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|  |  | Continental Scientific Drilling Division<br><br>Geological Society of America |
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## Continental Scientific Drilling Newsletter

### September 2025

**Dear CSD Division Members,**

Collectively, we are facing challenging times as scientists. The vision of the Management Board is for the CSD Division to support our members in their research and educational endeavors, and to provide a source of community for scientists who use continental drilling, coring, and geophysical techniques as their primary toolkit for subsurface investigation. We are actively working to build the Division and appreciate the continued engagement of our members. We share recent news and progress in this newsletter, and we look forward to hosting you at our annual townhall and reception at GSA Connects in San Antonio (October 19, 2025).

## Leadership and Committees

2025 is an off-cycle year for the CSD Division Management Board. Only one of our student representatives has changed this year, and we welcome Alexander Wilk from the University of Massachusetts to the Management Board. Alex replaces Madison Rafter (University of Minnesota), who we thank for her many contributions to our social media and science programming over the past two years. Likewise, we salute outgoing Chair Brett Carpenter (now Past Chair), who provided strong leadership and excellent ideas that helped the CSD Division to flourish and grow at a critical moment in the Division's history.

### Current management board



**Chair: Mike McGlue** is a Professor of Earth and Environmental Science at the University of Kentucky and Director of the Kentucky Geological Survey. He is a paleolimnologist using sediment cores and geophysical datasets in order to answer questions related to climate change, fisheries conservation, human-landscape interactions, and water resources. He and his group work on projects in Tanzania, Brazil, Kentucky, Wyoming and California. Mike holds a Ph.D. in Geosciences from the University of Arizona.



**Vice Chair: Lisa Park Boush** is Professor of Earth Sciences at the University of Connecticut. At UConn, she has served as Associate Dean as well as founding Head of the Department of Earth Sciences. Lisa's research involves the reconstruction of past climates and their impact on biological, coastal and lacustrine ecosystems. She is a Fellow of GSA and the Paleontological Society. She is past Chair of the Scientific Advisory Group (SAG) of the International Continental Drilling Program (ICDP). As SAG Chair, she helped spearhead the Geothermal as well as the Neogene and Quaternary Lake Drilling strategies, organize the 25<sup>th</sup> Anniversary celebration, and develop a proposal writing workshop. She is Past-Chair of the Limnogeology Division and served as a Program Officer at the National Science Foundation (2010-2013). She is the current Chair of the Advisory Committee for the NSF CSD Facility. Lisa holds a Ph.D. in Geosciences from the University of Arizona.



**Past Chair: Brett Carpenter** is an Associate Professor of Structural Geology at the University of Oklahoma. His research focuses on how fault/crustal structure and small-scale processes affect large-scale fault and crustal behavior, particularly the behavior of earth materials at shallow to central crustal conditions, where destructive earthquakes originate and propagate. He has been involved in a variety of continental scientific drilling projects on the San Andreas Fault (SAFOD Phase III) and the Alpine Fault (DFDP 1&2). Brett holds a Ph.D. from Penn State University.



**Secretary-Treasurer: Anders Noren** is the Director of the NSF Continental Scientific Drilling Facility at the University of Minnesota. His work focuses on the development and implementation of complex scientific projects requiring drilling and coring at continental localities worldwide. He has supported hundreds of scientific projects, training programs for students, postdocs, early career researchers, and senior scientists, and has advanced new techniques for sample collection and management to meet project requirements. He has led teams for collaborative development of software applications and systems for data management and visualization; curation of core samples; and management of associated data and publications produced by project teams. He has served as an officer for the Geological Society of America Geoinformatics Division and for the Continental Scientific Drilling Division since its inception in 2017.



**Student Representative (2023-2025): Laura Lopera Congote** is a PhD candidate at the University of Pittsburgh. Her research focuses on the use of sedimentary archives to reconstruct climate. Specifically, she is working on the ICDP funded Lake Junin Drilling Project, where a combination of compound-specific stable isotopes and brGDGTs are being used to reconstruct the climate of the high Andes over glacial-interglacial timescales. Before this, she focused on diatom paleoecology with the aim of reconstructing past lake ecology and resilience to changes in climate.



**Student Representative (2024-2026): Alex Wilk** is a PhD student in the Department of Earth, Geographic, and Climate Sciences at the University of Massachusetts Amherst, where he works with Dr. Isla S. Castañeda. His research broadly focuses on understanding long-term paleoclimate change in East Africa and throughout the tropics using organic geochemical proxies preserved in ancient lake sediments, as well as developing new biomarker proxies for reconstructing past environmental change. Previously, he earned his B.S. in Geology and Biology at Brown University in 2023 and his M.S. from the University of Massachusetts Amherst in 2025.

The Division's committees have experienced some changes, and we extend our sincere thanks to all of those members whose terms have expired. The CSD Division welcomes Dr. Cat Beck (Hamilton College) to the Program Committee, where she will assist Lisa with all things related to CSD science at the Annual Meeting. Dr. Tim Shanahan (University of Texas) joins Dr. Melissa Berke (University of Notre Dame) and Dr. Jonathan Obrist Farner (Missouri S&T) on the Nominating Committee. For our Awards Committee, Brett is joined by Dr. Jay Zambito (Beloit College) and Dr. Leandro Domingos Luz (University of Minnesota). We thank you all for your efforts!

If you are interested in assisting the division, we are always on the lookout for new committee members as well as members to serve as section representatives. Contact Mike McGlue ([michael.mcglue@uky.edu](mailto:michael.mcglue@uky.edu)) for more information.

## Membership

We would like to thank all of our division members! Your interest in and enthusiasm for continental scientific drilling is infectious. Division membership continues to be less than half of its pre-2023 levels, when GSA standardized membership dues for non-primary division affiliations. We are currently one of the smallest divisions, with a total of 372 members, which includes:

Lifetime Members/Honorary Fellows: 7  
Senior Members/Fellows: 21

Professional Members: 66  
Early Career Members: 29  
Student Members: 246  
Teacher Members/Affiliates: 3

Please encourage your colleagues and students to consider joining the CSD Division when they renew their GSA memberships. The CSD Division table at the GSA Connects meeting in San Antonio will have additional details on member benefits and opportunities to register.

## Division Awards

### CSD Division Distinguished Lecturer

We held our annual competition for the Distinguished Lecturer award in the past year. This award is structured similarly to the Birdsall-Dreiss award. The purpose is to promote GSA and CSD in the Earth Science community. Nominations were solicited and evaluated by our Awards Committee and Management Board. We are pleased to announce that **Dr. Kristine Pankow** will serve as the Distinguished Lecturer in 2025-2026. Dr. Pankow is available to give a series of presentations (either in-person or virtual) on her research. If you would like to request that Dr. Pankow present at your institution, please email her directly ([kris.pankow@utah.edu](mailto:kris.pankow@utah.edu)).



Dr. Kristine Pankow, University of Utah. "**Utah FORGE: A Field-Scale Geothermal Laboratory**". The Utah Frontier Observatory for Research in Geothermal Energy (FORGE) is a U.S. Department of Energy funded project to de-risk technologies necessary to make Enhanced Geothermal Systems (EGS) commercially viable. Utah FORGE will not generate energy, instead Utah FORGE is a field-scale laboratory for testing new technologies and hypotheses. No other similar field-scale laboratory exists elsewhere in the world.

The laboratory consists of a highly deviated injection and production well pair drilled into granitic and metamorphic basement rocks at temperatures of  $\sim 220^{\circ}\text{C}$ ; four additional deep boreholes that bottom in the basement rocks, three near reservoir depths ( $\sim 3$  km and temperatures up to  $241^{\circ}\text{C}$ ); and an extensive local seismic network consisting of three shallow ( $\sim 300$  m) seismic monitoring boreholes, six seismic monitoring postholes (30 – 40 m deep), and eleven seismic stations located on the surface.

Building Utah FORGE has led to technological advances in drilling into hot, low permeability basement rock with drill times improving with each new well. Analysis of stimulation pressures and rates, microseismic, strain, temperature and production data, and fluid and rock samples have provided insight into fracture creation and fluid-rock interactions. New technologies, including fiber optic sensing (DAS, DSS), enhanced microseismic processing, and seismic network design have improved monitoring of reservoir fracture development.

This talk will highlight findings and advancements made at Utah FORGE with an emphasis on

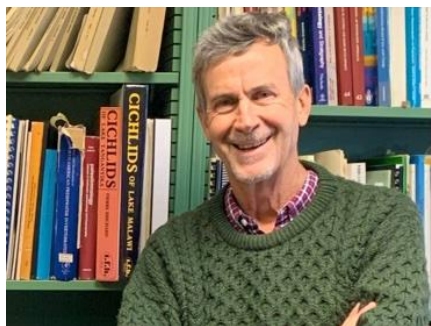


how seismic monitoring with deep instrumented boreholes and near-surface modeling is providing important details on geothermal reservoir development, strategies for mitigating risks related to induced seismicity, and seismic forecasting utilizing adaptive traffic light systems.

We would like to extend our heartfelt thanks to **Dr. Mattia Pistone** (University of Georgia), who set a new and remarkable standard as CSD Distinguished Lecturer in 2024-2025. Dr. Pistone provided 18 talks at universities and federal agencies across the USA, Canada, and Italy, and was an exceptional ambassador for the division at all of his invited lectures on the ICDP DIVE (Drilling the Ivrea-Verbano zone) Drilling Project, which brought key questions related to the chemistry and architecture of the crust-mantle transition, geophysical signatures, and insights into the deep biosphere into sharp focus. Thank you Mattia!

### **CSD Andrew S. Cohen Mid Career Award**

As you may recall, the CSD Division established GSA's first mid career award in 2024, and the inaugural awardee was Dr. Jeffery Stone from Indiana State University. Dr. Stone provided a mid-career retrospective at GSA Connects in Anaheim at the division town hall meeting, following a nomination and citation by several former students led by Laura Lopera Congote.



At its inception, the Mid Career Award was not named in honor of any particular scientist. In 2025, the management board felt strongly that the award should be named in honor of long-time division supporter Dr. Andy Cohen, who lost his battle with pancreatic cancer early in the year. Dr. Cohen had a long and influential career as a professor of geoscience and evolutionary biology and ecology at the University of Arizona. Andy was deeply involved in the continental scientific drilling community, having been a member of the

Board of Directors of DOSECC (Drilling, Observation, and Sampling Earth's Continental Crust, the academic consortium for CSD until 2016), a member of the ICDP Science Advisory Group and Lake Drilling Task Force, a key proponent for the development of the Global Lake Drilling (GLAD) platform and tooling, and a PI or co-PI on drilling projects in the western USA and East Africa, including the Great Salt Lake and Bear Lake Drilling Project, the Lake Malawi Drilling Project, and the Hominin Sites and Paleolakes Drilling Project, which involved 5 sites in Kenya and Ethiopia and more than 120 scientists from 11 nations. At the time of his passing, Andy was working on new drilling project concepts in Arizona, Lake Tanganyika, and a synthesis of drilling project results across the Afro-Syrian Rift System. Andy was a mentor and friend to many division members, and his leadership in our community will be sorely missed. Andy served on the nominations committee of the CSD for several years, as well as one of the Division's early distinguished lecturers. Moving forward, our Mid Career Award will carry his name in honor and recognition of his many contributions to continental scientific drilling.

We will select a new Mid Career Awardee in 2026. Please see the division website for eligibility, and be on the lookout for a call for nominations in January.

## CSD Research Support Grants

This year, the management board launched a new grant making program designed specifically to support early career scientists conducting research in areas that touch the CSD Division mission (scientific drilling, coring, subsurface investigation, etc). The Division aims to provide bridge support for post-doctoral scholars and pre-tenure faculty at institutions of higher education in the USA to bolster scholarship and expand opportunities in an otherwise challenging federal funding ecosystem. This new awards program may be renewed in future years depending on circumstances to be evaluated annually.

Each grant is valued at \$12,500, and can be used to support fieldwork-related travel, fieldwork permitting, laboratory-related travel, laboratory analyses, student/technician salary support, field or lab consumables/supplies, conference/workshop travel, or similar. The management board received a number of high quality applications, and two winners will be announced at the division townhall at GSA Connects in San Antonio (October 19, 2025).

## CSD Division Student Research Awards

In the past year we held our annual competition for Student Research Awards, administered as part of the GSA Graduate Student Research Grant Program—these awards are often supplemental to the regular GSA student grants. We made six awards totaling \$14,000, the highest amount awarded to date. These awards are made to students whose projects involve using drill cores to investigate a variety of geological processes.



**Cameron Greaves**, for the proposal “Postglacial relative sea-level reconstruction of Chedabucto Bay, Nova Scotia”. Cameron writes: My project aims to interpret the paleogeographic changes experienced throughout the Late Quaternary in Chedabucto Bay, Nova Scotia, Canada. To fulfill this aim, I will reconstruct the relative sea-level history for the region to understand how the coastal systems responded to changes in sea-level. This proposed work will conduct surveys of the modern coastal morphology and stratigraphy to identify sedimentary facies and sea-level indicators using ground-penetrating radar, RPAS LiDAR, and vibrocoreing of coastal sediments. This field work is in connection with previous expeditions conducted offshore on drowned coastal systems investigated through high-resolution multibeam

mapping, shallow seismic, and marine sediment coring. The results will improve the understanding of coastal retreat along formerly glaciated passive margins and provide much-needed Holocene relative sea-level constraints for Atlantic Canada. Additionally, this will determine previous rates of coastal retreat, important information for long-term coastline management.



**Chris Ploetz**, for the proposal “Maya Subsistence Strategies and Environmental Change at the Classic Maya to Modern Site of Laguna Seca and Laguna Verde”. This project investigates long-term environmental change and ancient land-use practices in northwestern Belize through sediment core analysis at Laguna Seca and Laguna Verde, two tropical karst lakes located near Classic Maya settlements. Preliminary fieldwork has revealed promising sediment sequences and contrasting hydrological signatures, including evidence that the perennial portion of Laguna Seca may have been anthropogenically modified. Using coring, I will collect long sediment cores from both lakes and adjacent features, including a peninsula structure and potential terrace systems. These cores will be analyzed for stratigraphy,

geochemistry, and paleoenvironmental proxies to reconstruct hydrological variability, climate change, and human impacts over the last 3,000 years. The research integrates sedimentology, water chemistry, and isotope geochemistry to evaluate how ancient Maya communities managed water and adapted to environmental stress. Findings will contribute to broader discussions on sustainability, climate resilience, and landscape modification in karst regions offering valuable insights for both archaeology and modern environmental management.



**Zachary Clore**, for the proposal “A Comparison Of Two In-Land Blue Holes Focusing On Conservation Paleobiology Of The Mollusk And Ostracodes”. Zachary’s project is a comparison of two inland blue holes from two different Bahamian islands (Eleuthera and San Salvador Island). It spans a 6,000-year record that was collected from sediment core transects taken from each blue hole. This comparison aims to understand the environmental effects of climate change over the Holocene within The Bahamas through an analysis of the biota residing within these inland blue holes.



**Adeel Jehangir**, for the proposal “Holocene Variations in the Strength of Winter Westerlies in Pakistan’s Himalayas”. Adeel’s research is on the Holocene interactions between the South Asian Summer Monsoon and mid-latitude winter westerlies in Pakistan’s Himalayas using lake sediment records. By analyzing sediment cores collected from lakes influenced by both precipitation systems, the study aims to reconstruct past hydroclimatic variability and its links to global climate events such as the Little Ice Age and the Medieval Climate Anomaly.

Geochemical, sedimentological, and isotopic proxies (e.g.,  $\delta^{18}\text{O}$ , Ca/Ti, MS) will be used to infer changes in precipitation source, intensity, and variability. The project addresses a critical gap in paleoclimate records from a region highly vulnerable to climate change, where altered rainfall and snowfall patterns threaten agriculture, water security, and livelihoods. The findings will

contribute to understanding the dynamics of coupled monsoon–westerly systems and help constrain future climate scenarios for one of the world’s most climate-sensitive regions.



**Médéric Lorry**, for the proposal “Active layer detachment slides following the 2023 wildfire in the central Mackenzie valley, NWT”. This research investigates how wildfire triggers permafrost slope failures in the discontinuous permafrost zone of the Northwest Territories. Following the 2023 Willow River wildfire near Tulit’a, over 50 new active layer detachment slides (ALDS) were identified. The study combines field surveys, permafrost coring, and satellite imagery to examine the role of ground ice, especially in the transition layer, in driving slope instability. By analyzing ice content across burned and unburned areas, the project aims to understand why these features

form, how they evolve, and whether they may transition into larger features such as retrogressive thaw slumps. This research addresses critical gaps in our understanding of wildfire, permafrost interactions, and supports community resilience in the Sahtu region. Through close collaboration with local Guardians, the project also fosters knowledge sharing and contributes to long-term monitoring of landscape change in a warming North."



**Kiri Maza**, for the proposal “Direct tests of indirect claims linking oxygen and the rise of animals”. The relationship between oxygen and the rise of animals is pertinent to both current and future life on Earth, and Kiri’s project aims to provide insight into understanding the environments in which some of Earth’s earliest animals emerged. In pursuit of reconstructing seawater chemistry during the Cambrian radiation, Kiri is applying the non-traditional stable thallium (Tl) isotope paleoredox proxy, amongst other geochemical measurements to shales containing exceptionally preserved fossils from Utah’s Drum Mountains. Kiri collected ~150 shale samples from a drill core intersecting the Wheeler Formation, a classical Cambrian study site known for its rare preservation of soft-bodied fauna. After initial paleoredox proxies indicated an anoxic to suboxic deep ocean

environment, Kiri collected cores with an outcrop drill from specific quarries with soft-bodied fauna for more information about both global-scale ocean change and Cambrian fossil taphonomy.



# Upcoming GSA Meetings and Events

## ***Town Hall and Reception***

CSD Division Town Hall and Reception

Sunday, 19 October 2025: 6:30 PM - 9:30 PM

Grand Hyatt San Antonio River Walk - Lone Star A

Meet division officers and community scientists for updates on CSD activities.

A great opportunity to meet and network with your colleagues over refreshments.

## ***Technical Sessions***

CSD Division officers are convening two special sessions:

- T1. Integrating 20 Years of Scientific Drilling in the East African-Syrian Rift: A Session In Honor of Andrew Cohen (Parts I and II)
  - Leaders: Lisa Park Boush, Anders J. Noren, Michael M. McGlue, Steven L. Goldstein
  - Continental drilling extending from the East African Rift into western Asia has yielded transformative discoveries, altering our understanding of paleoenvironments, paleoclimatology, paleoecology, and paleoanthropology. This session, in honor of Andrew Cohen, will celebrate these successes and define new directions.
- T2. Investigating Earth's Past, Present, and Future with Continental Scientific Drilling.
  - Leaders: Lisa Park Boush, Michael McGlue, Anders Noren Laura Lopera Congote, Alexander Wilk
  - This session brings together research exploring Earth using subsurface geological datasets from continental scientific drilling, intended to be a broad showcase of research spanning structural geology, tectonics, natural hazards, sedimentology/stratigraphy, geothermal energy, critical minerals, deep biosphere, paleoclimatology, paleolimnology, and paleobiology.

The division has also endorsed several technical sessions:

- T10. Geologic Energy Resources and Storage for Now and the Future
  - Leaders: Qinhong Hu, Justin E. Birdwell, Marc L. Buursink, Denise J. Hills, Eric Stautberg, Anna Littlefield, Lily Jackson
  - This session seeks contributions describing research on multi-resource development efforts, non-traditional uses of fossil fuels, natural hydrogen and helium, CCUS, enhanced geothermal energy, storage of hydrogen and compressed air, and enhanced methane recovery and carbon storage in coal.
- T11. Joint SGD-SEPM-IAS Focus on Sedimentary Geology and Energy Transitions
  - Leaders: Jean Hsieh, Andrew Leier, Amy L. Weislogel



- This topical session is designed to explore how sedimentary geology underpins cutting-edge research, exploration, and decision-making in energy-resource development and to identify workforce-development priorities for sedimentary geologists supporting the energy transition.
- T116. Lakes of the World Through Space and Time: Archives of Climate, Paleoenvironments, Ecosystems, Geohazards, and Economic Resources
  - Leaders: Elana Leithold, Kirsten M. Menking, Scott W. Starratt
  - This session celebrates lacustrine research across the globe. Lake sediments are excellent archives of changing climate, paleoenvironments, human impacts, and economic resources. This session explores limnogeological research on all time and spatial scales.
- T167. Impact Cratering Processes Across the Solar System: In Memory of Dr. Bevan M. French
  - Leaders: Jeffrey Plescia, Christian Koeberl, Steven J. Jaret, Neeraja Chinchalkar
  - Session focuses on the nature of impact craters and their influence on planetary geologic evolution. We solicit contributions on aspects of impact crater formation, ejecta, shock processes, geochemical and mineralogical signatures, modeling, and geologic implications; comparison among planetary bodies.
- P2. Groundwater in Achieving the Sustainable Development Goals
  - Leaders: Abhijit Mukherjee, David Kreamer, Prosun Bhattacharya, Timothy Parker, Donald O. Rosenberry
  - The growing impact of changing climate and land use, and water pollution has underlined the link between groundwater, environment, and society. This Pardee Session reinforces the importance of groundwater in achieving the sustainable development goals.
- P4. Impact Cratering and the Evolution of Life
 

Leaders: Nadja Drabon, David Kring

  - This session explores the role of impact cratering in life's evolution throughout Earth's history, from the origin of life to mass extinctions. It highlights connections between impacts, evolutionary change, and planetary processes.

## Chair's Report

I assumed the Chair position at the 2024 Connects Meeting in Anaheim, and to date our focus has been centralizing our members and distributing division resources to support their science. The division leadership has worked proactively to expand our grant making programs, acknowledging the challenging climate that faces our members. The leadership has also worked to expand programming at GSA Connects, and continues to be a presence at GSA Division Chairs meetings. Just a few of the things the leadership has been working on to improve the Division include:

- Improved our division communications through the website, Connected Community, Twitter/X (@gsa\_csdd), and the division Instagram account (@gsa\_csdd).

- Developed the first mid-career award in the GSA, and named it in memory of long-time champion of continental scientific drilling Professor Andy Cohen (University of Arizona), who lost the battle with cancer in 2025.
- Initiated a new bridge research funding program, to support early career scientists in the division who may be facing headwinds with the changing federal funding landscape.
- Expanded graduate student research awards to the highest funding level in the division's history.
- Organized two sessions at GSA Connects in San Antonio (a first in the division's history), and sponsored both topical sessions and Pardee sessions.

Please keep an eye for new developments, ways to engage with the division, and requests for input. We will be calling for nominations for our second Andy Cohen Mid Career Awardee in early 2026. We also hope to co-sponsor a pre-meeting core workshop at GSA Connects in Denver in 2026, in collaboration with other divisions.

— Mike McGlue, CSD Division Chair

## Secretary-Treasurer's Report

The division maintains a strong financial position, with more than \$940,000 invested in the GSA Foundation Continental Scientific Drilling Fund. A portion of investment annual returns is the primary component of support for an increasing range of Division activities and awards.

## Workshops, Training Courses, and More Opportunities

There are a number of upcoming drilling workshops, events, and projects that we would like to bring to your attention, including International Continental Scientific Drilling Program (ICDP) project workshops and others. We hope you will consider applying to be involved if you are interested. Check the links below for more information and watch the CSD Division, CSD Facility, and ICDP websites and social media.

### Workshops

#### [ICDP M-JET: Middle Jurassic Earth System and Timescale](#)

June 2025, Figueira da Foz, Portugal

PIs: R. Silva et al.

- We propose a workshop to develop plans for an ICDP-supported series of shallow boreholes that will recover an almost complete Middle Jurassic sedimentary record at Cabo Mondego, in the northern sector of the Lusitanian Basin, Portugal. The Cabo Mondego record comprises a biostratigraphically (mostly) complete and stratigraphically expanded succession of marine mudrocks and limestones, spanning the Lower Jurassic Toarcian, the Middle Jurassic Aalenian, Bajocian, Bathonian and Callovian, and the Upper Jurassic Oxfordian, including the Bajocian GSSP and the Bathonian ASSP.

- The attributes of the stratigraphic succession at Cabo Mondego are ideal for constructing a sorely missing integrated astrochronological, chemostratigraphic, biostratigraphic, and magnetostratigraphic framework for this time-interval, which would allow this succession and ICDP-funded borehole to become the international standard for these (as currently assessed) ~13 million years (~174–161 Ma) of Earth history. The obtained rock materials and data will be applied to construct a comprehensive understanding of the Earth system during the Middle Jurassic, and is expected to significantly improve the Middle Jurassic geological and numerical timescale.

### **ICDP DIVE-2: Drilling the continental crust–mantle transition zone**

**July 2025, Zoom only**

**PIs: O. Müntener et al.**

- After successful completion of ICDP Expedition 5071-1 (DIVE 1), we are pleased to announce an online workshop to bring together members of the Earth Sciences community to initiate scientific discussions on goals and strategies for a full drilling proposal of DIVE 2.
- DIVE 2 targets the continental Moho transition zone, a major boundary of the Earth's interior, being the geophysical divide/connector between crust and mantle, and many related themes. The drilling target of DIVE 2 is in Val Sesia (N-Italy) where a major geophysical anomaly is within reach (1±1 km b.s.l.) for deep continental scientific drilling.

### **ICDP KIND: Lake Kinneret Drilling**

**July 2025, Potsdam, Germany**

**PIs: A. Torfstein et al.**

- Reconstructing Pliocene-Quaternary hydroclimate and seismic history of the Levant
- The southern Levant serves as the triple junction of Asia, Europe and Africa, and is located on the fringe of the Sahara Desert, making its regional hydro-climate extremely sensitive to even small global climate perturbations. In addition, this region has served as a major pathway for the migration “out of Africa” of fauna, flora and hominids throughout the Quaternary, as well as for the development of human culture. Spanning the length of the southern Levant is the Dead Sea Rift, which hosts the Dead Sea in the south and Lake Kinneret in the north. Seismic activity along the rift is a major hazard to infrastructure and human life, and together with future predictions of increased aridity over the coming century, superimposed over existing severe geopolitical strife, there is a critical need to identify and quantify climate change patterns, seismic risks to infrastructure and human life, and the overall ecological impacts of these processes on the environment.
- The Kinneret sedimentary sequence has the potential to serve as one of the longest, and highly resolved lacustrine records on Earth, which is particularly important due to the relevance of this site to:

- High resolution reconstruction of Pliocene-Quaternary hydro-climate history of the Levant and East Mediterranean, which is considered a major hot spot of projected climate warming
- Evaluation of the impacts of climate change on human history and regional ecology
- Reconstruction of seismic activity along the Dead Sea Rift since the Pliocene

#### **ICDP PlioWest: Drilling Pliocene Lakes in Western North America**

**10-11 September 2025, Zoom only** — contact [daniel\\_ibarra@brown.edu](mailto:daniel_ibarra@brown.edu) for more information

**PIs: D. Ibarra et al.**

- The objectives of this virtual workshop are to invite new scientists to the team, solidify plans and work on all necessary components needed for a strong proposal revision to ICDP by January 2026.
- The Pliocene Epoch is the focus of scientific interest as a period of sustained global warmth, with a continental configuration similar to modern. Studies suggest that the Pliocene was warmer and largely wetter, at least in the subtropics, than today, which contrasts with most long-term climate model simulations. We hypothesize that the hydro-climate of western NA was, in addition to global warmth, dictated by changes in the Pacific surface sea temperature (SST) gradient either: a weaker zonal gradient in SST between the western and eastern equatorial Pacific, or a weaker equator-to-pole temperature gradient between the tropics and the mid-latitudes
- During the Pliocene in WNA, large perennial lakes existed for 0.1 – 1 million years in basins to the east of the Cascades, Klamath Mountains and the Sierra Nevada, spanning seven degrees of latitude. Data from these basins will compliment the SST reconstructions from global sites spanning the last 5Ma and investigate the large-scale hydrological cycle controls associated with both global warming and cooling. We propose to acquire new drilled cores from four of these basins and request funds to organize an ICDP workshop in Minneapolis, MN, USA in 2020, to extend the research objectives, refine the drilling and site survey plan, and broaden the science team working in PLIOWEST.

#### **ICDP FlankEd: Drilling the deforming eastern flank of Mount Etna**

**24 -27 September 2025, Catania, Italy**

**PIs: C. Faccenna et al.**

- FlankEd aims to investigate the physical mechanisms and triggers of volcano flank sliding, with an emphasis on interdisciplinary monitoring to capture related signals. This focus is crucial for advancing multi-risk mitigation strategies to protect populations and infrastructure near active volcanoes. Mount Etna's eastern flank is one of the most studied examples of volcano flank instability. However, despite extensive research and a dense monitoring system, several critical aspects remain unresolved. These include its relationships with eruptive processes, the depth and frictional behavior of sliding surfaces, the stress field, connections with regional structures and earthquakes, rock rheology, hydrothermal circulation, and the mechanical behavior of deep and surface structures.

- Drilling into the eastern flank will provide new constraints and insights into these questions, significantly advancing our understanding of large volcano mechanics. This initiative is expected to drive technological innovation while contributing substantially to scientific knowledge. Core sample analysis and in-situ measurements during drilling will validate mechanical and hydrogeological models, deepening our understanding of the mechanisms driving Etna's flank sliding.

#### **ICDP Deep EGS: Deep geothermal energy exploration in crystalline rock**

**30 September – 02 October 2025, Espoo, Finland**

**PIs: I. Kukkonen et al.**

- Post-drilling assessment and experiments in the St1 Deep Heat Reservoir, Finland
- The world's deepest Enhanced Geothermal System (EGS) project was carried out by the company St1 in Espoo, Finland, 2014 - 2022. The project comprised drilling two deep wells to >6 km depths, and carrying out hydraulic stimulation and monitoring of induced seismicity with downhole seismic arrays and satellite stations. The St1 drill site in Otaniemi, Espoo, is a world-class site, where superdeep wells are accessible in an urban area. Excellent research has been already done providing in-depth background knowledge. The St1 deep holes provide a unique possibility to establish a deep borehole observatory and geothermal laboratory offering unprecedented possibilities for research in induced seismicity, geothermics, hydraulic properties, deep fluids and gas as well as deep biosphere, helping to understand the behavior of crystalline bedrock at extreme depth.
- Our aim is to apply the boreholes and data sets for a thorough analysis of the crystalline bedrock conditions at 5 – 6 km depth, solving problems related to developing EGS in crystalline rock

#### **ICDP PROTEA: Probing the heart of an earthquake and life in the deep subsurface**

**16 - 17 October 2025, Klerksdorp, South Africa**

**PIs: Y. Yabe et al.**

- The 2014 Orkney earthquake (M5.5) ruptured an ultramafic lamprophyre dike at 3.5-7 km depths in the West Rand Group (WRG) beneath Moab Khotsong mine. Deep development of the mine enables PROTEA to drill from a site at 3 km depth to the nucleation zone, ultimately the hypocenter, of the Orkney earthquake to elucidate spatial variations of frictional properties, stress state, pore pressure, and lithology along the source fault for better understanding of nucleation, propagation and termination of an earthquake.
- PROTEA will drill through a substantial thickness of the WRG to systematically investigate the variation of host rock lithology associated with the dike-sill complex and its impact on the alteration of the lamprophyre dike. PROTEA will also conduct a pre-drilling seismic site survey and post-drilling seismic monitoring using up-to-date techniques. The finer structure of the dike-sill complex will elucidate its role in an extensional tectonic event such as supercontinent breakup.



- PROTEA is the successor project to DSEIS, which successfully probed metamorphic minerals in an altered ultramafic dike that hosted the aftershocks of an M5.5 earthquake from a depth of 2.9 km.

#### **ICDP Samoa-PLUS: Probing the Lithosphere Under Samoa**

**Postponed TBA.**

**PIs: M. Jackson et al.**

- A 2500-meter drill core to explore hotspot-trench interactions, continental recycling, the deep biosphere, and geothermal resources
- Volcanic hotspots, like Hawai'i and Samoa, are sourced by mantle plumes that upwell from the deep mantle. Excellent exposure and sampling of Hawaiian volcanoes provide data for what has been considered the prototypical model for ocean island evolution worldwide. Available data, however, suggest that Samoan volcanoes grow in a manner very different from Hawai'i. To better understand how a Samoan volcano grows and evolves, this proposal seeks funding for a workshop to discuss drilling a 2500 m borehole on the Samoan island of Savai'i. In addition to providing a critical counterpoint to the "Hawaiian model," the drill core will help address long-standing problems associated with the evolution of a Samoan volcano, including: 1) evaluating the poorly-understood genesis of Samoan lavas with extreme continental signatures recovered by dredging the deep submarine flanks of Savai'i; 2) investigating the near-absence of tholeiites in the Samoan shield stage in light of their ubiquity at Hawaii; 3) testing a possible plate flexure origin for the unusual volumes of rejuvenated lava on Savai'i that takes into account Savai'i's juxtaposition with the nearby Tonga trench. This will shed light into the globally relevant problems of how different tectonic mechanisms interact with mantle plumes to modulate hotspot volcanism.

#### **ICDP HOROMAN DC: Horoman Mantle Drilling and Carbon Injection**

**Workshop details TBA.**

**PIs: I. Katayama et al.**

- The high reactivity of dissolved carbon in aqueous fluids with the mantle has been demonstrated in natural occurrences of carbonated peridotites, including different tectonic settings such as ocean fracture zones and ophiolites. This suggests a significant contribution of mantle carbonation as a global carbon sink. In this proposal, we plan to drill the Horoman peridotite massif and inject CO<sub>2</sub> fluid into the borehole. The Horoman peridotite massif is characterized by exceptional freshness with a minor degree of serpentinization, and the reaction mechanisms may be different from those of highly altered peridotites such as the Oman ophiolite. Migration of carbonaceous fluids and carbon mineralization will be monitored by fluid chemistry and geophysical data for two years after the injection. By monitoring multiple physicochemical properties during the CO<sub>2</sub> injection experiments, we will develop a method for detecting carbon mineralization and apply such a method to improve quantifiable attribution of natural mantle alteration and carbonation to the global carbon cycle. The knowledge of carbon mineralization in the mantle can also be applicable to subsurface CO<sub>2</sub> sequestration,

which represents the safe and long-term carbon storage mechanism due to its conversion to the stable solid form.

### **ICDP DeepCHB: Getting to the bottom of the Quaternary**

**Workshop details TBA.**

**PIs: V. Foerster et al.**

- The Chew Bahir basin (CHB), located in the southern Ethiopian Rift, provides a unique natural archive offering critical insights into the interactions of climate, tectonics, ecosystems, and human activities during the Pleistocene. This project builds on prior successes, such as the Hominin Sites and Paleolakes Drilling Project (HSPDP), and extends exploration to unprecedented depths to address innovative, transdisciplinary research questions. The CHB's sedimentary fill, spanning several kilometres, preserves a high-resolution fluviolacustrine record of environmental and biogeographic history. By drilling to a depth of 1,200 m—well beyond the ~300 m explored in previous cores—this project aims to access the base of the Quaternary, enabling detailed reconstructions of the region's climatic, ecological, and anthropogenic evolution.

## **Training Courses**

### **ICDP Annual Training Course**

Date: 14–20 September 2025

Location: Weinan (near Xi'an), PRC

Future ICDP training courses to be announced on the [ICDP website](#).

## **Operational and Upcoming Projects**

- **ICDP Weihe Basin: Cenozoic tectonic-climate interactions**  
Z. An et al., PIs.  
Phase I drilling began 30 July 2025.
- **Hanna Basin, Wyoming, USA: Paleocene-Eocene Thermal Maximum.**  
M. Dechesne et al, PIs.  
Phase 1 completed September 2023; Phase 2 active through September 2025.
- **Utah FORGE**: Research and technology testing to develop a commercial pathway to Enhanced Geothermal Systems.  
J. Moore et al., PIs.  
Multiple phases of drilling underway.
- **Bedrock Critical Zone Network**: Bedrock controls on the deep critical zone, landscapes, and ecosystems.

W. S. Holbrook et al., PIs.

Phase 3 drilling at San Dimas Experimental Forest, California in 2026.

- [ICDP SWAIS2C](#): Sensitivity of the West Antarctic Ice Sheet to 2 degrees Celsius (SWAIS).  
R. Levy et al., PIs.  
Phase 3 drilling late 2025-2026.
- [ICDP DeepDust](#): Paleozoic Icehouse-Greenhouse Transition  
G. Soreghan et al., PIs.  
Drilling to begin March 2026.
- [ICDP PEP-US](#): Constraining Timing and Cause of PETM Carbon Injection and Ecosystem Response in the eastern US  
K. Miller et al., PIs.  
Phase 2 drilling to begin 2026.

## Recently Completed Projects

- [ICDP GOE-DEEP](#): Gabon and Oxygenation of Earth - Drilling Early Earth Project (Phase 1).  
A. Lapland et al., PIs.  
Phase 1 completed August 2025.
- [ICDP Bushveld Complex Drilling Project](#)  
L. D. Ashwal et al., PIs.  
Drilling completed August 2025.
- [ICDP Trans-Amazon Drilling Project](#): Cenozoic evolution of the South American continent and biodiversity  
P. Baker et al., PIs.  
Drilling completed September 2024.
- [ICDP NamCore](#): Nam Co Drilling Project, Tibet: A one million year sedimentary record from the third pole  
T. Haberzettl et al., PIs.  
Drilling completed July 2024.

## CSD Facility Update

The [NSF Continental Scientific Drilling Facility](#) at the University of Minnesota supports scientists engaged in drilling and coring, project planning and budgeting, funding strategies, logistics and field operations, core scanning and inspection, and sample and data management and archiving, and offers training opportunities for early-career researchers.

In the past year, the CSD Facility has coordinated long-range community science planning. Domain-specific working groups were established for scientific communities that use scientific drilling to obtain the samples or data required to meet their objectives:

- Energy Transition (Geothermal, Critical Minerals, Geologic Hydrogen)
- Fault Mechanics and Earthquakes
- Geomicrobiology
- Hydrology and Critical Zone
- Magmatic Systems
- Paleoclimate
- Paleoecology

Working groups drafted executive summaries, which were circulated among a wide community of scientists for input. In October 2024, facility staff convened the CSD Community Science Planning Integration Summit. Representatives from each working group presented their community vision, participants identified commonalities across domains, new opportunities and strategic directions, and articulated community-wide implementation plans.

Working groups have continued to expand their executive summaries into short manuscripts for publication.

#### **Science Planning Links**

- [CSD Community Science Planning website](#)
- [Community Executive Summaries](#)
- Paleoclimate community publication: [The paleoclimate potential of continental scientific drilling \(Nature Geoscience, Obrist-Farner et al., 2024\)](#)
- [Working group presentation videos](#)
- [Information about recent and future CSD projects](#)
- [Archive of white papers and related publications](#)

The CSD Facility will continue to host biannual working group discussions in March and September to facilitate communication and collaboration between community members, and to remain aware of arising needs and opportunities. If you would like to participate, contact Kat Cantner at [cantn001@umn.edu](mailto:cantn001@umn.edu).

***We look forward to hearing from you in the coming months, and to meeting in San Antonio. Reach out to us at any time with your ideas for Division support of the CSD community.***

***Sincerely,***

***Mike McGlue, Chair***

***Lisa Park Bousch, Vice-Chair***

***Brett Carpenter, Past Chair***

***Anders Noren, Secretary-Treasurer***

***Laura Lopera Congote, Student Rep.***

***Alex Wilk, Student Rep.***