CRC ENERGY TRANSITION LECTURE SERIES 2023

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Interactions Between Ice Sheets and Relative Sea Levels: Lessons From Antarctica and NW Scotland

Local sea-level changes are not simply a function of global ocean volumes but also the interactions between the solid Earth, the Earth's gravitational field, and the loading and unloading of ice sheets. These processes lead to great variability in sea levels across the globe. Although these interactions can be felt at great distances, the most complex interactions are found in regions beneath the former ice sheets themselves. Efforts to better understand these interactions have brought new insights into the behavior and history of the ice sheets but also left us with many remaining questions. In this presentation, I review some of these interactions, or glacial-isostatic adjustment, with field examples from the Antarctica Peninsula and northwest Scotland.

Along the Antarctica Peninsula, small advances and retreats in the ice sheets result in measurable changes in relative sea levels that include increases in the rate of rebound or uplift and periods of transgression during the overall fall in sea levels. These changes can be used to track the behavior of the former ice sheets at a relatively fine scale. In Scotland, the rate of relative sea-level change accompanying the retreat of a large ice stream that once drained a portion of the northwestern British-Irish-Ice Sheet at the last glacial maximum. Contrasting behaviors between Antarctica and Scotland highlight how important the geologic structure beneath the former ice sheets is in determining the interactions between ice sheets and relative sea levels.

Alex Simms, PhD
UC Santa Barbara

ABOUT THE SPEAKER

Alex Simms grew up in eastern Oklahoma and after earning a BS in Geology at Oklahoma State University, pursued a PhD at Rice University in Houston, Texas. His PhD work focused on the depositional systems and Quaternary history of the Texas Gulf Coast. After a stint as an assistant professor at his alma mater in Stillwater, Oklahoma, he moved to the University of California Santa Barbara where he is a Professor of Earth science today. Alex's research focuses on the processes that shape the Quaternary history of shallow marine settings with a particular emphasis on reconstructing past records of sea-level change. He has conducted fieldwork on coastlines across the globe including Antarctica, Texas, California, and recently the UK.

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