.09	Styremøte UiB	UiB	Siri Tunland	Siri Tunland	16
33	02.10	Latex kurs	UiO	Marie og Markus	Caro Bauer	37
34	05.10	Teambuilding	UiB	Vegard Pettersen		12
35	06.10	Quiz	UiO	Lefteris		20
36	09.10	GeOrakel	UiB	Solveig Toppe, Fredrik Paulsen, Elias Halleland	GEOV110, GEOV114	4
37	10.10	iEarth Karrieredag	UiT	Emilie, Truls, Vidar, Isak og Lasse	10 businesses recruiting geoscientists	103
38	18.10	Stand på Bacheloraften	UiB	Solveig Toppe, Siri Tunland, Majken Borgersen		35
39	19.10	Styremøte	UiB	Siri Tunland		13
40	19.10	UNIS Breakfast	UNIS	Ingrid, Sara, Olympe and Daan	Anna Pienkowski and Emelie Huppelepup	42
41	21.10	Cabin trip	UiO	Marie og Markus	Cabin trip	10
42	25.10	Movie night	UiO	Sara	Joe H. Lacasce	25
43	01.11	Night talk	UNIS	Albert, Guy, Miriam	Ólafur Ingólfsson	37
44	03.11	PubLecture	UiO	Marie	Terje Koren Bertsen	15
45	03.11	Taco-Friday	UiO	Marie og Markus		11
46	06.11	Publecture	UiB	Amalie Andersen, Jacob Nygaard		16
47	08.11	Styremøte	UiO	Marie og Markus		14
48	13.11	GeOrakel	UiB	Solveig Toppe, Fredrik Paulsen, Elias Halleland	GEOV101	9
49	17.11	Brewery & pizza night	UNIS	Ingrid, Sara, Olympe and Daan		18
50	17.11	Julebord	UiB	Vegard Pettersen		16
51	17.11	Taco-Friday	UiO	Marie		14
52	20.11	GeOrakel	UiB	Solveig Toppe, Fredrik Paulsen, Elias Halleland	GEOV107	15
53	20.11	Co-creation lunch	UiT	Emilie, Truls, Vidar, Isak	Common lunch with teachers and students	54
54	20.11	UNIS Breakfast	UNIS	Ingrid, Sara, Olympe and Daan	Arthur Garreau & Amélie Roché	47
55	20.11	Teambuilding	UiT	Emilie, Truls, Vidar, Isak	Teambuilding with iEarth board UiT	5
56	30.11	Exam GeOrakel	UiT	Emilie, Truls, Vidar, Isak		43
57	30.11	Taco-Friday	UiO	Marie og Markus		12

58	04.12	UNIS Breakfast	UNIS	Ingrid, Sara, Olympe and Daan	Victor Gónzales Triginer & Rafael Kenji Horota	43
59	05.12	GeOrakel	UiB	Solveig Toppe, Fredrik Paulsen, Elias Halleland	GEOV112, GEOV113	3
60	07.12	GeOrakel	UiB	Solveig Toppe, Fredrik Paulsen, Elias Halleland	GEOV103	7
61	13.12	Styremøte	UiB	Siri Tunglund		5

Appendix 5: iEarth publications (peer-reviewed) 2023

- Daae, K., A. D. Årvik, E. Darelius, and M. S. Glessmer, 2023. Student guides: supporting Learning from laboratory experiments through across-course collaboration. *Nordic Journal of STEM Education*, 7(1): 98-105, doi: <https://doi.org/10.5324/njsteme.v7i1.5093>
- Glessmer, M. S., L. Latuta, F. Saltalamacchia, and K. Daae, 2023. Activity Bingo: Nudging students to make the most out of fieldwork. *Oceanography*, doi: <https://doi.org/10.5670/oceanog.2023.217>
- Horota, R. K., Rossa, P., Marques, A., Gonzaga, L., Senger, K., Cazarin, C. L., Spigolon, A., & Veronez, R., 2023. An Immersive Virtual Field Experience Structuring Method for Geoscience Education. *IEEE Trans. Learn. Technol.* 16, 1 (Feb. 2023), 121–132. <https://doi.org/10.1109/TLT.2022.3207089>
- Kordts, R., & Schneider C., 2023. Interaktionsprozesse in Führungssituationen – erfahrungs- und case-based Lehre an der Universität St.Gallen (HSG) [Interaction processes in leadership situations – experience- and case-based learning at the University of St.Gallen]. *Zeitschrift für Hochschulentwicklung/Journal for Higher Education Development*, 18(2), 279–297. <https://doi.org/10.3217/zfhe-18-02/15>
- Maier, N., Mendzheritskaya, J., Hagenauer, G., Hansen, M., Kordts, R., Stephan, M., & Thies, K., 2023. Developing a CVTAE-based conceptual framework for examining emotions in higher education teaching: a systematic literature review. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2023.1142506>
- Møller, T., Kvarøy, S., Hannisdal, B., 2023. Students’ response to the introduction of active learning and computational practices in a bachelor-level earth science course. *Nordic Journal of STEM Education*. 7. <https://doi.org/10.5324/njsteme.v7i1.4827>

Appendix 6: iEarth scientific conferences (peer-reviewed)

iEarth conferences (peer-reviewed) 2023					
#	Date	Title	Author(s)	Occasion	Contribution
1	16.03	Supporting learning of difficult theory by hands-on experiences and across-course collaboration.	Daae, K., A. D. Årvik, E. Darelius, and M. S. Glessmer. 2023.	MNT conference 2023	Poster & Presentation
2	16.03	Developing a sequence of experiments to support learning about rotating fluid dynamics at different university levels.	Glessmer, M. S., A. D. Årvik, E. Darelius, T. Martin, and K. Daae. 2023	MNT conference 2023	Poster
3	16.03	What challenges do students face in introductory STEM courses, and how can instructors help?	Bolland, S., E. Rønning, T. Try, S. Cotner, K. Daae, and M. Glessmer. 2023.	MNT conference 2023	Presentation
4	16.03	Supporting learning of difficult theory by hands-on experiences and across-course collaboration	Daae, K., A. D. Årvik, E. Darelius, and M. S. Glessmer. 2023.	MNT conference 2023	
5	25.04	Redesign to student-active learning for Field and Laboratory Course in Quaternary Geology/Physical Geography	P.R. Nielsen, J. Bakke, K. Vasskog	UiB Læringskonferanse 2023	Poster
6	25.04	Implementing changes in higher education: a social network perspective	Dario Blumenschein	UiB Læringskonferanse 2023	Presentation
7	25.04	"The transformational potential of co-creation"	Catherine Bovill	UiB Læringskonferanse 2023	Keynote presentation
8	25.04	A new framework for curriculum development	Bjarte Hannisdal (presenter), Dario Blumenschein, Kristian Haaga	UiB Læringskonferanse 2023	Presentation
9	26.04	Internships in academia	Iver Martens and Helge A. Vogt	EGU 2023	Presentation
10	28.04	Internships in academia - challenges and opportunities for practical orientation in disciplinary and multidisciplinary study programs in higher education	Iver Martens	AMPS Toronto	Presentation
11	13.06	Geoscientist's internships – relevant performance for the future challenges. PermaIntern Internship	Iver Martens	Puigcerda Spain	Presentation
12	20-23.06	Unconference session, defining quality parameters in internships for higher education	Iver Martens	Global internship Berlin 2023	Presentation

13	20.09	Betydningen av praksisordninger i høyere utdanning	Iver Martens	Conference for Higher Education 2023	Presentation
14	21.09	The future of assessment in higher education	Bjarte Hannisdal	HK-Dir Conference on Higher Education	Presentation
15	22.09	The role of social networks for implementing change in higher education	Dario Blumenschein	DOKON (University of Rijeka, Croatia)	Presentation
16	27.10	Building pathways to success: How your education prepares you for the future	Blumenschein D. and Hannisdal B.	Geopraksis dagen 2023, Bergen	Poster
17	8-11.11	Teaching during the COVID-19 pandemic. Perspectives of SoTL scholars.	Kordts, R., & Leschke, J.	ISSOTL23, Utrecht University, The Netherlands.	Poster
18	8-11.11	Not theoretical enough? Too complicit? Engaging with critiques of academic development.	Van der Kloet, M., Boge, C., Kordts, R., & Darcie, I.	ISSOTL23, Utrecht University, The Netherlands.	Panel
19	21.11	Incorporating UN Sustainability Goals into the curriculum	Anna Pieńkowski and Mark Furze	UNIS Learning Forum 2023	Presentation

Appendix 7: iEarth dissemination and outreach

iEarth Outreach 2023				
#	Date	Title	Presenter(s)	Occasion
1	04-06.01	"Towards integrated Earth System Science education in Norway"	Thomas Hagen Thuesen, Jostein Bakke	NGWM23 at NTNU in Trondheim
2	09.01	Presentation of iEarth		
3	12.01	GeoPraksis - Bedriftspresentasjon	Helge Vogt	Bedriftspresentasjon Omya Hustadmarmor AS
4	Feb	Chat GPT: Betydningen for undervisning, læring og vurdering [Chat GPT: The importance for teaching, learning and assessment].	Robert Kordts	Presentation at the Faculty of Psychology at the University of Bergen, Norway.
5	Feb	The Scholarship of Teaching and Learning (SoTL).	Robert Kordts	Presentation at the Bærekraftskollegiet at the University of Bergen, Norway.
6	07.02	GeoPraksis - Bedriftspresentasjon	Iver Martens og Helge Vogt	Prosjektmøte med Ungt Entreprenørskap IG, UiT
7	March	University teachers' emotions – findings and ways forward.	Robert Kordts	Presentation at the research group Knowledge, Learning and Governance: Studies in higher education and work at the University of Oslo, Norway.
8	16-17.03	<i>What challenges do students face in introductory STEM courses, and how can instructors help</i>	S.S. Bolland, E.C. Rønning, T.T. Try, S.H. Cotner, K.B. Daae and M.S. Glessmer	Presentation at MNT konferansen i Stavanger: "Utdanning for framtidens arbeidsliv"
9	16-17.03	<i>" Student guides: supporting learning from laboratory experiments through across-course collaboration "</i>	K. Daae, E. Darelius, A. D. Årvik, and M. S. Glessmer	Presentation at MNT konferansen i Stavanger: "Utdanning for framtidens arbeidsliv"
10	16-17.03	<i>"Developing a sequence of experiments to support learning about rotating fluid dynamics at different university levels "</i>	M.S. Glessmer, A. D. Årvik, E. Darelius, T. Martin, K. Daae	Poster at MNT konferansen i Stavanger: "Utdanning for framtidens arbeidsliv"
11	22.03	How can we assess students working on "wicked problems"	Bjarte Hannisdal	Education seminar, Faculty of Medicine, UiB
12	18.04	"Supporting students in higher education: proposal for a theoretical framework" Kirsty Dunnett summarizes De Ketele (2014).	Kirsty Dunnett	Mirjam Glessmer's blog
13	19.04	Geopraksis UiB at DOF Subsea	Kenneth Mangersnes, Thomas H. Thuesen and Jarle B. Sleire	DOF Subsea's offices in Bergen

14	20.04	Geopraksis UiB at Brønnøy Kalk	Kenneth Mangersnes and Jarle Børve Sleire	Digital meeting
15	24.04	Geopraksis UiB at NORCE	Kenneth Mangersnes and Jarle Børve Sleire	NORCE's offices in Bergen
16	24.04	Scoret høyt i studentundersøkelse	Geoforskning.no	Bachelorstudentene ved UiT ga gode tilbakemeldinger da de ble spurt om studiet.
17	25.04	<i>Student guides: supporting learning from laboratory experiments through across-course collaboration</i>	K. Daae, E. Darelius, A. D. Årvik, and M. S. Glessmer	UiB Læringskonferanse in Bergen: "Transformative Learning and Teaching"
18	25.04	Geopraksis UiB at Norsk geologisk undersøkelse (NGU)	Kenneth Mangersnes and Jarle Børve Sleire	NGU's offices in Trondheim
19	26.04	Meeting with a delegation from Vilnius University, Lithuania	Bjarte Hannisdal (presenter), Dario Blumenschein, Kristian Haaga	UiB
20	26.04	Geopraksis UiB at Bergen kommune	Kenneth Mangersnes, Thomas H. Thuesen and Jarle B. Sleire	Bergen kommune's offices in Bergen
21	26.04	Geopraksis UiB at Rambøll	Kenneth Mangersnes, Thomas H. Thuesen and Jarle B. Sleire	Rambøll's offices in Bergen
22	27.04	Geopraksis UiB at Sweco	Kenneth Mangersnes, Thomas H. Thuesen and Jarle B. Sleire	Sweco's offices in Bergen
23	28.04	Geopraksis UiB at NVE	Kenneth Mangersnes and Jarle Børve Sleire	NVE's offices in Førde
24	02.05	Geopraksis UiB at Norconsult	Kenneth Mangersnes and Jarle Børve Sleire	Norconsult's offices in Bergen
25	21.06	Kirsty Dunnett's addition to my post on "A conceptual framework for the teaching and learning of generic graduate attributes (Barrie, 2007).	Kirsy	Mirjam Glessmer's blog
26	26.06	Overview of iEarth	Bjarte Hannisdal	University of Edinburgh
27	27.06	University of Edinburgh "Learning and Teaching" annual conference.	Kjersti B. Daae, Elena Victoria Brattebø, Bjarte Hannisdal, Anders Mattias Lundmark	University of Edinburgh
28	27.06	The impacts of increased worklife relevance - the internships!	Kenneth Mangersnes, Kristian B. Bakken, Elena Victoria Brattebø	University of Edinburgh
29	27.06	An ecosystem framework for curriculum as a process	Bjarte Hannisdal and Dario Blumenschein	iEarth meeting with Jon Turner Head of University of Edinburgh Curriculum Transformation Project

30	12.07	Derivatives and Concept Images - a guest post by Kirsty Dunnett	Kirsty Dunnett	Mirjam Glessmer's blog
31	07.08	Doing things together instead of alone: structures for Collective SoTL - a guest post by Kirsty Dunnett	Kirsty Dunnett	Mirjam Glessmer's blog
32	Sept	GeoPraksis og yrkestilnærming	Iver Martens	Norsk Bergindustri
33	Sept	Bedriftspresentasjon av GeoPraksis	Iver Martens	Norsk Polarinstitutt
34	Sept	Geohazards field trip implementing "Activity Bingo"	Carly Faber and C. Kollsgård	Tromsø area
35	Sept	Quaternary geology	Anders Schomacker	Skibotn area
36	21.09	Raging against the Machine... with machines?	Bjarte Hannisdal	Seminar, Centre for Digital Transformation, University of Agder
37	Sept	Bedriftspresentasjon av GeoPraksis	Helge Vogt	Asplan Viak
38	Sept	GeoPraksis og yrkestilnærming	Iver Martens	Nordland Fylkeskommune
39	Sept	GeoPraksis og yrkestilnærming	Iver Martens	ACT-update møter
40	20.09	Arbeidslivspraksis i høyere utdanning	Iver Martens	Nordlys avis
41	20.09	The strength of evidence in (geosciences) education research: might a hierarchy do more harm than good? Guest post by Kirsty Dunnett	Kirsty Dunnett	Mirjam Glessmer's blog
42	29.09	Open day for schools at UNIS - Presentation of Geology department and geology of Svalbard along with immersive digital teaching technologies.	Mark Furze, Rafael Kenji Horota, Maria Jensen	UNIS
43	30.09	Open day for public at UNIS - Public lecture on geology department and iEarth	Mark Furze	UNIS
44	Oct	GeoIntern and WorkLife Relevance	Iver Martens	PermaIntern Annual conference session
45	07.10	Arbeidslivspraksis i høyere utdanning trenger langsiktighet for å møte fremtidens skrikende kompetansebehov	Iver Martens	Khrono.no
46	09.10	Best Practice and "Know-how" from the GeoIntern project	Iver Martens	PermaIntern Certification meetings, Copenhagen
47	Oct	GeoIntern project presentation	Iver Martens	Norges Petroleumsforening, Tromsø
48	11.10	Geoscientists - relevant performance for the future challenges.	Iver Martens	BridGet Erasmus+ summer school Sicily

49	27.10	Geopraksisdagen - Kompetanseløft for fremtidens geovitere	Kenneth Mangersnes (leader), Jarle Børve Sleire, Karen Tellefsen, Thomas H. Thuesen, Elena V. Brattebø. Presenters: Gunn Mangerud, Helge Alexander Vogt, Israel Polonio Martin (Aker BP), Christian Haug Eide (UiB), Catrine Hatlenes (Multiconsult), Lina Hedvig Line (Aker BP), Torstein Hole (HK-dir), Atle Rotevatn (UiB).	UiB
50	27.10	Geopraksis ved Universitetet i Bergen	Kenneth Mangersnes	Geopraksisdagen 2023
51	27.10	Host of Geopraksisdagen 2023	Jostein Bakke	Geopraksisdagen 2023
52	27.10	Effekten av GeoPraksis	Helge Alexander Vogt	Geopraksisdagen 2023
53	27.10	Perspektiv på praksisordningen fra studenter	Elena Victoria Brattebø, Jonas Vestye Andreassen, Martin Borgen	Geopraksisdagen 2023
54	06-07.11	GeoLearning Forum - Sustainability and inclusivity in Earth Science Education	Katja Enberg, Susan Kaspari, Steven Rogers, Catherine Bovill, Thomas H. Thuesen, Jostein Bakke, Anna Pienkowski, Mark Furze, Elena V. Brattebø	GeoLearning Forum 2023
55	06-07.11	Turning teaching questions into research questions, poster	Anders Mattias Lundmark, Kirsty Dunnett, Mirjam Sophia Glessmer, Kjersti B. Daae, Carly Faber.	GeoLearning Forum 2023
56	06-07.11	iEarth student chapter UiO, poster	Kacper Karaszkiwicz	
57	Nov	Bedriftspresentasjon av GeoPraksis	Iver Martens	Multiconsult
58	22.11	iEarth lunch - Student-teacher cooperation	Carly Faber	UiT
59	30.11-01.12	Supervision: A Process Model.	Robert Kordts	University of Bergen's Department of Biological Sciences Teacher Retreat, Voss, Norway.
60	Desember	GeoPraksis - Realfagspraksis prosjektpresentasjon	Helge Vogt	Microsoft Development Center Tromsø

Appendix 8: Educational research group activities

ERG activities 2023			
#	Date	Activity	Organizer(s)
1	20.01	Webinar	Anders Ahlberg
2	17.02	Webinar	Anders Ahlberg
4	21.04	Webinar	Anders Ahlberg
5	28.06	Edinburgh social gathering	Anders Ahlberg
6	07.11	ERG Social gathering - Dinner	Dario Blumenschein, Rafael K. Horota, Julien Pooya Weihs, Kirsty Dunnett

Appendix 9: Other relevant activities in iEarth

iEarth other activities 2023				
#	Date	Title	Author(s)	Occasion
1	02.01	UNIS BioCEED-iEarth Synergy Meeting	Tina Dahl, Steve Coulson, Mark Furze	Meeting
2	06.02	UNIS BioCEED-iEarth Synergy Meeting	Tina Dahl, Steve Coulson, Mark Furze	Meeting
3	13-14.02	iEarth strategy meeting, Tromsø	Bjarte Hannisdal	Strategy meeting UiT
4	09.03	Presentation of iEarth for the board of Akademia-avtalen. Dreggen.	Jostein Bakke	Meeting
5	09.03	Strategy working group meeting: "A strategy for resilience"	Bjarte Hannisdal	Meeting
6	14.04	A digital twin for higher education design and development. VIS innovation, Bergen	Bjarte Hannisdal	Meeting
7	26.04	Presentation of iEarth for a delegation from Vilnius. Department of Earth Science, UiB.	Jostein Bakke	Meeting
8	14.09	Presentation of iEarth for the board of University of Bergen (UiB), Musepllass 1.	Jostein Bakke	Meeting
9	10.10	Presentation of iEarth for a delegation from the University of Aberdeen, Musepllass 1.	Jostein Bakke	Meeting
10	17.10	bioCEED monthly meetings UNIS	Anna Pieńkowski	Meeting
11	26.10	Pedagogical Academy, Faculty of Mathematics and Natural Sciences, UiB. "Collegial educational development in a time of crisis"	Bjarte Hannisdal	Meeting
12	08.11	A roadmap for Focus Area 1, Shaping the future	Bjarte Hannisdal	iEarth strategy meeting UiO
13	15.11	A digital twin for higher education design and development	Bjarte Hannisdal	Central IT Division, UiB
14	21.11	bioCEED monthly meetings UNIS	Anna Pieńkowski	Meeting
15	29.11	Education Leader Meeting, Matnat, UiB. "Collegial educational development in a time of crisis"	Bjarte Hannisdal	Meeting
16	Nov23-Feb24	NAV placement - Zeliha Alagoz, building visulization of curriculum data in Python	Bjarte Hannisdal	NAV placement
17	12.12	bioCEED monthly meetings UNIS	Anna Pieńkowski	Meeting

Appendix 10: iEarth external funding

Externally funded projects				
#	Corresponding author	Project title	Funding resource	Amount granted
1	Kirsty Dunnett	Travel stipend	Kristine Bonnevie	84 000 NOK

Appendix 11: iEarth personnel

Centre management

**Centre Leader:****Professor Jostein Bakke, UiB**

Jostein Bakke has been the centre leader for iEarth since its start in 2016. He is a Quaternary geologist working on paleoclimatic problems worldwide and a leader in the national research infrastructure EARTHLAB. He is especially engaged in student active learning and academic development. Another engaging topic is how to utilise field and laboratory teaching into the Earth science curriculum.

**Network Coordinator:****Advisor Thomas Hagen Thuesen, UiB**

Thomas Hagen Thuesen started as the Network Coordinator for iEarth in September 2022. He has a sedimentology and Quaternary geology background from the Department of Earth Science at UiB.



Associate Professor Bjarte Hannisdal, UiB

Bjarte is both Education Chair for GEO-UiB and leader for Focus Area 1. He is an associate professor at the Department of Earth Science at UiB, affiliated with the Geochemistry and Geobiology research group. His research interests are quantitative paleobiology and geobiology, Earth system history and causality in dynamic systems.



Associate Professor Kjersti Birkeland Daae, UiB

Kjersti is the Education Chair at GFI-UiB, affiliated with the Physical Oceanography research group. She works on high-latitude processes, emphasising water exchange along continental slopes, water mass transformations and ice shelf-ocean interaction.



Senior Lecturer Karianne Staalesen Lilleøren, UiO

Karianne is the Education Chair at UiO, which fits well with her role as Head of Education at the Department of Geosciences. She is a Senior Lecturer at the section for Physical Geography and Hydrology and Head of the very new Geoscience Education Section.



Associate Professor Anders Mattias Lundmark, UiO

Anders is the leader of Focus Area 2. He is an associate professor at the Department of Geosciences at UiO, where he is affiliated with the Section of Geology and Geophysics and a member of the Geoscience Education Section. His research interests include tectonics and Earth development, regional geology and geodidactics.



Lecturer Iver Martens, UiT – The Arctic University of Norway

Iver is the leader of Focus Area 5 and lectures at the Department of Geosciences at UiT – The Arctic University of Norway. Iver investigates the cooperation between industry and academia, how we can reduce the gap between them, and how we can help each other to ensure benefits for both parts.



Professor Anders Schomacker, UiT – The Arctic University of Norway

Anders is both Education Chair at UiT, The Arctic University of Norway, and leader for Focus Area 3. He is a professor at the Department of Geosciences at UiT. His research focuses on Quaternary sciences, palaeoclimatology, glacial sediments, processes, and geomorphology.



Associate Professor Anna Pienkowski, UNIS

Anna is the new Education Chair at UNIS and Focus Area leader for Field Learning.

**Advisor Kristian Bjelbøle Bakken, UiO**

Kristian is one of the iEarth coordinators, working as a Senior Executive Officer within the Section for Geodidactics at UiO.

**Assistant Professor Kenneth Mangersnes, UiB**

Kenneth is one of the iEarth coordinators, running the subject GEOV298 - GeoIntern at UiB.

**Senior Consultant Karen Tellefsen, UiB**

Karen is one of the iEarth coordinators. She is Senior Executive Officer at the Department of Earth Science, contributing to iEarth management and particularly the GeoIntern course at UiB.

**PhD candidate Jarle Børve Sleire, UiB**

PhD candidate, working together with Kenneth Mangersnes on the subject GEOV298 – Geopraksis.

iEarth Research Group 2023



Maria Weurlander (Leader), UiT and Stockholm University

Maria is an associate professor and senior lecturer in higher education at the Department of Education at Stockholm University. She now joins us as a new adjunct associate professor II at IG as part of iEarth. Her professional interest centers around the interplay between teaching and learning in various educational settings, from both teachers' and students' perspectives.



Associate Professor Mirjam Glessmer, Lund University

Senior Lecturer in academic development at the Centre for Engineering Education at Lund University. Mirjam is an adjunct associated professor II, at UiB GFI and iEarth



Professor Catherine Bovill, University of Edinburgh

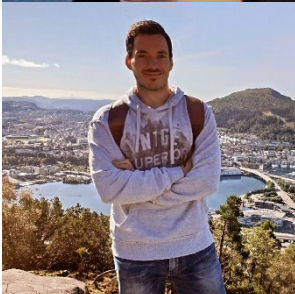
Professor of Student Engagement in Higher Education and recently a co-director at the Institute for Academic Development at the University of Edinburgh and holds a professor II position with iEarth.

Cathy is leading a range of strategic student engagement work at the University of Edinburgh and is considered a world leader in co-created curriculum, student-staff partnership and student engagement.



Kirsty Dunnett, UiO

Postdoctoral fellow.



Dario Blumenschein, UiB

PhD candidate, GEO-UiB.



Julien Pooya Weihs, UiB

PhD candidate, GFI-UiB.



Carly Faber, UiT
Postdoctoral fellow.



Rafael Horota, UNIS
PhD candidate.



Gerald Leo Decelles III, UiO
PhD candidate.

iEarth Board

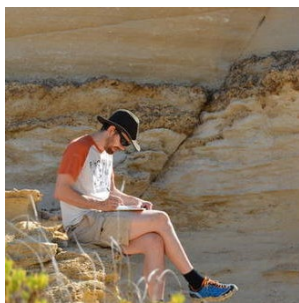


Thomas Hagen Thuesen
Secretary, iEarth admin leader



Chairman of the Board Professor
Bernd Etzelmüller
Head of Department, GEO- UiO

Marit Ubbe
HK-Dir observer



Professor Atle Rotevatn
Head of Department, GEO-UiB



Professor Matthias Forwick
Head of Department, GEO-UiT



Professor Tor Eldevik
Head of Department, GFI-UiB



Associate Professor Maria Jensen
Head of Department, Arctic Geology, UNIS



Elena Victoria Brattebø
Student Representative, National Student Leader, UiB

Student Organisation



Elena Victoria Brattebø
National Student Leader, UiB

UiO Student Chapter

<p>Marie Aas Student Leader BSc 2021</p>	<p>Markus Haugen Nestleder BSc 2021</p>	<p>Sara Edland Gjøsteen GeOrakel MSc 2023</p>	<p>Ruth Kristine Brevig Studentrepresentant MSc 2023</p>
<p>Tuva Kristina Stelander SoMe responsible MSc 2023</p>	<p>Åsne Berthling SoMe responsible MSc 2023</p>	<p>Jenny Beate Fossen Course representative MSc 2023</p>	<p>Lisa Julianne Nystad Career Day MSc 2023</p>

UiB Student Chapter

<p>Siri Tungland Student leader BSc 2022</p>	<p>Kaja Friis Ruud Nestleder BSc 2023</p>	<p>Elias Halleland GeOrakel BSc 2023</p>	<p>Fredrik Paulsen GeOrakel BSc 2022</p>



**Lars Andreas
Huseby**
Economy
BSc 2023



Ada Mascolo
SoMe
BSc 2023



Vegard Pettersen
Social
BSc 2022



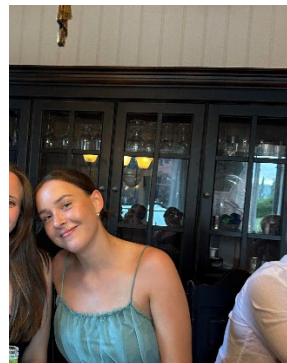
Amalie Andersen
Course representative
BSc 2022



Jacob Nygaard
Course
representative
BSc 2023



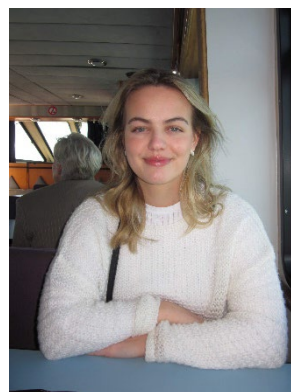
**Ann Emelie
Haugeberg**
Member
BSc 2023



Ingrid Helle
Member
BSc 2023



Karoline Tysnes
Member
BSc 2023



Tiril Sundal
Member
BSc 2022

UiT Student Chapter



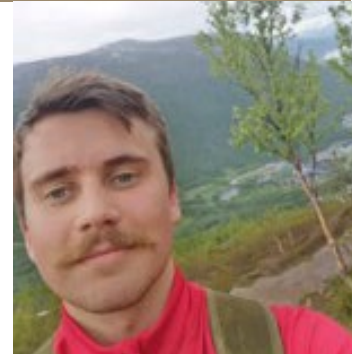
Emilie Norbeck Iarsen
Student Leader
BSc 2021



Isak Steffensen Krane
Nestleder
BSc 2020



Truls Aaby
Economy
BSc 2020



Vidar Nygård
GeOrakel
BSc 2020



Matias Grude Eriksen
GeOrakel
BSc 2022



Lasse Økland
Course representative
BSc 2021



Siri Lekve
SoMe
BSc 2021



Ronja Malm
GeOrakel
BSc 2021

UNIS Student Chapter

Ingrid Valstad Student leader
BSc 2023

Daan Boer Student leader
BSc 2023

Sara Borchgrevink Economy
BSc 2023

Olympe Labesse Events
BSc 2023

Nele Eggers Member
BSc 2023

Janika Sanders Student leader until summer 2023
BSc 2022

Helene Dreyer SoMe
BSc 2022

Malene Broholm Nielsen Member
BSc 2022

Tereza Mosociová Member
BSc 2022

Marion Gerbel Member
BSc 2023

Muriel Bühlhoff Member
BSc 2023

Rebecca Frey Economy
BSc 2022

Appendix 12: iEarth core group meetings

iEarth core group meetings			
#	Date	Type of meeting	Attendees
1	09.01	Status meeting	10
2	16.01	Status meeting	13
3	17.01	Board meeting	7
4	23.01	Status meeting	15
5	30.01	Status meeting	13
6	31.01	SEED project evaluation meeting	11
7	13.02	Strategy meeting	12
8	20.02	Status meeting	13
9	27.02	Status meeting	15
10	13.03	Status meeting	12
11	20.03	Status meeting	11
12	27.03	Status meeting	9
13	17.04	Status meeting	12
14	08.05	Status meeting	12
15	15.05	Status meeting	12
16	12.06	Status meeting	9
17	19.06	Status meeting	11
18	14.08	Status meeting	10
19	21.08	Status meeting	16
20	28.08	Status meeting	9
21	04.09	Status meeting	13
22	11.09	Status meeting	17
23	18.09	Status meeting	12
24	25.09	Status meeting	11
25	29.09	Board meeting	9
26	02.10	Status meeting	12
27	09.10	Status meeting	10
28	16.10	Status meeting	12
29	23.10	Status meeting	11
30	30.10	Status meeting	12
31	08.11	Strategy meeting	12
32	13.11	Status meeting	8
33	20.11	Status meeting	10
34	27.11	Status meeting	12
35	04.12	Status meeting	11

Appendix 13: Accounting

Aktiviteter	Regnskap 2020	Regnskap 2021	Regnskap 2022	Budsjett 2023	Regnskap 2023	Differanse- 2023	Budsjett 2024	Budsjett 2025	Budsjett 2026	Budsjett hittil	Regnskap hittil	Diff Budsjett hittil/Regnskap hittil	Justert totalbudsjett	Forbruk i % av totalbud- sjett
06-Drift	44 799	299 023	381 096	350 000	373 669	-23 669	320 178	224 822	273 626	1 225 000	1 098 587	126 413	1 917 213	0,57
07-Webinar	334 608	468 271	0	0	0	0	0	0	0	802 879	802 879	0	802 879	1,00
08-Virtuelt kompetansesenter	0	62 500	77 787	87 500	0	87 500	13 500	0	0	237 500	140 287	97 213	152 787	0,92
09-Retreats	104 688	499 116	552 432	296 196	402 489	-106 293	193 707	0	0	1 548 628	1 558 725	-10 097	1 792 432	0,89
10-Internships	0	0	0	350 000	205 747	144 253	150 000	69 253	25 000	350 000	205 747	144 253	450 000	0,46
11-Konferanse	0	0	0	0	0	0	0	300 000	0	0	0	0	300 000	0,00
Internprosjekter	324 234	945 292	1 034 886	1 347 050	1 178 632	168 418	531 578	187 226	1 168 418	4 509 774	3 483 045	1 026 729	5 370 267	0,65
PHD	0	3 110 295	3 914 353	5 439 705	4 781 634	658 071	4 052 000	2 887 647	658 071	14 841 705	11 806 282	3 035 423	19 404 000	0,61
Post doc	0	91 427	1 522 816	1 317 000	1 170 665	146 335	1 356 000	904 757	146 335	3 836 000	2 784 908	1 051 092	5 192 000	0,54
Tekn	0	297 000	0	848 000	1 564 323	-716 323	1 526 000	716 323	0	2 519 000	1 861 323	657 677	4 103 646	0,45
adm.	434 996	889 160	770 856	912 000	894 505	17 495	960 844	534 639	0	3 143 000	2 989 517	153 483	4 485 000	0,67
education chair	1 715 868	3 766 959	4 303 766	5 737 000	3 647 810	2 089 190	3 212 580	2 479 912	1 057 399	17 338 000	13 434 404	3 903 596	20 184 295	0,67
Proff II	520 755	1 614 291	1 434 521	1 076 000	775 761	300 239	764 479	300 000	146 415	4 164 222	4 345 329	-181 107	5 556 223	0,78
PI	379 661	1 013 814	526 832	939 000	639 753	299 247	967 000	1 000 000	790 000	3 237 000	2 560 060	676 940	5 317 060	0,48
Total kostnader	3 859 609	13 057 149	14 519 346	18 699 451	15 634 988		14 046 866	9 604 579	4 265 264	57 752 708	47 071 091		74 987 800	
Finansiert av Diku	2 810 323	8 241 136	7 416 050		8 400 801		7 500 000	2 570 336		26 868 310			36 000 000	
Egen finansiert	1 049 286	4 816 013	7 103 296		7 234 187		6 546 866	7 034 243		30 884 398			38 987 800	

In 2023, we funded ten projects for 604 310 NOK (Internprosjekter). When we changed SEED projects to having an open call rather than a fixed announcement, the number of SEED project applications received dramatically declined in 2023. Several previous SEED projects are coming to a close, while some are extended to the summer or winter of 2024.

06 Drift is funding used to cover travel expenses for everyone in the consortium, such as the educational research group and the day-to-day expenses of the centre. Several of the costs related to our website and virtual competence centre were spent on this post rather than “08 Virtual competence centre”, so no funds were allocated to that post this year.

The post-09-Retreats section of the budget is aimed explicitly towards the GeoLearning Forum (our annual conference) held in Oslo this year. With over 100 participants at the GeoLearning Forum and increased costs across the board for hotels and travel, we used more than anticipated but significantly lowered the costs compared to 2021 and 2022. We will transfer money from the internal project post to cover these costs. We wanted to make this event as large as possible for the whole consortium, and with over 100 participants, we will use more than the foreseen budget in 2024 as well.

Through in-kind resources from iEarth institutions, we have created positions for five PhDs, five adjunct professors and one postdoc. In 2022, one PhD student left the position for personal reasons. The *Prof II* section of the budget shows some underspent resources which is because one of the adjunct professors retired in 2022, and we were delayed in hiring a new one.