Stony Brook University

GEOLOGY OPEN NIGHT

HOT ROCKS AND FROZEN ICE, AND THINGS IN BETWEEN

DR. WEISEN SHEN

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April 25, 7:30pm, Earth & Space Sciences 001

Around 60% of the world's total fresh water (which is 90% of the world's surface fresh water) is held in the ice sheet of Antarctica. If melted, the ice sheet has the potential to elevate the sea-level by 70 m. Over the past decades, signs of accelerated ice mass loss have been observed in multiple glaciers of Antarctica. Monitoring its movement and mass balance, as well as predicting its behavior in the future decades, is at the central position to maintain the sustainability of human society. In this talk, I will present some of the basic observations of the Antarctic Ice Sheet and its dynamics, and introduce a key parameter, the Earth's geothermal heat flux, to help the science community make better predictions of the Ice Sheet movement. This heat flux, generated from heat sources such as radioactive heating elements in the crust, is hard to measure directly but can be assessed by using the traveling energy of seismic waves. I will demonstrate in this talk that, by developing instruments to make such seismic observations in Antarctica, quantifying the heat from deep Earth into the ice sheet is now possible and can be used to better predict the ice behavior in the future.

Weisen Shen is an associate professor at the Department of Geosciences, SUNY-Stony Brook. He obtained Ph.D. of geophysics from the University of Colorado Boulder in 2014, and received postdoc training in Washington University in St Louis between 2015 and 2017. As the principal investigator of the South Pole seismic array, he has participated in field works in Antarctica in 2015-16 (Siple Dome, RIS/DRIS project), 17-18 (South Pole, POLENET), 23-24 and 24-25 (both at the South Pole) seasons. Currently he also serves as the co-lead of the Probing the Solid Earth and Interactions (PSE) working group of the SCAR-INSTANT program. In addition to Antarctica, he is interested in seismic tomography for general continents, especially for its deep crust. He has authored/coauthored a few papers on seismic imaging using multiple seismic observables on both regional and continental scales and is the recipient of the 2020 AGU Keiiti Aki Young Scientist Award and 2023 NSF CAREER award.