

Draft Agenda

U.S. Science Support Program – International Ocean Discovery Program Workshop

Antarctica's Cenozoic ice and climate history: New Science and new challenges of drilling in Antarctic waters.

IODP, Texas A&M, College Station, 9-11 May 2016

Monday 9 May, Morning (Room 110/111, Koldus Building, Texas A&M)

8:00 – 8:45 Arrive; pick up badges; coffee.

8:45 Welcome and introductions; housekeeping.

8:50 Introduction to the workshop agenda and objectives.

Proposed IODP Antarctic Drilling

9:00 Short summary of past Antarctic scientific drilling, including recent expeditions.

9:15 Introduction to the IODP proposal system.

9:30 *Presentations on Antarctic drilling proposals at JOIDES Resolution Facility Board:*

IODP-751. Ocean-ice sheet interactions and West Antarctic Ice Sheet vulnerability: clues from the Neogene and Quaternary record of the outer Ross Sea continental margin (McKay et al.).

IODP-839. Development and sensitivity of the West Antarctic Ice Sheet tested from drill records of the Amundsen Sea Embayment (Gohl et al.).

10:00 Coffee break with light snacks (15 minutes)

IODP-732. Sediment drifts off the Antarctic Peninsula and West Antarctica (Channell, Larter, et al.).

IODP-567. Paleogene South Pacific APC Transect: Heat Transport and Water Column Structure During an Extreme Warm Climate (Thomas et al.).

Questions and discussion (15 minutes).

11:00 *Presentations on Antarctic drilling proposals that are scheduled or in IODP review:*

IODP-813-MSP. Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments (Williams, Escutia, et al.). Mission-Specific Platform expedition scheduled for Dec 2017 to Feb 2018.

IODP-847. Plio-Pleistocene reconstruction of ice-sheet, atmosphere, and ocean dynamics in Iceberg Alley (Weber et al.) Resubmitted to the IODP Science Evaluation Panel (SEP), 1 April 2016.

IODP-848. Late Neogene to Quaternary ice-sheet and sea-level history of the Weddell Sea, Antarctica (Weber et al.). At SEP.

Other presentations, possibly including:

IODP-812-MSP. Shallow drilling in the far southeastern Ross Sea Antarctica for records of the early West Antarctic Ice Sheet (Wilson et al.), at IODP SEP.

IODP-868 Scotia Sea – tectonics and sedimentation (Hernandez Molina et al.),

Questions and discussion (15 minutes).

12:00 – 1:00 Lunch (multiple food options available in the nearby Memorial Student Center)

Monday 9 May, Afternoon (Room 110/111, Koldus Building, Texas A&M)

Geographic areas and time intervals of interest; toward an integrated overview of Antarctic ice in intervals of past high atmospheric CO₂ levels.

- 1:00 Presentation: Ice sheet modeling (will also serve as an introduction to the geographic areas of the ice sheet).
- 1:15 Presentation: Sea level and Glacial Isostatic Adjustment (GIA) (Austermann)
- 1:30 *Discussion: Where to drill – do we target the best geographic locations? Are we targeting the geographic sectors where ice sheets are sensitive to climate change? Do we have a balance of drilling locations between deep water (continuous records) and close to the ice edge (a more direct record of ice advance and retreat)?*
- 2:15 Presentation: Carbon dioxide, temperature, and ice volume over the Cenozoic.
- 2:30 Break
- 3:00 *Discussion: Which ages, events, and high-CO₂ scenarios to target? e.g. Late Eocene climate cooling, and ice extent and climate variability over the course of the Oligocene through to the Holocene. In particular: warm intervals and transitions that can serve as analogues for future warming (e.g. Oligocene, Mid-Miocene, Pliocene). Which intervals are currently not well characterized?*
- 4:00 *Discussion: Synthesis of the discussions so far, and the place of new IODP Antarctic drilling as policy-relevant science.*
- The fundamental links of Antarctic drilling to the IODP Science Plan and the Denver prioritization of the Science Plan challenges.
 - Opportunities for linking the new results to current climate change questions. IPCC-level science and policy-relevant science.
 - Possible new drilling proposals.
 - Summary, outlook, plan for workshop report.

Monday 9 May, Evening – group reception

At Blackwater Draw, a microbrewery in Bryan. Catering by Papa Perez Mexican restaurant.

Tuesday 10 May, Morning (Room 110/111, Koldus Building, Texas A&M)

Drilling in a harsh polar environment: sea ice and weather assessment, and planning for the unexpected.

8:15 – 8:45 Arrive; coffee.

8:45 Introduction to the topic of ice and weather conditions in Antarctic waters.

9:00 Satellite imagery of ice and weather conditions (Morin, or another rep. from PGC)

9:15 Sea ice – seasonal changes, trends, etc.

9:30 Sea ice images over the season over the site locations of the proposed expeditions.

9:45 Coffee break with light snacks (15 minutes)

10:00 *Discussion: How best to plan for ice and weather conditions?*

Including, for example:

- Direct experiences of attendees from high-latitude research cruises.
- The utility of icebreaker support.
- Sea bed drilling technology (MeBo, RD2).
- Characteristics of sea ice and storm (ship heave) conditions, monitoring, decision-making at sea;
- Role of Alternate sites and prioritization.

12:00 – 1:00 Lunch (multiple food options available in nearby Memorial Student Center)

Tuesday 10 May, Afternoon (Koldus 110/111 and IODP / Gulf Core Repository)

1:00 Introduction and organization for the core description part of the workshop (Harwood and Kulhanek)

2:00 – 2:45 Travel one mile from Koldus to IODP / Gulf Coast Repository by university bus (free) or on foot.

Examination of Antarctic sediment cores in the Gulf Core Repository.

2:45 Meet in IODP lobby: Welcome and orientation to the IODP and GCR.

3:00 The sediment cores will be organized into about six stations (benches), each focusing on a different area or time interval, each bench holding up to eight 1.5 m core sections and a small microscope at some of them. There will be three or four additional stations for micropaleontology, possible student posters, etc. Groups of about six people will cycle around the stations, spending about 50 minutes at each one. Groups will contain a mix of experienced and junior scientists.

At each sediment core station, a map and seismic profile will provide the setting, and published data from the cores will be displayed on screen or on paper above the benches, to give examples of ice-rafted debris (IRD) content, micropaleontology, opal content, physical properties, and other measurements.

In parallel: possible breakout groups to discuss matters arising from the first day and a half of the workshop.

Stations with sediment cores similar to those anticipated from proposed expeditions:

- 1 Ross Sea / Amundsen Sea, IODP-751, 839. Site 270 + (Oligocene-Miocene)
- 2 Peninsula-Belingshausen, IODP-732. Site 1096 + (Pliocene-Pleistocene)
- 3 George V Land, IODP-813. Sites U1356, 1166 + (Eocene-Oligocene)

Stations with sediment cores related to time intervals of interest:

- 4 Antarctic ice sheet evolution through time, e.g. Site 689, Maud Rise.
- 5 Pliocene cycles. Site U1361
- 6 Holocene Antarctic sediments.

[Note: we are still working on the exact sites and cores to lay out for the workshop.]

Activities at other stations in adjoining rooms

- 7 Microscope work – micropaleontology, IRD.
- 8 Student posters
- 9 Timeline for a drilling proposal / how to apply to an expedition.

Wednesday 11 May (IODP / Gulf Coast Repository)

Examination of Antarctic sediment cores in the Gulf Core Repository (continued)

In parallel: possible breakout groups to discuss matters arising from the two days of the workshop.

8:15 – 8:45 Arrive; coffee.

8:45 Examination of Antarctic sediment cores, continued.

10:00 Coffee break

12:00 Lunch (Blue Baker pizza and salad, setup in lobby)

1:00 Examination of Antarctic sediment cores, continued.

4:00 – 4:30 **Workshop wrap-up in IODP Room C126**

(time can be adjusted depending on when people need to leave for flights or to get on the road).

Workshop student attendees:

Jeanine Ash	UCLA
Imogen Browne	U South Florida
Jason Coenen	Northern Illinois U
Michelle Guitard	U South Florida
Anna Ruth Halberstadt	Rice U --> U Mass
Katharina Hochmuth	AWI, Bremerhaven, Germany
Bridget Lee	U California Riverside
Jennifer Middleton	Harvard U
Yuribia Munoz	U Houston
Elisabetta Olivo	OGS Trieste, Italy
Michelle L Penkrot	U Florida
Brendan Reilly	Oregon State U
Delaney Robinson	U Houston
Ari Salabarnada	U Granada, Spain
Catherine Smith	U South Florida
Kara Vadman	U South Florida
Mingyu Yang	U Nebraska Lincoln

Workshop attendees:

Gary Acton	Sam Houston U
John Anderson	Rice U
Jacqueline Austerman	Harvard U
Phil Bart	Louisiana State U
Steve Bohaty	NOC, Southampton, UK
Anders Carlson	Oregon State U
Jim Channell	U Florida
Ellen Cowan	Appalachian State U
Laura De Santis	OGS Trieste, Italy
Justin Dodd	Northern Illinois U
Eugene Domack	South Florida U
Carlota Escutia	U Granada, Spain
Sarah Feakins	U Southern California
Andrew Fraass	Smithsonian, Washington DC
Karsten Gohl	AWI, Bremerhaven, Germany
David Harwood	U Nebraska, Lincoln
Daniel Hauptvogel	U Houston
CD Hillenbrand	BAS, UK
Minoru Ikehara	Kochi U, Japan
John Jaeger	U Florida
Tom Janecek	NSF
Denise Kulhanek	Texas A&M U
Rob Larter	BAS, UK
Chris Lowery	U Texas IG
David Mallinson	East Carolina U
Mitch Malone	Texas A&M U
Ellen Martin	U Florida
Rob McKay	Victoria U Wellington, New Zealand

Paul Morin	Polar Geospatial Center, Minneapolis
Frank Nitsche	Lamont / Columbia U
Suzanne O'Connell	Wesleyan
Sandra Passchier	Montclair State U, NJ
Molly Patterson	U Mass
Stephen Pekar	Queens College CUNY
Frank Rack	U Nebraska Lincoln
Alan Rooney	Harvard U
Howie Scher	U South Carolina
Reed Scherer	Northern Illinois U
Amelia Shevenell	South Florida U
Lauren Simkins	Rice U
Joe Stoner	Oregon State U
Debbie Thomas	Texas A&M U
Ellen Thomas	Yale U
Tina van de Fliert	Imperial College London, UK
Jonathan Warnock	Indiana U Pennsylvania
Sophie Warny	Louisiana State U
Mike Weber	U Köln, Germany
Jo Whittaker	U Tasmania, Australia
Trevor Williams	Texas A&M U
Wenshen Xiao	Tongji U, China