The SD Mines GEOL/GEOE/PALEO Seminar Series

presents

Oceanic lithosphere is produced by deep-seated hydrothermal cooling beneath spreading centers

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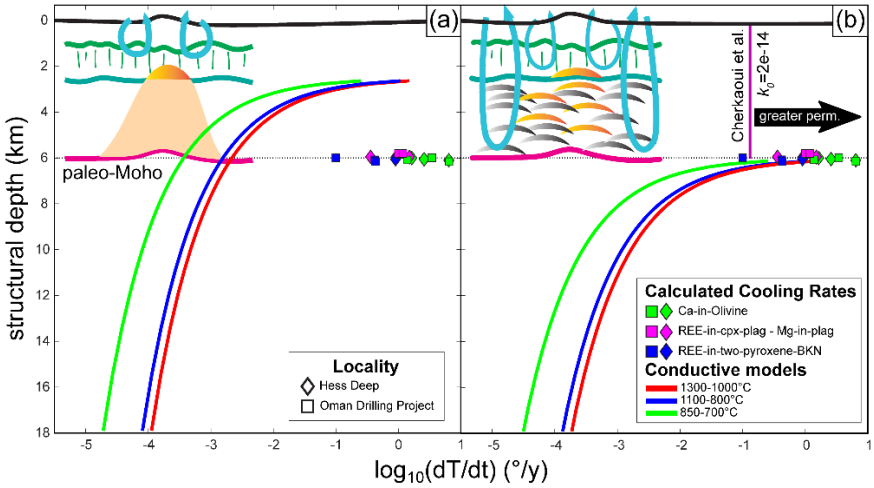
New oceanic lithosphere is produced at seafloor spreading centers, but many aspects of oceanic lithosphere formation are poorly understood. For example, the depth extent of hydrothermal cirulation beneath oceanic spreading centers is vigorously debated. Some workers argue hydrothermal circulation is restricted to the extrusive oceanic crust (as in (a) below), while others argue hydrothermal circulation extends all the way through the intrusive crust to the crust-mantle boundary (as in (b) below). These distinct interpretations imply different mechanisms for accretion of the oceanic crust, and conditions under which the oceans interact with the Solid Earth. This talk presents new thermometric results from the Samail ophiolite in Oman and the East Pacific Rise at Hess Deep. The data demonstrate that beneath seafloor spreading centers, the crust-mantle transition zone is quenched from near-magmatic temperatures by deep and efficient hydrothermal circulation, consistent with the Sheeted Sills model for accretion of oceanic crust.



Nicholas Dygert got a taste for geology from a childhood spent exploring the Olympic and Cascade mountains near his hometown of Olympia, Washington. He went on to earn a BS in Geochemistry from the University of Rochester, worked in industry for two years, and then started a PhD at Brown University. Upon graduation, Nick was awarded a Distinguished Postdoctoral Fellowship at the University of Texas at Austin. Two years later, he joined the faculty at the University of Tennessee, Knoxville. In 2019, Nick was named the Larry and Dawn Taylor Assistant Professor of Planetary Geosciences. Nick's research integrates field, experimental and model-based approaches to study dynamic processes that formed and modify the Earth, and other rocky bodies across the Solar System.

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