

First Annual Hercules Dome Ice Core Workshop & Open Science Meeting, May 10-11, 2021

Monday, May 10, 2021: All Times Central Daylight Time

10:00-10:40. **Welcome, Introduction, and Project Update**

Eric Steig, University of Washington (UW) – Welcome

Paul Cutler, NSF – Update from the National Science Foundation

Mark Twickler & Joe Souney, University of New Hampshire – Project Planning and Logistics

Jay Johnson, University of Wisconsin – Drilling technology

10:40-11:45. **Session 1: Characteristics of Hercules Dome**

T.J. Fudge (UW) & *Nick Holschuh* (Amherst College) – Site selection and ice-sheet modeling

Weisen Shen, Stony Brook U. – Seismic & thermal structure beneath Hercules Dome and why we want to know more

Tobias Staal, U. of Tasmania – Geothermal heat flow in Hercules Dome region - results & uncertainties

11:15 Breakout rooms (10 min.) followed by Panel Discussion (20 min.)

11:45-1:15. **Session 2: Motivations and context for drilling at Hercules Dome**

Marina Dütsch, University of Vienna – Response of water isotopes in precipitation to a collapse of the WAIS in high-resolution simulations with the Weather Research and Forecasting Model

Mackenzie Grieman, University of Cambridge – SkyTrain Ice Rise

Ed Brook, Oregon State University – CO₂ changes during glacial terminations and inception

Murat Aydin, University of California, Irvine – SPICEcore trace gas measurements and implications for the Hercules Dome project.

12:45 Breakout rooms (10 min), followed by Panel Discussion (20 min.)

1:15 **Lunch/Afternoon Break (45 min.)**

2:00-3:20. **Session 3a: Short-version talks (<5 min.)**

John Patterson, University of California, Irvine – H₂ in Ice Cores

Julia Marks-Peterson, Oregon State University – Developing high precision CO₂ measurements

Jenn Campos Ayala, University of California – Acetylene from ice cores throughout the Holocene

Vasilii Petrenko, University of Rochester – ¹⁴CO₂ to improve the radiocarbon calibration curve

Erich Osterberg, Dartmouth – Circulation changes recorded in microparticle flux, size & chemistry

2:20 Discussion (10 minutes)

Julia Andreasen, University of Minnesota – Snow accumulation time series of coastal WAIS

Thomas Chen, Academy for Mathematics, Science, and Engineering – Machine learning for climate change insights from ice core data

Erin Pettit, Oregon State University – Deformation, climate, & physical properties from borehole observations

Julien Bodart, University of Edinburgh / BAS – Age-depth stratigraphy of Pine Island Glacier

2:55 Breakout rooms (10 min), followed by Panel Discussion (15 min.)

3:20 Break (10 min.)

3:30-4:30. **Session 4: Larger Context**

Natalya Gomez, University of Montréal – Links between Antarctic ice dynamics, glacial isostatic adjustment and global sea level

Ted Scambos, University of Colorado – The International Thwaites Glacier Collaboration

4:05 Panel Discussion

4:30 End for the day

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10:00-11:00. Session 5. More on Hercules Dome characteristics

Murat Aydin, University of California, Irvine – Welcome

TJ Young, University of Cambridge – Polarimetry methods

Ben Hills, University of Washington – Polarimetry Results at Hercules Dome

Annika Horlings, University of Washington – Surface mass balance at Hercules Dome

10:45 Discussion

11:00-12:00 Session 6. Engagement with Antarctic Research

Guillaume Mauger, UW – Washington Coastal Resilience Project and connecting sea level rise science to decision-makers

Peter Neff, U. of Minnesota – Role of social media in science engagement & broadening participation

Helen Glazer, Independent Artist – Art as a tool for communicating science

Gifford Wong, IDA Science and Technology Policy Institute – Science-policy interface and career pathways for science outside of academia

11:40 Discussion moderated by Heidi Roop

12:00 Break (10 min)

12:10-1:15 Session 7: More motivations and context for Hercules Dome

Sarah Shackleton, Princeton – Mean ocean temperature in Marine Isotope Stage 5: insight into early interglacial climate, and future work

Dave Reusch, UW – Observing and understanding precipitation, accumulation and meteorology in the Hercules Dome region

Greg Balco, Berkeley Geochronology Center – Subglacial bedrock recovery drilling and exposure dating

Marissa Tremblay, Purdue University – Noble gases in rock

1:00 Discussion (15 min.)

1:15 Lunch/Afternoon Break (45 min.)

2:00-3:20. Session 8: Short-version talks (<5 min., *= 10 min.)

**Juliana D'Andrilli*, Louisiana Universities Marine Consortium – Polar ice core organic matter signatures reveal past atmospheric carbon composition and spatial trends

**Paolo Gabrielli*, The Ohio State University – Elemental characterization of single mineral particles by mass spectrometry: a novel tool to infer past environmental and climate variability from ice cores

Shuting Zhai, UW – Anthropogenic Impacts on Tropospheric Reactive Chlorine since the Preindustrial

Dominic Winski, University of Maine – Holocene sea ice variability from South Pole ice core chemistry

2:30 Discussion (10 min.)

Aaron Chesler, University of Maine – The SPICEcore microparticle record.

Jihong Cole-Dai, South Dakota State University – Ice core chemical measurements - tools to date cores and to investigate ice sheet variations and ocean biogenic emissions

Andrew Pauling, UW – Non-linear modeled climate response to Antarctic topography change

Jessica Badgeley, UW – Inferring paleoaltimetry of the Antarctic Ice Sheet from ice cores

3:00 Panel Discussion (20 min.)

3:20 Break (10 min.)

3:30-4:30. Session 9: Advances in Ice Core Research

Christo Buizert, Oregon State University – Δ age as a temperature proxy at Hercules Dome

Laurence Yeung, Rice University – Using the ice-core record to investigate the ancient free troposphere

4:05 Panel Discussion

4:30 *Hercules Dome Leadership Team* – Wrap up/next steps.