

Draft Minutes for the 1578th meeting of the Geological Society of Washington

April 27, 2022

John Wesley Powell Auditorium, Cosmos Club, Washington, D.C.

After technical difficulties were resolved, President Larry Meinert called the meeting to order at 20:19 EDT.

Attendance

There were 71 attendees, 29 in-person and 42 on Zoom.

Minutes

The meeting began with the approval of the minutes from the previous meeting (1577th). The minutes of the 1577th meeting had been posted online and a Minute's Minute was read aloud at the 1578th meeting. No corrections were noted, and the minutes were accepted.

New Members and Guests

No new members were introduced.

Four guests were introduced: Jianhua Wang (Carnegie Institution), Lynn Shirey (wife of Steve Shirey), Kathy Breen (NASA Goddard) and Claire van der Wal (NASA Goddard).

Announcements

1) Larry Meinert announced that the 2022 GSW Spring Field Trip: "The Proterozoic and Paleozoic Evolution of the Blue Ridge Geologic Province in Northern Virginia" is on Saturday, May 14th. Bill Burton and Steve Schindler will lead this trip and Alan Pitts will provide logistical support. Details can be found on the GSW website.

2) Jamie Allan announced a talk tomorrow, April 28th on matching unused Appalachian Energy with bitcoin mining. Jamie said that this topic struck him as "sufficiently weird and interesting." Through GSW's affiliation with AAPG, GSW members can attend this talk by signing up. Jamie provided his email address for those interested.

Informal Communication

There was no informal communication.

Obituaries

There were no obituaries.

Formal Program

The formal program commenced at 20:26 EDT and consisted of three speakers: Dr. Steven Shirey (Earth and Planets Laboratory, Carnegie Institution for Science), Dr. Scott Guzewich (NASA Goddard Space Flight Center) and Dr. Jens Barosch (Earth and Planets Laboratory, Carnegie Institution for Science).

Steve Shirey presented "What Super Deep Diamonds Tell Us About a Top-100 Question in Science: What Causes Deep Focus Earthquakes?" Steve opened by establishing that earthquakes occurring below 300 km and especially in the mantle transition zone are some of the strongest events in the Earth. So-called deep focus earthquakes, whose nature and cause has been poorly understood for more than 100 years, occur with regularity and are a prominent result of plate tectonics. He explained how decarbonation/melting reactions in the slab crust and dehydration reactions in the slab mantle can provide mobile fluids to the earthquake generation regions, suggesting that mobile fluids cause or are related to deep earthquakes. He discussed newly synthesized observations that support this conclusion including model paths of cold versus warm subducting slabs,

comparison of P-T conditions to experimentally determined mineralogies of the slab crust and mantle, and synthesis of mineral inclusions in super deep diamonds showing mobile fluids exist. *Talk Length: 15'24"*

Questions were asked by: Jamie Allan (NSF), John Jens (USACE ERDC TEC), Bethany Theiling (NASA Goddard) and Martin Schmidt ().

Scott Guzewich presented "Volcanic Climate Warming." Scott gave an overview of flood basalt, or large igneous province volcanism, noting that it is among the most intense geologic phenomena a planet can experience, lasting for millennia or longer and releasing massive quantities of climate-changing gases and aerosols. Such eruptions appear common to all rocky terrestrial worlds in the Solar System and have been linked to or are contemporaneous with major climate disruptions, ocean anoxic events, and mass extinctions in Earth's history. He said that previous work has suggested that such eruptions would produce two distinct phases of climate response: comparatively brief, but intense, cooling from the reflection of sunlight by sulfate aerosols, and then longer-term warming from CO₂ emissions. Guzewich explained how he and his team utilized a sophisticated global climate model to determine that SO₂ emissions alone can produce climate warming through dynamic and radiatively driven feedbacks that result in three orders of magnitude increase in stratospheric water vapor. *Talk Length: 20'21"*

Questions were asked by: Mike Purucker (NASA Goddard), Bethany Theiling (NASA Goddard), Frank Lemoine (NASA Goddard), Mike Ackerson (NMNH) and George Helz (UMD).

Jens Barosch presented "Initial Analysis of Asteroid Ryugu: Organics and Presolar Grains." Jens shared details on the collection of approximately five grams of material from the carbonaceous asteroid Ryugu by the Japanese Hayabusa2 mission. Since the successful delivery of these precious samples to Earth in late 2020, several international science teams have been working on the initial analysis. Barosch said that a major scientific goal of the mission is to understand the nature and origin of (prebiotic) organic matter commonly found in primitive solar system objects such as Ryugu and chondritic meteorites. He shared results from the macromolecular organics initial analysis sub-team with a focus on the H, C and N isotopic characterization of Ryugu organic matter by NanoSIMS. He also discussed tiny and rare dust grains found in the returned samples and their formation in winds and explosions of ancient dying stars. Barosch noted that they were part of the original building blocks of the Solar System and provide a wealth of information about its origin and evolution. *Talk Length: 21'39"*

Questions were asked by: Mike Ackerson (NMNH), Steve Shirey (Carnegie Institution), Larry Meinert (Economic Geology & CSM), Scott Guzewich (NASA Goddard) and Mark Tyra (NIST).

President Meinert announced that the next meeting will be at the Cosmos Club on May 11. He then adjourned the 1578th meeting at 21:39 EDT.

Respectfully submitted,

Beth Doyle