

Draft Minutes for the 1585<sup>th</sup> meeting of the Geological Society of Washington  
January 18, 2023  
Video Conference via Zoom

President Kori Newman called the meeting to order at 20:03 EST.

#### Attendance

There were 38 attendees.

#### Minutes

The meeting began with the approval of the minutes from the previous meeting (1584<sup>th</sup>). The minutes of the 1584<sup>th</sup> meeting had been posted online and a Minute's Minute was read aloud at the 1585<sup>th</sup> meeting. No corrections were noted, and the minutes were accepted.

#### Guests and New Members

Four new members were announced: Sophia Campbell, George Washington University; Jan Hellmann, University of Maryland; Valerie Finlayson, University of Maryland; and Janina Czas, Carnegie Institute of Science.

No guests were introduced.

#### Announcements

President Kori Newman announced local science fairs and urged members to contact her if interested in volunteering as a judge.

#### Obituaries

No obituaries were announced.

#### Informal Communication

There was no informal communication.

#### Formal Program

The formal program commenced at 20:10 EST and consisted of three speakers: Patricia Gregg, University of Illinois; Li Wei, Lamont-Doherty Earth Observatory; and Emilie Beaudon, The Ohio State University.

Patricia Gregg, presented "Forecasting volcanic unrest and eruption potential through thermomechanical modeling and geodetic data assimilation." Dr. Gregg provided an example of how physical models combined with satellite observations can enable volcano forecasts analogous to weather forecasts. InSAR data collected from satellites was used to measure the inflation rate of the Sierra Negra Volcano in the Galapagos. These observations were used to tune physical parameters of a thermomechanical model and run hundreds of iterations. Using data collected prior to January 2018, the model forecasted an eruption in June-July 2018. Fortuitously, Sierra Negra experienced an eruptive event on June 26 preceded by a Mw 5.3 earthquake. After the eruption, the researchers used available data from satellite measurements to hindcast (or retroactively forecast) and improve their model tuning parameters. *Talk length: 20 minutes.*

Questions were asked by: Jamie Allen, National Science Foundation; Keith McGlaughlin, Leidos; Larry Meinert, Colorado School of Mines; and Mike Walter, Carnegie Institute for Science.

Li Wei, presented "Reactive Transport Modeling of Microbial Dynamics in Marine Methane Hydrate Systems." Li explained how methane hydrate forms in deepwater sedimentary basins through complex

microbially-mediated reactions. Sediment grain size exerts a strong control on methanogenesis; high-porosity sand hosts many times more microbes than low-porosity mud. Extramicrobial enzymes migrate from sand to mud and convert primary organic carbon in mud layers to high-molecular weight dissolved organic carbon via hydrolysis. Dissolved organic carbon migrates from mud to sand and undergoes further hydrolysis and fermentation to form low-molecular weight dissolved organic carbon and eventually methane. The reactive transport model represents a detailed understanding of how methane hydrate forms and matches observations recorded in deepwater boreholes. *Talk length: 16 minutes.*

Questions were asked by: Jamie Allen, National Science Foundation; George Helz, University of Maryland; and Larry Meinert, Colorado School of Mines.

Emilie Beaudon presented “The Paleoenvironmental Value of the Mineral Aerosol Record from the Oldest Tibetan Ice Core.” Emilie explained mineral dust and how it affects and is affected by the global climate system. Understanding aeolian dust can inform paleoenvironment and climate models. The oldest (>120 thousand years) non-polar ice core in the northern hemisphere was collected from the Guliya glacier in western Kulun mountains of northwestern Tibet in 2015 at the respectable altitude of 6700 m. The well-preserved ice core recorded substantial variability in mineral dust and contained at least two populations discernable as diffuse brown layers and grey dust nodules. The dust samples were subjected to a battery of analytical techniques, including thermal and inductively coupled plasma mass spectrometry analysis of trace elements, rare earth elements, and Nd and Sr isotopes; and mineralogical characterization by X-ray diffraction, and scanning electron microscopy. Dust derived from the Taklimakan desert can be discriminated from other potential source areas, prompting additional work to characterize dust from neighboring regions such as the Qaidam basin and elsewhere. *Talk length: 23 minutes*

Questions were asked by: Kori Newman, NVCC; George Helz, University of Maryland; Mark Tyra, NIST; and Maryann Malinconico, Lafayette College

President Newman adjourned the meeting at 21:41 EST.

Respectfully submitted,

Graham Lederer