



Tuesday, 12 July 2022



17:30 - 18:00

*Hawaii Convention Center - 304A/B*

Session/Theme

Abstract

Paleo-CO₂ reconstructions are integral to understanding the evolution of Earth system processes and their interactions given that atmospheric-CO₂ concentrations are intrinsically linked to planetary function. In this talk, we use several case studies, spanning the 3 Phanerozoic Eras, to illustrate the potential of paleo-CO₂ records to constrain the magnitude and state-dependency of equilibrium climate sensitivity, to advance our understanding of global biogeochemical cycles, to test the sensitivity of Earth System modeled atmospheric and oceanic circulation to PCO₂ over a range of climate states, and to interrogate ecosystem—CO₂—climate linkages and physiological responses to CO₂. Further advances in these areas, however, are dependent on how well we ‘know’ paleo-CO₂ estimates.

CO₂ estimates exist for much of the past half-billion years, but the degree to which the accuracy and precision of these estimates are constrained is quite variable, leading to substantial

Opportunities and Challenges in Paleo-CO₂ Reconstruction and Implications for Advancing our Understanding the Paleo-Earth System. Endowed Biogeochemistry Lecture

form.

To address these issues and to advance paleo-CO₂ reconstruction, we introduce CO₂PIP, a new community-scale project that takes a two-step approach to building the next generation Phanerozoic-CO₂ record. Collective efforts are modernizing existing terrestrial-based CO₂ estimates through additional analyses, measurements and proxy system modeling to constrain critical parameters used to estimate paleo-CO₂. A set of forward proxy system models being developed in collaboration with the CO₂ community, will provide a quantified representation of proxy sensitivities to environmental and ecophysiological conditions and processes that govern the CO₂ signals. Ultimately, statistical inversion analysis of the simulated and modernized proxy datasets will be used to revise individual CO₂ records and to build a new integrated model-data-constrained CO₂ record for the Phanerozoic.

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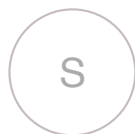
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