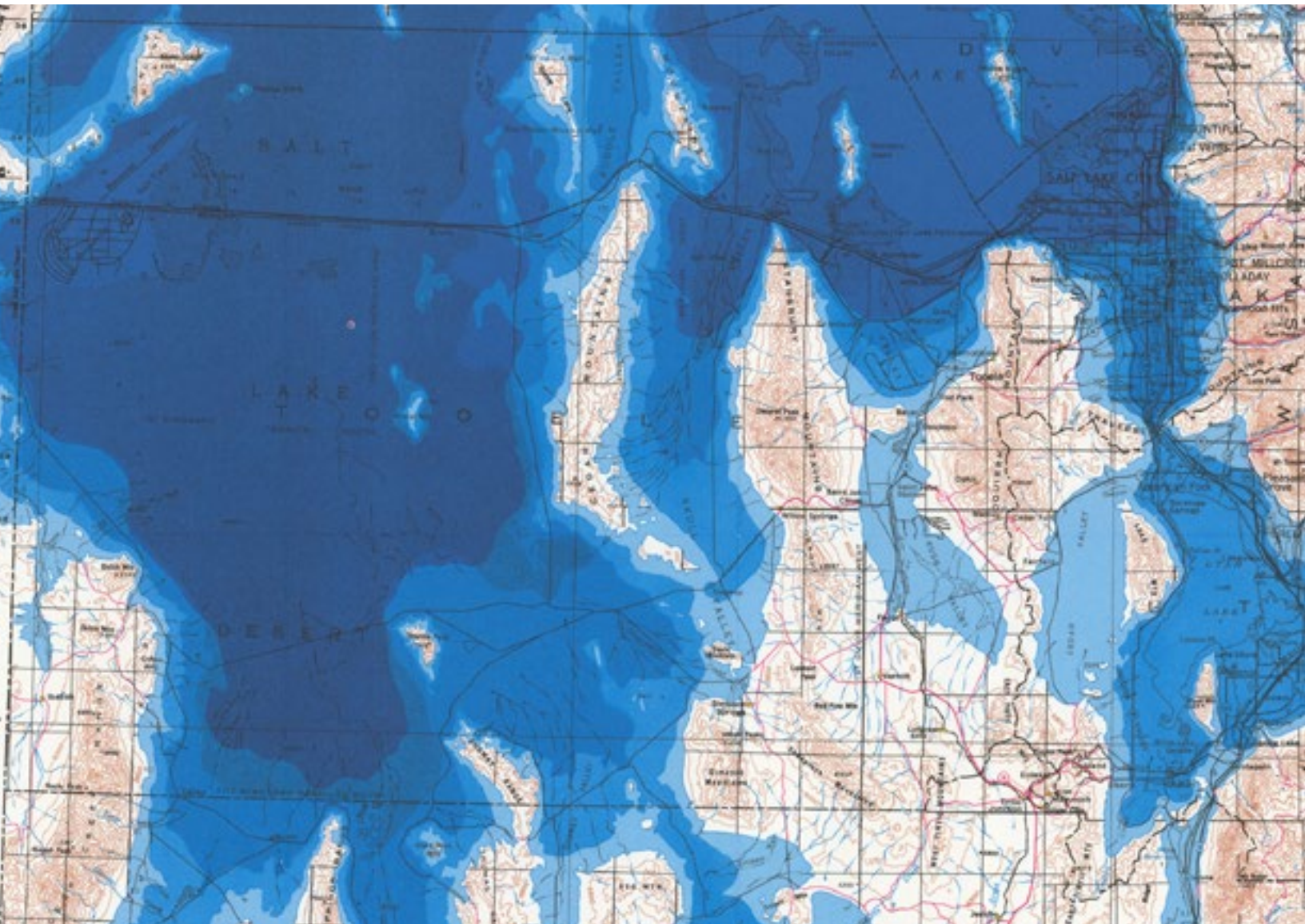


# PROCEEDINGS VOLUME: 2018 LAKE BONNEVILLE GEOLOGIC CONFERENCE AND SHORT COURSE, October 3–6, 2018

*Edited by William R. Lund, Adam P. McKean, and Steve D. Bowman*



**MISCELLANEOUS PUBLICATION 170**  
**UTAH GEOLOGICAL SURVEY**  
*a division of*  
UTAH DEPARTMENT OF NATURAL RESOURCES  
**2019**

*Blank pages are intentional for printing purposes*

**PROCEEDINGS VOLUME:  
2018 LAKE BONNEVILLE GEOLOGIC CONFERENCE  
AND SHORT COURSE, October 3–6, 2018**

**Utah Department of Natural Resources Building  
1594 W. North Temple, Salt Lake City, Utah**

*Edited by William R. Lund, Adam P. McKean, and Steve D. Bowman*

*Sponsored by  
Utah Geological Survey  
Utah Geological Association  
Utah Division of Occupational & Professional Licensing,  
Utah Professional Geologists Licensing Board*

*Cover photo: Detail from UGS Map 73, Major Levels of Great Salt Lake and Lake Bonneville.*



**MISCELLANEOUS PUBLICATION 170  
UTAH GEOLOGICAL SURVEY**  
*a division of*  
UTAH DEPARTMENT OF NATURAL RESOURCES  
**2019**

**STATE OF UTAH**

Gary R. Herbert, Governor

**DEPARTMENT OF NATURAL RESOURCES**

Brian C. Steed, Executive Director

**UTAH GEOLOGICAL SURVEY**

R. William Keach II, Director

**PUBLICATIONS**

contact

Natural Resources Map & Bookstore

1594 W. North Temple

Salt Lake City, UT 84116

telephone: 801-537-3320

toll-free: 1-888-UTAH MAP

website: [utahmapstore.com](http://utahmapstore.com)

email: [geostore@utah.gov](mailto:geostore@utah.gov)

**UTAH GEOLOGICAL SURVEY**

contact

1594 W. North Temple, Suite 3110

Salt Lake City, UT 84116

telephone: 801-537-3300

website: [geology.utah.gov](http://geology.utah.gov)

*The Miscellaneous Publication Series provides non-UGS authors with a high-quality format for documents concerning Utah geology. Although review comments have been incorporated, this document does not necessarily conform to UGS technical, editorial, or policy standards. The Utah Department of Natural Resources, Utah Geological Survey, makes no warranty, expressed or implied, regarding the suitability of this product for a particular use. The Utah Department of Natural Resources, Utah Geological Survey, shall not be liable under any circumstances for any direct, indirect, special, incidental, or consequential damages with respect to claims by users of this product.*

# Contents

INTRODUCTION .....	1
DEDICATION .....	1
CONFERENCE AGENDA.....	3
SHORT COURSE AGENDA .....	7
AVAILABLE CONFERENCE ABSTRACTS AND PRESENTATIONS .....	8
AVAILABLE CONFERENCE POSTERS .....	10
SHORT COURSE PRESENTATIONS.....	11
ACKNOWLEDGMENTS .....	11



# **PROCEEDINGS VOLUME: 2018 LAKE BONNEVILLE GEOLOGIC CONFERENCE AND SHORT COURSE, October 3–6, 2018**

*Edited by William R. Lund, Adam P. McKean, and Steve D. Bowman*

## **INTRODUCTION**

The Utah Geological Survey, Utah Geological Association, and Utah Division of Professional and Occupational Licensing sponsored the 2018 Lake Bonneville Geologic Conference and Short Course at the Utah Department of Natural Resources Building in Salt Lake City, Utah, on October 3–6, 2018. The conference provided a follow-up to the 2016 publication of *Lake Bonneville: A Scientific Update* edited by Charles G. (Jack) Oviatt and John F. Schroder. At the meeting, the Lake Bonneville and Great Salt Lake research community came together to review the current standing of research and discuss future research.

Sessions of the conference addressed (1) general Lake Bonneville and Great Salt Lake research, (2) pre-Bonneville lakes and Lake Bonneville-related topics, (3) current research on the Bonneville Salt Flats, (4) Pleistocene and Holocene carbonates and microbialites of Lake Bonneville and Great Salt Lake, (5) topics related to the overflow and termination phases of Lake Bonneville, (6) paleolimnology and stratigraphy of Pilot Valley, Utah, and (7) Quaternary paleoclimate and glaciation. The conference included time for group discussion and poster presentations related to the session topics. The sessions included 34 speakers and 15 poster presentations; over 115 individuals attended the two-day meeting. Importantly, the meeting provided education and networking opportunities for the local geological community.

The two-day short course was intended for local geologists, students, and others as an educational opportunity to learn about the latest in applying Lake Bonneville stratigraphy and other concepts to current and future projects. The short course included a day in the classroom that touched on topics including (1) commonly used Lake Bonneville terms, (2) updated Lake Bonneville stratigraphy and marker beds, (3) lake elevation variability, (4) isostatic rebound of Lake Bonneville shorelines, and (5) age dating. Hands on activities included aerial photographic mapping and sediment core logging exercises. The short course also included a field trip to the Goggin Drain site to directly observe deep-water, fine-grained deposits of Lake Bonneville, the Gilbert-episode lake, and Great Salt Lake. This was followed by stops at the Great Salt Lake Marina and Stansbury Island, where the group examined transgressive-phase deposits of Lake Bonneville that highlight the transition from fine-grained deeper water deposits to the coarse-grained Stansbury shoreline deposits. Over 65 individuals attended the short course.

## **DEDICATION**

We dedicate the 2018 Lake Bonneville Geologic Conference and Short Course proceedings volume to Dr. Charles G. (Jack) Oviatt for his outstanding lifetime contributions to the study of Lake Bonneville and the other Quaternary lakes in the Bonneville basin.

For over 40 years, Jack has and continues to make significant contributions to our understanding of Lake Bonneville and the late Pleistocene and Holocene geologic history of Utah. He has authored over 70 scientific publications on Lake Bonneville and related Bonneville basin lakes, including at least 20 geologic maps depicting these deposits across Utah. A recent culmination of this research is *Lake Bonneville: A Scientific Update*, a book published by Elsevier in 2016 which Jack co-edited and co-authored. This comprehensive 659-page book covers important topics from stratigraphy and sedimentology to vegetation, fish, and mammals of the Bonneville basin. With 23 chapters covering new information and interpretations, it is the first comprehensive book published on Lake Bonneville since G.K. Gilbert's 1890 *Lake Bonneville* (U.S. Geological Survey Monograph 1). The publication of this 2016 book in part motivated the organization of the Lake Bonneville Geologic Conference and Short Course that this proceedings volume represents.



*Dr. Charles G. (Jack) Oviatt*

Jack's geologic interest as an undergraduate and graduate student at the University of Wyoming (1973–1977) focused on glacial geology, but it was his interactions with Professor Donald Currey as a graduate student at the University of Utah that pulled him into research on Lake Bonneville. The two collaborated for decades and, at a time of competing theories and ideas, developed and solidified our current understanding of Lake Bonneville's history and hydrography.

In 1983, the Utah Legislature funded the creation of the Utah Geologic Mapping Program, part of the Utah Geological and Mineralogical Survey (UGMS, now UGS). Jack was one of the first three geologic mappers hired by UGMS Director Genevieve Atwood. With his experience and understanding of Quaternary geology, Jack co-developed the style guide used by the UGS for the geologic mapping of surficial deposits in Utah. Developed around 35 years ago, that style guide is still used and referred to today.

Not only has Jack been a selfless collaborator and researcher, he has been a friend and mentor to many students and researchers. He is a respected colleague and valued contributor across multiple scientific disciplines. One does not need to spend much time with Jack before his characteristic traits put others at ease. He maintains a positive, cheerful, and optimistic outlook, yet has a dedicated work ethic. He is remarkably humble and always open to listening to others' ideas, observations, and theories, often despite being many years their senior. In discussion and scientific debate, he is cool and calm, and never threatened by competing ideas.

In the field with Jack, many of us have learned of his other interests and passions in life, whether with his binoculars focused on a bird, an observation of the natural world around him, or hearing about his wife Susan and their two children.

He has spent the majority of his career at Kansas State University where he researched a variety of topics over his career, but number one has always been Lake Bonneville. Now in retirement, we look forward to many more delightful days in the field with Jack, with much continued discussion on the intricacies of the lakes that occupied the Bonneville basin.

*Adam McKean  
Donald Clark*





## 2018 LAKE BONNEVILLE GEOLOGIC CONFERENCE AGENDA

**Wednesday and Thursday, October 3–4, 2018**

**Utah Department of Natural Resources Building, Auditorium (1<sup>st</sup> floor)  
1594 West North Temple, Salt Lake City, Utah**

The Utah Geological Survey, in conjunction with the Utah Geological Association and the Utah Division of Occupational & Professional Licensing, Utah Professional Geologists Licensing Board, is sponsoring the *2018 Lake Bonneville Geologic Conference and Short Course* to provide a setting for the review and discussion of Lake Bonneville and Great Salt Lake geologic research and provide education and networking opportunities for the local geologic community. With the publication in 2016 of *Lake Bonneville: A Scientific Update*, this conference and short course is timely to bring the research and geologic community together to review where current research stands and discuss where it may be going in the future.

### **DAY 1 – Wednesday, October 3**

#### **8:00 Welcome and Introduction**

8:00 – Welcome, Overview of the Lake Bonneville Conference, and Attendee Introduction: Adam McKean, Conference Co-Chair, Utah Geological Survey

#### **8:30 Session 1: Lake Bonneville and Great Salt Lake Introduction. Moderator: Adam McKean**

8:30 – Introduction to Lake Bonneville: Jack Oviatt, Kansas State University (retired)

9:15 – Great Salt Lake – Lake Bonneville: It's a System, and Do Not Assume Shorelines are Level: Genevieve Atwood, Earth Science Education

9:45 – The New Utah Geochronology Database: Steve Bowman, Utah Geological Survey

10:00 *Break (20 minutes)*

#### **10:20 Session 2: Pre-Bonneville and Bonneville. Moderator: Paul Jewell, University of Utah**

10:20 – The Bear River's Diversion and the Cutting of Oneida Narrows at ~55-50ka and the Relations to the Lake Bonneville Record: Joel Pederson, Utah State University

10:40 – OSL Age Dating of Two, Perhaps Three, Pre-Bonneville Deep-Water Pluvial Lakes in Cache Valley, Utah-Idaho, Implications of the Unexpected High Altitudes for Excavation of the Cutler Narrows from a Level above 1494 m (4901 ft), Down to the Present 1314 m (4310 ft) Mainly During the Bonneville Lake Cycle: Robert Oaks, Jr., Utah State University

11:00 – Late Pleistocene Lake Shambip, Central Utah: Paul Jewell, University of Utah

11:20 – Cedar Valley Lake—An Isolated Lake in Cedar Valley, Utah County, Utah, During the Bonneville Lake Cycle: Adam McKean, Utah Geological Survey

11:40 – Revisiting the Deformed High Shoreline and Isostatic Rebound of Lake Bonneville: Christine Chen, Massachusetts Institute of Technology

12:00 *Lunch (1 hour)*

**1:00 Session 3: Bonneville Salt Flats. Moderator: Brenda Bowen, University of Utah**

1:00 – Adaptation, Mitigation, and Biophysical Feedbacks in the Changing Bonneville Salt Flats: Brenda Bowen, University of Utah

1:15 – The Transition of Lake Bonneville to the Bonneville Salt Flats?: Jeremiah Bernau, University of Utah

1:30 – Is Water from Lake Bonneville Still with Us? A Geochemical Evaluation of Groundwater in the Western Bonneville Basin: Jory Lerback, University of Utah

1:45 – What Has Been the Role of Humans on Environmental Change at the Bonneville Salt Flat?: Evan Kipnis, University of Utah

2:00 *Break and Poster Session (40 minutes)*

**2:40 Session 4: Pleistocene and Holocene Carbonates of Lake Bonneville and Great Salt Lake: Windows to the Past? Moderator: Mike Vanden Berg, Utah Geological Survey and Carie Frantz, Weber State University**

2:40 – Overview of Holocene Great Salt Lake Carbonates and Microbialites: What Are They and When Did They Form?: Mike Vanden Berg, Utah Geological Survey and Carie Frantz, Weber State University

3:00 – Modern Great Salt Lake Salinity Gradients Influence the Biology of Microbialites: Bonnie Baxter, Great Salt Lake Institute at Westminster College

3:20 – Influence of Salinity on the Potential for Dolomite Formation in Great Salt Lake Sediments: Melody Lindsay, Montana State University

3:40 – Stable Isotope Variability in Modern Great Salt Lake Sediments: How do Local Microbial Processes Translate to the Sedimentary Record?: Miquela Ingalls, University of Colorado and California Institute of Technology

4:00 – Great Salt Lake Microbialite Geochronology and Stable Isotope Geochemistry, Implications for Paleolake Hydrogeochemistry: Dennis Newell, Utah State University

4:20 – Radial Ooids from Great Salt Lake, Utah as Paleoenvironmental Archives, Insights from Radiocarbon Chronology and Stable Isotopes: Olivia Paradis, University of Southern California

4:40 – Into Hot Water or Out of Our Depth? Tufa, Travertine, and Microbialites at Lakeside, Utah: Peter Homewood, GEOSOLUTIONS TRD

5:00 – Group Discussion of the Topics from Sessions One Through Four

5:30 *Adjourn*

## DAY 2 – Thursday, October 4

### 8:00 Welcome and Introduction

8:00 – Welcome and Overview of the Day: Adam McKean, Conference Co-Chair, Utah Geological Survey

### 8:10 Session 5: Overflow and Termination Phases of Lake Bonneville.

*Moderator: David Miller, U.S. Geological Survey (retired)*

8:10 – The Provo Shoreline Phase of Lake Bonneville and Subsequent Decline: David Miller, U.S. Geological Survey (retired)

8:50 – An Elastic Plate Model Applied to New Estimates of the Vertical Deflection Patterns on Bonneville and Provo Shorelines: Bruce Bills, Jet Propulsion Laboratory

9:10 – New Age Control on Old Lake Cycles, Evidence from Luminescence Ages from Northern Utah and Southern Idaho: Tammy Rittenour, Utah State University

9:30 – Cache Valley—A Critical Part of Lake Bonneville Tells a Unique Tale of Shorelines, Thresholds, Clustered Earthquakes, Liquefaction, Possible Triggers of the Bonneville Flood, and Late Integration with the Main Basin: Susanne Jänecke, Utah State University

9:50 – The Last Pleistocene Glaciation in the Uinta Mountains, Updated Chronology and Connections to Lake Bonneville: Benjamin Laabs, North Dakota State University

10:10 *Break (20 minutes)*

### 10:30 Session 6: Paleolimnology and Stratigraphy of Pilot Valley, Utah.

*Moderator: John McBride, Brigham Young University*

10:30 – Visualization of a Lake Bonneville Deposit in Pilot Valley, Utah: John McBride, Brigham Young University

10:50 – Imaging the Margins of Pleistocene Lake Deposits with High-Resolution Seismic Reflection in the Eastern Basin and Range, Pilot Valley, Utah: John South, Dominion Energy Wexpro

11:10 – Diatom, Mineralogical, and Geochemical Proxies Provide a New View of the Paleolimnology of Lake Bonneville, Western USA, as Observed in the Restricted Pilot Valley Sub-Basin: Stephen Nelson, Brigham Young University

### 11:40 Session 7: Lake Bonneville and Great Salt Lake Introduction (continued). *Moderator: Adam McKean*

11:40 – Lake Bonneville Geosites and Analogs to Mars: Marjorie Chan, University of Utah

12:00 *Lunch (1 hour)*

### 1:00 Session 8: Quaternary Paleoclimate and Glaciation. *Moderator: Benjamin Laabs, North Dakota State University*

1:00 – Numerical Modeling of Late Pleistocene Glaciers and Lakes West of Lake Bonneville, Implications for Regional Climate Change: Kaitlyn Fleming, North Dakota State University

1:20 – Lake Area Constraints on Past Hydroclimate in the Western United States, Application to Lake Bonneville: Daniel Ibarra, Stanford University

1:40 – Glacial Hydroclimate of Western North America, Insights from Proxy-Model Comparison, Records from Key Locations, and Implications for Lake Bonneville: Jessica Oster, Vanderbilt University

2:00 – Wasatch Range Climate During the Late Glacial and Last Glacial Maximum: Brendon Quirk, University of Utah

2:20 – Ice at the Edge of the Bonneville Basin–Mountain Glaciation and Paleoclimate of the Upper Fremont River Catchment, Central Utah: David Marchetti, Western Colorado University

2:40 – Closed-Basin Lake Response to Climate Variability: Kathleen Huybers, University of Utah

3:00 *Break and Poster Session (60 minutes)*

**4:00 Group Discussion of the Topics from Sessions Five to Eight**

5:00 *Adjourn*

## POSTER SESSIONS

Analysis of Lake Bonneville Shoreline Elevations in Northwest Utah Using 5-Meter Digital Elevation Model Data and ArcGIS: Tracey Felger, U.S. Geological Survey

Basin-Floor Lake Bonneville Stratigraphic Section as Revealed in Paleoseismic Trenches at the Baileys Lake Site, West Valley Fault Zone, Utah: Michael Hylland, Utah Geological Survey

Core from the Salt Flats Project: Brenda Bowen, University of Utah

Episodic Deposition and Incision of the Logan Canyon, Third Dam Alluvial-Fan Complex: Michael Ferraro, Utah State University

Evolution and Architecture of a Preserved Transgressive-Regressive Provo Stage Gravel Bar: Jason Klimek, Brigham Young University

Geologic Map for the Tooele 30' x 60' Quadrangle, Tooele, Salt Lake, and Davis Counties, Utah: Donald Clark, Utah Geological Survey

Great Salt Lake and Green River Formation Microbialites: Michael Vanden Berg, Utah Geological Survey

Interactive Utah Geologic Map Portal: Marshall Robinson, Utah Geological Survey

Reduced Evaporation Rates Led to Growth of the Glacial Lake Bonneville: Alexandra Arnold, University of California, Los Angeles

Stream-Terrace Deposits Along Little Cottonwood Creek Record the Regression of Lake Bonneville and Incision of the Cottonwoods Delta Complex: Adam McKean, Utah Geological Survey

The Utah Geochronology Database, Map of Current Data: Steve Bowman, Utah Geological Survey

Post-Lake Bonneville Migration of the Jordan River, Salt Lake Valley, Utah: Adam McKean, Utah Geological Survey

Paleoseismology of the Faults Submerged Beneath Utah Lake: David Dinter, University of Utah

Paleoseismology of the Northern Segments of the Great Salt Lake Fault: David Dinter, University of Utah and James Pechmann, University of Utah Seismograph Stations

Utah Earthquakes (1850-2016) and Quaternary Faults: Steve Bowman, Utah Geological Survey

Comparison of Stromatolitic Structures Between Bonneville, Pre-Bonneville, and Lake Uinta: Peter Nielsen, Utah Geological Survey



## 2018 LAKE BONNEVILLE SHORT COURSE AGENDA

**Friday and Saturday, October 5–6, 2018**

**Utah Department of Natural Resources Building, Auditorium (1<sup>st</sup> floor)  
1594 West North Temple, Salt Lake City, Utah**

The Utah Geological Survey, in conjunction with the Utah Geological Association and the Utah Division of Occupational & Professional Licensing, Utah Professional Geologists Licensing Board, is sponsoring the *2018 Lake Bonneville Geologic Conference and Short Course* to provide a setting for the review and discussion of Lake Bonneville and Great Salt Lake geologic research and provide education and networking opportunities for the local geologic community. With the publication in 2016 of *Lake Bonneville: A Scientific Update*, this conference and short course is timely to bring the research and geologic community together to review where current research stands and discuss where it may be going in the future. The short course is intended for geologists practicing in the field, students, and others as an educational opportunity to learn about the latest in applying Lake Bonneville stratigraphy and other concepts to current and future projects.

### **DAY 1 – Friday, October 5**

#### **DNR Auditorium**

**8:00 – Welcome; Overview of the Lake Bonneville Short Course, and Attendee Introductions:**  
**Adam McKean, Short Course Co-Chair, Utah Geological Survey**

**8:30 – Lecture 1 – Commonly Used Terms and Updated Lake Bonneville Stratigraphy: Jack Oviatt,**  
**Kansas State University (retired)**

*10:00 – Break (20 minutes)*

**10:20 – Guest Speaker – Shoreline Elevation Variability: Genevieve Atwood, Earth Science Education**

11:00 – Hands-On Activity – Aerial Photo Mapping and Lidar Elevation Data: Adam McKean, Utah Geological Survey

*12:00 – Lunch (1 hour)*

**1:00 – Lecture 2 – Stratigraphy, Marker Beds, and Age Dating: Jack Oviatt, Kansas State University (retired)**

2:00 – Guest Speaker – Paleo-Winds: Paul Jewell, University of Utah

*2:40 – Break (20 minutes)*

**3:00 – Guest Speaker – Isostatic Rebound: Bruce Bills, Jet Propulsion Laboratory**

3:40 – Hands-On Activity – Core Logging: Kevin Ray, Brigham Young University

**4:20 – Lecture 3 – Where Things are Going in Lake Bonneville and Great Salt Lake Research: Jack Oviatt,**  
**Kansas State University (retired)**

*5:00 – Adjourn*

## DAY 2 – Saturday, October 6

### Field trip

8:00 – Meet at the Utah Department of Natural Resources (DNR) Building south parking lot by 8 am.

8:30 – Leave the DNR Building and Travel to the Goggin Drain Site by Bus.

9:00 – Field Time at the Goggin Drain Site.

11:00 – Travel to the Great Salt Lake State Marina by Bus, Have Lunch at the Marina (provided), and Short Overview Presentation (10-15 minutes) at the Great Salt Lake View Area by Bruce Bills and Jack Oviatt.

12:30 – Leave for the Stansbury Island Site by Bus.

1:15 – Field Time at the Stansbury Island Site.

4:00 – Leave for the DNR Building.

5:00 – Return to the DNR Building

## AVAILABLE CONFERENCE ABSTRACTS AND PRESENTATIONS

**Not all speakers provided an abstract and/or presentation for the conference, available abstracts/presentations are presented here.**

## DAY 1 – Wednesday, October 3

### Session 1: Lake Bonneville and Great Salt Lake Introduction: *Moderator, Adam McKean*

Introduction to Lake Bonneville: *Jack Oviatt, Kansas State University (retired)*

Great Salt Lake – Lake Bonneville: It's a System, and Do Not Assume Shorelines are Level: *Genevieve Atwood, Earth Science Education*

The New Utah Geochronology Database: *Steve Bowman, Utah Geological Survey*

### Session 2: Pre-Bonneville and Bonneville: *Moderator, Paul Jewell, University of Utah*

The Bear River's Diversion and the Cutting of Oneida Narrows at ~55-50 ka and the Relations to the Lake Bonneville Record: *Joel Pederson, Utah State University*

OSL-IRSL Ages of Two, Perhaps Three, Pre-Bonneville Deep-Water Pluvial Lakes in Cache Valley, Utah-Idaho: Implications of the Unexpected High Altitudes for Excavation of the Cutler Narrows from a Level above 1494 m (4901 ft), Down to the Present 1314 m (4310 ft) Mainly During the Bonneville Lake Cycle: *Robert Oaks, Jr., Utah State University*

Late Pleistocene Lake Shambip, Central Utah: *Paul Jewell, University of Utah*

Cedar Valley Lake—An Isolated Lake in Cedar Valley, Utah County, Utah, During the Bonneville Lake Cycle: *Adam McKean, Utah Geological Survey*

Revisiting the Deformed High Shoreline and Isostatic Rebound of Lake Bonneville: *Christine Chen, Massachusetts Institute of Technology*

**Session 3: Bonneville Salt Flats: Moderator, Brenda Bowen, University of Utah**

Adaptation, Mitigation, and Biophysical Feedbacks in the Changing Bonneville Salt Flats: *Brenda Bowen, University of Utah*

The Transition of Lake Bonneville to the Bonneville Salt Flats?: *Jeremiah Bernau, University of Utah*

Is Water from Lake Bonneville Still with Us? A Geochemical Evaluation of Groundwater in the Western Bonneville Basin: *Jory Lerback, University of Utah*

**Session 4: Pleistocene and Holocene Carbonates of Lake Bonneville and Great Salt Lake: Windows to the Past?: Moderators, Mike Vanden Berg, Utah Geological Survey and Carie Frantz, Weber State University**

Modern Great Salt Lake Salinity Gradients Influence the Biology of Microbialites: *Bonnie Baxter, Great Salt Lake Institute at Westminster College*

Stable Isotope Variability in Modern Great Salt Lake Sediments: How do Local Microbial Processes Translate to the Sedimentary Record?: *Miquela Ingalls, University of Colorado and California Institute of Technology*

Great Salt Lake Microbialite Chronology and Isotope Geochemistry: Implications for Paleolake Biogeochemical Evolution: *Dennis Newell, Utah State University*

Into Hot Water or Out of Our Depth? Tufa, Travertine, and Microbialites at Lakeside, Utah: *Peter Homewood, GEOSOLUTIONS TRD*

**DAY 2 – Thursday, October 4**

**Session 5: Overflow and Termination Phases of Lake Bonneville: Moderator, David Miller, U.S. Geological Survey (retired)**

An Elastic Plate Model Applied to New Estimates of the Vertical Deflection Patterns on Bonneville and Provo Shorelines: *Bruce Bills, Jet Propulsion Laboratory*

New Age Control on Old Lake Cycles, Evidence from Luminescence Ages from Northern Utah and Southern Idaho: *Tammy Rittenour, Utah State University*

Cache Valley—A Critical Part of Lake Bonneville Preserves Evidence for a Protracted Bonneville Highstand, Possible Tectonic Triggers of the Bonneville Flood, Liquefaction, and Clustered Earthquakes on the East and West Cache Fault Zones: *Susanne Jänecke, Utah State University*

The Last Pleistocene Glaciation in the Uinta Mountains, Updated Chronology and Connections to Lake Bonneville: *Benjamin Laabs, North Dakota State University*

**Session 6: Paleolimnology and Stratigraphy of Pilot Valley, Utah: Moderator, John McBride, Brigham Young University**

Visualization of a Lake Bonneville Shoreline Deposit in Pilot Valley, Utah: *John McBride, Brigham Young University*

Imaging the Margins of Pleistocene Lake Deposits with High-Resolution Seismic Reflection in the Eastern Basin and Range, Pilot Valley, Utah: *John South, Dominion Energy Wexpro*

Diatom, Mineralogical, and Geochemical Proxies Provide a New View of the Paleolimnology of Lake Bonneville, Western USA, as Observed in the Restricted Pilot Valley Sub-Basin: *Stephen Nelson, Brigham Young University*

**Session 7: Lake Bonneville and Great Salt Lake Introduction: Moderator, Adam McKean**

Lake Bonneville Geosites and Analogs to Mars: *Marjorie Chan, University of Utah*

**Session 8: Quaternary Paleoclimate and Glaciation: Moderator, Benjamin Laabs, North Dakota State University**

Numerical Modeling of Late Pleistocene Glaciers and Lakes West of Lake Bonneville, Implications for Regional Climate Change: *Kaitlyn Fleming, North Dakota State University*

Lake Area Constraints on Past Hydroclimate in the Western United States, Application to Lake Bonneville: *Daniel Ibarra, Stanford University*

Glacial Hydroclimate of Western North America, Insights from Proxy-Model Comparison, Records from Key Locations, and Implications for Lake Bonneville: *Jessica Oster, Vanderbilt University*

Wasatch Range Climate During the Late Glacial and Last Glacial Maximum: *Brendon Quirk, University of Utah*

Ice at the Edge of the Bonneville Basin–Mountain Glaciation and Paleoclimate of the Upper Fremont River Catchment, Central Utah: *David Marchetti, Western Colorado University*

Response of the Great Salt Lake, Lake Bonneville, and Intermediate Shorelines to Interannual Climate Variability: *Kathleen Huybers, University of Utah*

**AVAILABLE CONFERENCE POSTERS**

**Not all poster authors provided a digital copy of their poster, available posters are presented here.**

Analysis of Lake Bonneville Shoreline Elevations in Northwest Utah Using 5-Meter Digital Elevation Model Data and ArcGIS: *Tracey Felger, U.S. Geological Survey*

Basin-Floor Lake Bonneville Stratigraphic Section as Revealed in Paleoseismic Trenches at the Baileys Lake Site, West Valley Fault Zone, Utah: *Michael Hylland, Utah Geological Survey*

Stream-Terrace Deposits Along Little Cottonwood Creek Record the Regression of Lake Bonneville and Incision of the Cottonwoods Delta Complex: *Adam McKean, Utah Geological Survey*

The Utah Geochronology Database, Map of Current Data: *Steve Bowman, Utah Geological Survey*

Post-Lake Bonneville Migration of the Jordan River, Salt Lake Valley, Utah: *Adam McKean and Michael Hylland, Utah Geological Survey*

Paleoseismology of the Northern Segments of the Great Salt Lake Fault: *David Dinter, University of Utah and James Pechmann, University of Utah Seismograph Stations*

Utah Earthquakes (1850–2016) and Quaternary Faults: *Steve Bowman, Utah Geological Survey*



## SHORT COURSE PRESENTATIONS

Commonly Used Terms and Updated Lake Bonneville Stratigraphy: *Jack Oviatt, Kansas State University (retired)*

Shoreline Elevation Variability: *Genevieve Atwood, Earth Science Education*

Stratigraphy, Marker Beds, and Age Dating: *Jack Oviatt, Kansas State University (retired)*

Deciphering Paleo-winds: The Promise and Pitfalls of Lake Bonneville: *Paul Jewell, University of Utah*

Geodynamics of Large Lakes: Bonneville, Lahontan, and Minchin: *Bruce Bills, Jet Propulsion Laboratory*

Where Things are Going in Lake Bonneville and Great Salt Lake Research: *Jack Oviatt, Kansas State University (retired)*

## ACKNOWLEDGMENTS

The 2018 Lake Bonneville Geology Conference and Short Course was made possible through the efforts of many individuals and organizations. Special thanks are in order for the organizations that co-sponsored the meeting by providing financial and/or logistical support; they include the Utah Division of Professional and Occupational Licensing Professional Geologist Board, the Utah Geological Association, and the Utah Geological Survey. Thanks are also offered to the summit organizers (Adam McKean, Steve Bowman, and Charles “Jack” Oviatt), technical session moderators (Adam McKean, Paul Jewell, Brenda Bowen, Mike Vanden Berg, Carie Frantz, David Miller, John McBride, and Benjamin Laabs), and invited subject-matter experts who made oral and poster presentations. Thank you to the authors who prepared papers or provided digital copies of their presentation/poster for this proceedings volume. Thank you to the many UGS staff who assisted with the conference and short course logistics and contributed to the success of the conference and field trip.

