

School of Earth and Environmental Sciences

Colloquium Series

Dr. Stephen Pekar

Professor, Queens College, CUNY

Wednesday, March 15

12:15 – 1:30 PM

Science Building

Room C-207

Solving the mystery of high CO₂ and high ice-volume estimates during the Middle Miocene (16-13 Ma), the last time CO₂ was higher than today

Abstract: The Miocene Climatic Optimum (16.7-14.6 Ma) is the last time that atmospheric CO₂ levels were significantly higher (450-600 ppm) than today (420 ppm) making this time interval an important analog for potential future warm climates. While, paleo water temperature proxies (e.g., Mg/Ca ratios and clumped isotopes) indicate bottom water temperatures 5-8°C warmer than present, in contrast, ice volume estimates during this time are far larger than modern day based on paleoceanographic proxies (e.g., $\delta^{18}\text{O}$ paired with Mg/Ca ratios or clumped isotopes). These are incongruence with high atmospheric CO₂ levels and as well as other studies (e.g., eustatic changes based on backstripped stratigraphy from continental shelves) that show ice volume was lower during this time. This study attempts to resolve this apparent mismatch between large ice-volume estimates concomitant with high bottom water temperatures and high atmospheric CO₂ for the span between 16 and 13 Ma by taking into account higher isotopic values of seawater owing to increased evaporation effects on isotopic value of sea water ($\delta^{18}\text{O}_{\text{sw}}$) and the larger areal size of the Antarctic continent during the Middle Miocene.



****HYBRID SESSION****

Zoom link for remote attendance:

<https://us02web.zoom.us/j/84324766285?pwd=MUVMUVRPbEpXOXZLdU9UUU0lWNEdvUT09>

Meeting ID: 843 2476 6285

Passcode: 161859