

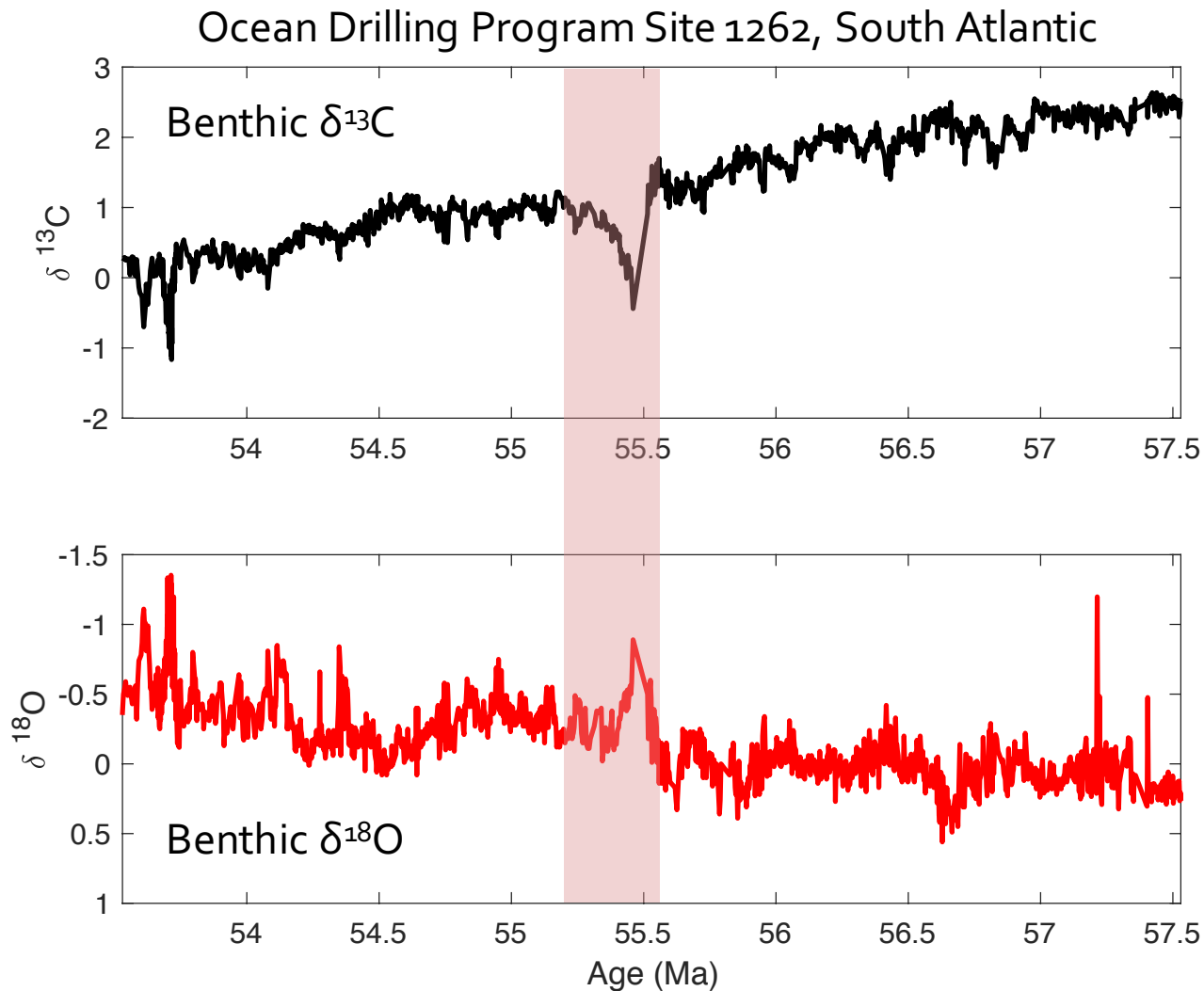
# Modeling orbital forcing to constrain carbon cycle feedbacks

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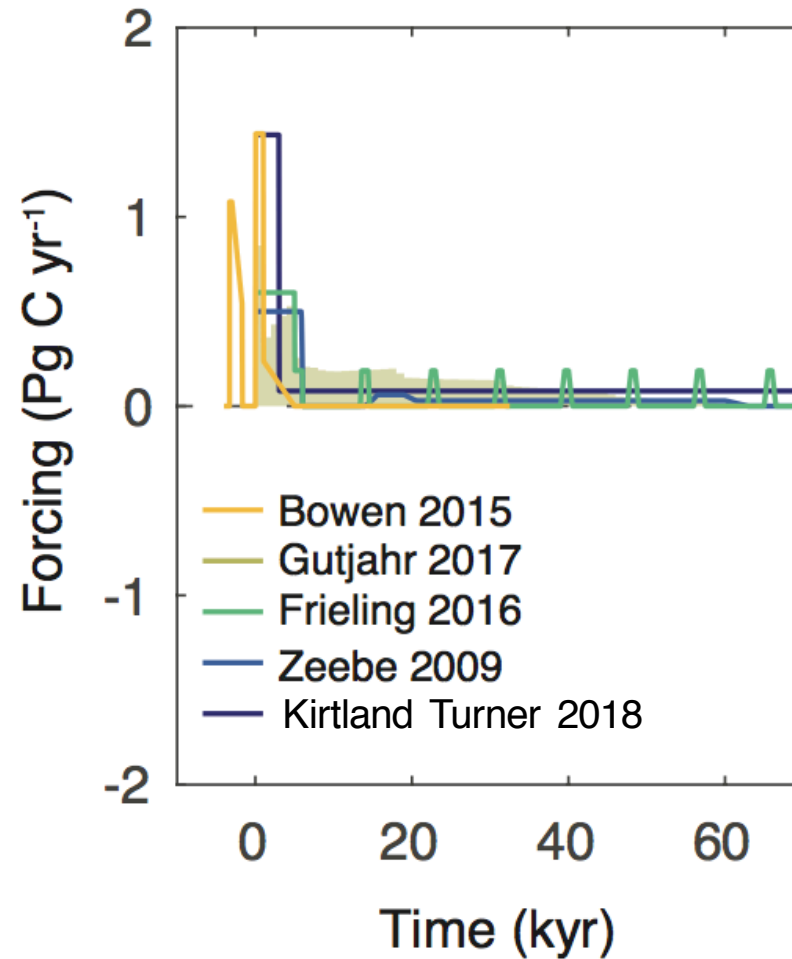
HEISING - SIMONS  
FOUNDATION

# PETM and background orbital forcing

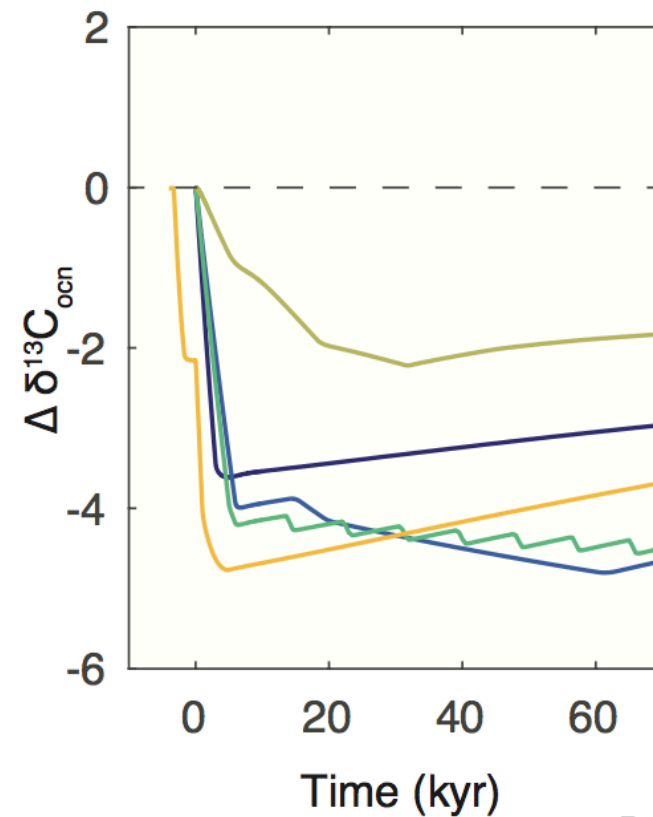
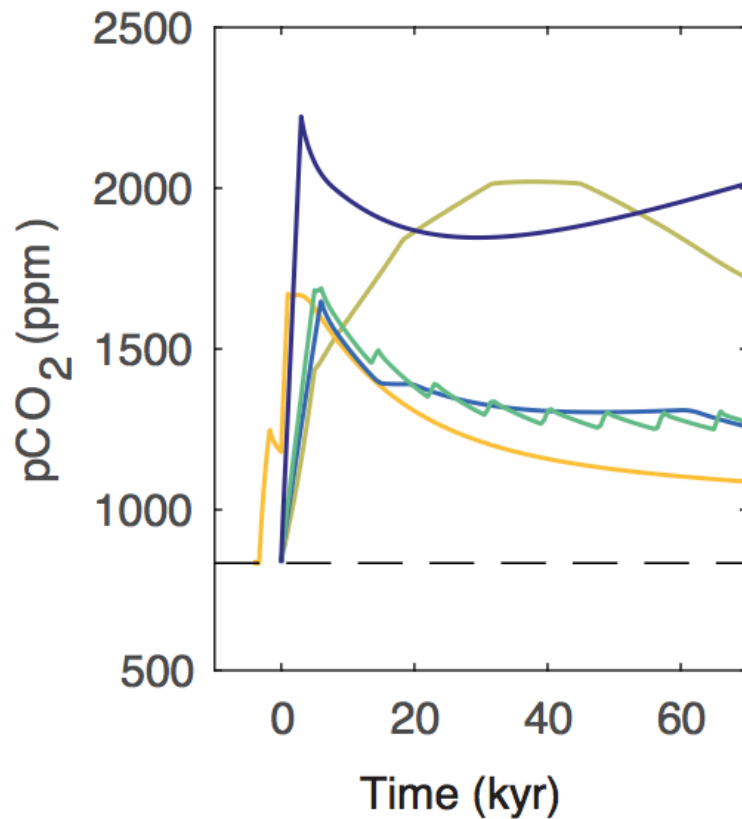


Data: Litter et al., (2014)

# Model PETM carbon injection



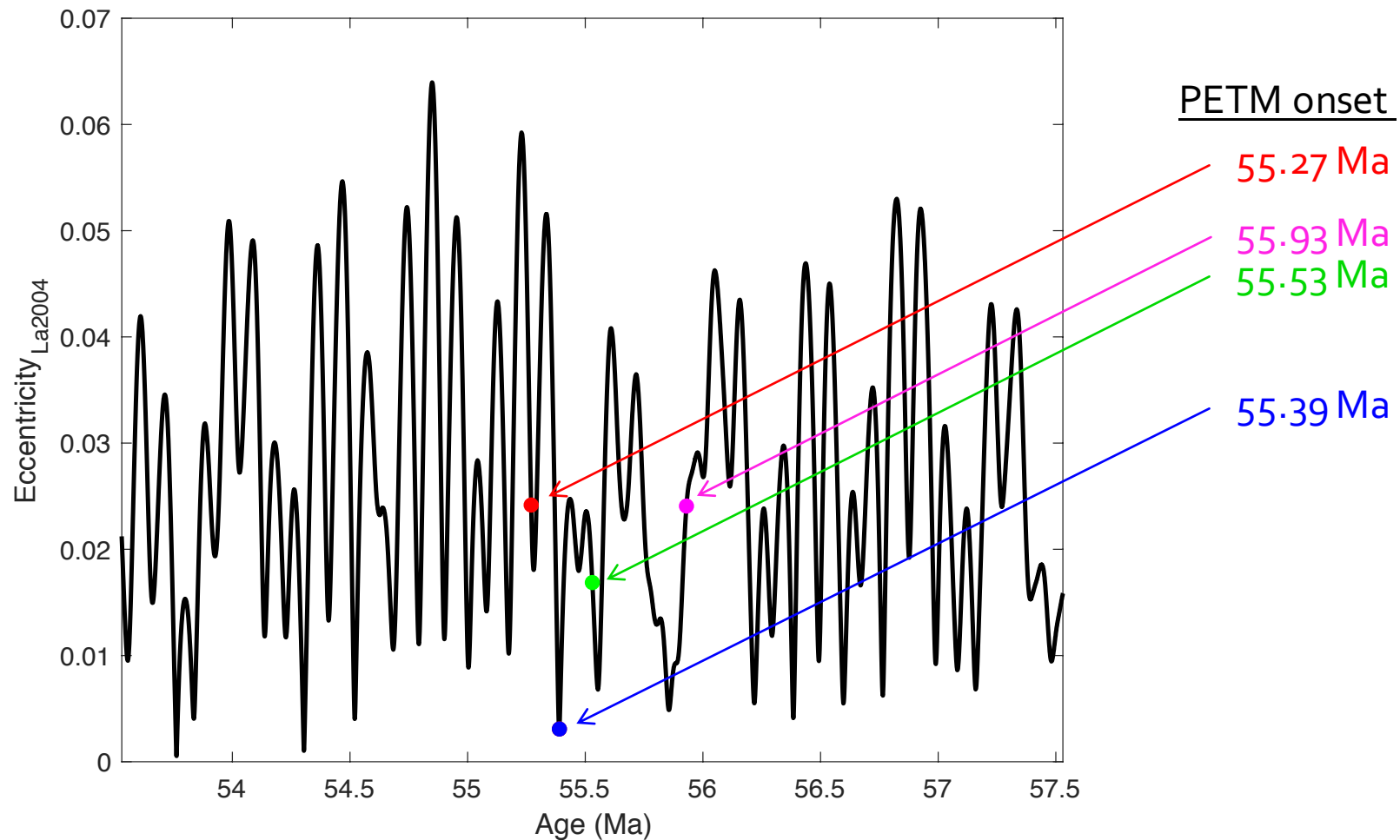
# Model PETM environmental change

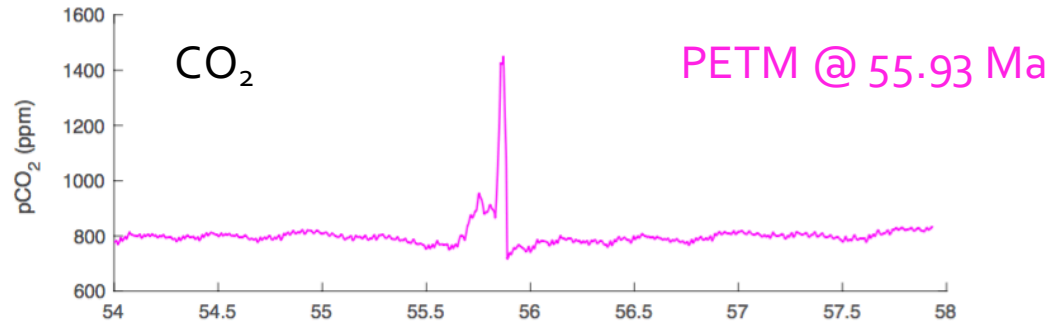


Kirtland Turner, 2018

- Bowen 2015
- Gutjahr 2017
- Frieling 2016
- Zeebe 2009
- Kirtland Turner 2018

# Orbital Forcing across the PETM





# Model PETM with orbital forcing

Model forced by La2004 orbital solution plus CO<sub>2</sub> emissions of C<sub>org</sub> (-22‰) to match a prescribed  $\delta^{13}\text{C}$  curve (black line below) at various relative timings

