THE LAKE TANGANYIKA DRILLING PROJECT

THE PALEOCLIMATIC, TECTONIC AND EVOLUTIONARY HISTORY OF AFRICA'S OLDEST LAKE

Ramada Resort, Dar es Salaam, Tanzania
17 – 20 June, 2019

Sponsored by the International Continental Drilling Program (ICDP), EarthRates, the University of Basel, and Brown University

Workshop Goals:

1) Develop the scientific hypotheses and goals for drilling Lake Tanganyika

2) Identify drilling targets and a drilling operations plan for the project

3) Develop the structure of the Tanganyika Drilling Project, including the science team, international funding structures and plans, education, outreach, and capacity building plans, and research partnerships

4) Determine if additional datasets and projects are needed prior to drilling

5) Synthesize information and workshop discussions in preparation for proposals for the project

June 17

Introduction and Goals of Workshop		**Moderator: H. Nkotagu**
9:00 – 9:15	Opening of the workshop	Rashid Tamatamah
9:15 – 9:35	Workshop Goals and Overview of Project	Jim Russell
9:35 – 9:55	The ICDP Program	Marco Bohnhoff
9:55 – 10:15	Drilling Operations and basic core analyses for the Tanganyika Project	Anders Noren
10:15 – 10:30	Group Q&A and discussion	

10:30 – 11:00 Coffee break

State of the art: current research on Lake Tanganyika		**Moderator: Emma Msaky**
11:00 – 11:15	The limnology of Lake Tanganyika	Ishmael Kimirei
11:15 – 11:30	Lake Tanganyika's life	Walter Salzburger
11:30 – 11:45	Structural and stratigraphic framework from seismic reflection data	Shaidu Nuru Shaban, Chris Scholz
11:45 – 12:00	Sedimentary processes and facies	Mike McGlue
12:00 – 12:30	Group Q&A and discussion	

12:30 – 1:30 Lunch

1: 30 – 3:00	**Questions for drilling Lake Tanganyika**	**Moderator: Melanie Leng**
1:30 – 1:40	Tectonics, sedimentation, and source-to-sink processes	Donna Shillington
1:40 – 1:50	Paleoclimate	Jim Russell
1:50 – 2:00	Evolutionary Biology	Andy Cohen
2:00 – 2:10	Terrestrial Ecosystems	Sarah Ivory
2:10 – 2:20	Human Evolution	Chris Campisano
2:20 – 2:30	Geomicrobiology and biogeochemistry	Jens Kallmeyer
2:30 – 2:40	Education, outreach, and capacity building	Hudson Nkotagu
2:40 – 3:00	Group Q&A and Discussion	

3:00 – 3:20 Coffee

3:20 – 5:00 Individual Presentations **Moderator: Jim Russell**

3-minute lightning talks by Chen, Yost, McIntyre, Spanbauer, Tiedemann, Roberts, Fontijn, Sier, Deino, Muirhead, Zeeden, Konecky, Castañeda, Spencer-Jones, Bauersachs, Leng, Beverly, Wolff, Vogel, Vonhoff, Trauth, Wu, Jovanovska, Rick, Ronco, Albrecht, Bocxlaer, Michel.

7:00 Dinner to summarize the day's results, Market Restaurant

Lightning Talks

Sophia Chen, Arable land and forest changes around Lake Tanganyika
Chad Yost, Phytoliths from mesic C4 tall-grasses and xeric C4 short-grasses to reconstruct hydroclimate variability
Pete McIntyre, Heterogeneous warming of Tanganyika's waters, and its implications for upwelling and littoral faunas
Trisha Spanbauer, Preliminary sedimentary DNA results from Lake Tanganyika
Ralph Tiedemann, DNA metabarcoding on deep drill cores: biodiversity and evolutionary dynamics in relation to paleoclimate
Helen Roberts, Luminescence dating: the Swiss Army Knife of Quaternary geochronology
Karen Fontijn, Explosive eruptions in the Rungwe Volcanic Province and their potential imprints in Lake Tanganyika
Mark Sier, Paleo- and rock magnetism of Tanganyika lake sediments: chronology and cyclostratigraphy
Alan Deino, Recent Examples of East Africa Drill-core Chronostratigraphy
James Muirhead, Geodynamic questions for Tanganyika Drilling.
Christian Zeeden, Physical properties, structural features, and climate signals in sediments of Lake Tanganyika
Bronwen Konecky, Water isotope hydroclimatology of modern and ancient East Africa
Isla Castañeda, Using organic biomarkers from lacustrine and marine sediments to reconstruct East African paleoclimate
Charlotte Spencer-Jones, Reconstructing the Tropical Carbon Cycle using Organic Biomarkers
Thorsten Bauersachs, Heterocyst glycolipids: A novel tool to reconstruct the the effect of climate change on cyanobacterial blooms in Lake Tanganyika
Melanie Leng, The potential of diatom oxygen and silicon isotopes in palaeolimnology
Emily Beverly, Using clumped and triple oxygen isotopes to better understand land-lake transitions
Chris Wolff, Sulfur isotopes as a tool to unravel lake mixing history of Lake Tanganyika
Hendrik Vogel, 4D high-resolution sediment geochemistry
Hubert Vonhoff, Sr isotope analysis of lacustrine fossils as proxy for paleo-hydrologic variation
Martin Trauth, Advanced Time Series Analysis Methods to Detect Trends, Rhythms and Events
Qinglong Wu, Unveiling microbiomes in Lake Tanganyika
Eci Jovanovska, Diversity and evolution of diatoms in the East African Rift lakes
Jessica Rick, Uncovering clues about pelagic fish evolution
Fabrizia Ronco, Diversity and Disparity of Lake Tanganyika cichlids
Christian Albrecht, Unraveling the origins of enigmatic invertebrate species flocks of Lake Tanganyika
Bert van Bocxlaer, Inferring evolutionary dynamics and paleoenvironments from macrofossils, with a focus on freshwater molluscs
Ellinor Michel & Jon Todd, Gastropods: dimensions of diversity.

June 18 Scientific Breakout discussions

Charge: Work in groups to define the major scientific questions to be answered by scientific drilling on Tanganyika. Participants are encouraged to attend multiple working group meetings.

9:00 – 10:30 Scientific breakouts

1) Geochronology
   (Discussion chair: Christine Lane, Rapporteur, John King)
2) Basin evolution
   (Discussion Chair: Mike Soreghan, Rapporteur: Emma Msaky)
3) Paleoclimate and paleolimnology
   (Discussion Chair: Phil Barker, Rapporteur, Bronwen Konecky)
4) Biological evolution
   (Discussion Chair, Christian Albrecht, Rapporteur, Lisa Boush)
5) Geomicrobiology and biogeochemistry
   (Discussion Chair, Qinglong Wu, Rapporteur, Lotta Purkamo)
6) Terrestrial paleoecology
   (Discussion Chair, Sarah Ivory, Rapporteur, Cassian Mumbi)

10:30 – 10:50 Coffee Break

10:50 – 12:00
Reports from breakout groups and group discussion

12:00 Lunch

1:00 Group Field Excursion to Mbudya Island, return ~5:30 PM

7:00 Dinner to summarize the day's results, Market Restaurant

June 19 Breakout discussions

9:00 – 10:30
Methodological breakouts
What methods can best address thematic questions? What additional science activities prior to drilling are needed to best position us for success? What are requirements for on-site science activities, drill site locations, and other constraints on drilling operations?

1) Geochronology
   (Chair: Helen Roberts, Rapporteur, Alan Deino)
2) Basin evolution and geophysics
   (Chair: Mike McGlue, Rapporteur, James Muirhead)
3) Paleoclimate and paleolimnology
   (Chair: Isla Castañeda, Rapporteur: Verena Foerster
4) Biological evolution
   (Chair Walter Salzburger, Rapporteur, Jeffery Stone)
5) Geomicrobiology and biogeochemistry
   (Chair, Jens Kallmeyer, rapporteur, Charlotte Spencer-Jones)
6) Terrestrial paleoecology
   (Chair, Cassian Mumbi, rapporteur, Chad Yost)

10:30 – 11:00 Coffee

11:00 – 12:30
Reports of working groups (10 minutes each) and group discussions

12:30 – 1:30 Lunch

1:30 – 3:00 Drilling Logistics and Planning
Core handling and on-site science
(Discussion leader: Anders Noren, Rapporteur Christian Zeeden)
Core site selection
(Discussion leader: Chris Scholz, Rapporteur: Hendrik Vogel)
Logistics, permitting, partnerships
(Discussion leader: Mike McGlue, Rapporteur: Neema Maganza)
Education and Outreach
(Discussion leader: Andy Cohen, Rapporteur: Hudson Nkotagu)
3:00 – 3:30 Coffee

3:30 – 5:00 Working group presentations of strategies

7:00 Dinner to summarize the day's results, Swahili BBQ

June 20 Synthesis, Group Discussion, and Planning

9:00 Group synthesis and discussion Moderator Jim Russell

Where will we drill and why?
Funding strategies
Near-term analysis and field programs
Permitting and logistics
Timelines for proposals, etc.
Synthesis papers

10:30 – 11:00 Coffee

111:00 Group Synthesis and conclusions

12:00- 1:00 Lunch

Workshop Travel and Logistics

International travelers will arrive at Julius Nyerere Airport, and can enter Tanzania on a tourist visa. Please list the Ramada Resort as your hotel (Plot 170/171, Jangwani Beach, +255-222-162-333). Visas can be obtained on arrival or in advance using Tanzania's e-visa program. You may reach the hotel by taxi from the airport; since many of you will be arriving on the same flights we hope you can share taxis. It is about a 40 minute drive, depending on traffic.

The workshop will be held at the Ramada Resort located on Jangwani Beach, north of Dar es Salaam. All meals will be provided by the workshop. Meals included soda or water, but you will be asked to cover your alcoholic beverages or additional drinks.

On the afternoon of the second day of the workshop, we will take a field trip to Mbudya Island, a small uninhabited island/park offshore from the hotel. This will let the team get better acquainted and let us continue our discussions in a more informal setting. Plan to bring a bathing suit if you would like, as well as goggles and a snorkel to see the underwater life. And don't forget your sunscreen…

Reimbursements: The workshop will pay your meal and hotel costs directly and will reimburse your airfare costs as specified in your invitation. Reimbursement will come directly from ICDP unless otherwise specified. More detailed reimbursement information will be provided at the workshop.