



Application of Earth system models to understanding catastrophic changes in global carbon cycling at the PETM

A. Ridgwell (1), K. Panchuk (2), L. Kump (2)

(1) School of Geographical Sciences, University of Bristol, Bristol, UK, (2) Dept. of Geosciences, Penn State, University Park, PA, USA. (andy@seao2.org)

Much of the available information regarding changes in climate and global carbon cycling over the Mesozoic and Cenozoic comes from sediment cores recovered from the ocean floor. However, while forward modeling has found widespread application in interpreting terrestrial data and in better understanding how past climatic conditions might arise; it has yet to become fully accepted in helping interpret the paleoceanographic record of past marine biogeochemical cycling. Here I take the example of catastrophic global change associated with the Paleocene-Eocene thermal maximum (PETM), some 55.5 Myr ago. I argue that there is sufficient marine geologic data spanning this event to be able to meaningfully forward model the biogeochemical impacts of CO₂ and/or CH₄ release in an Earth system model, thus constraining the relationship between greenhouse forcing and climate shift recorded at this time.