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Eocene Paleoclimate: Incredible or Uncredible? Model data syntheses raise questions.

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Reconstructions of Eocene paleoclimate have pushed on the boundaries of climate dynamics theory for generations. While significant improvements in theory and models have brought them closer to the proxy data, the data themselves have shifted considerably. Tropical temperatures and greenhouse gas concentrations are now reconstructed to be higher than once thought–in agreement with models–but, many polar temperature reconstructions are even warmer than the eye popping numbers from only a decade ago. These interpretations of subtropical-to-tropical polar conditions once again challenge models and theory. But, the devil, is as always in the details and it is worthwhile to consider the range of potential uncertainties and biases in the paleoclimate record interpretations to evaluate the proposition that models and data may not materially disagree. It is necessary to ask whether current Eocene paleoclimate reconstructions are accurate enough to compellingly argue for a complete failure of climate models and theory. Careful consideration of Eocene model output and proxy data reveals that over most of the Earth the model agrees with the upper range of plausible tropical proxy data and the lower range of plausible high latitude proxy reconstructions. Implications for the sensitivity of global climate to greenhouse gas forcing are drawn for a range of potential Eocene climate scenarios ranging from a literal interpretation of one particular model to a literal interpretation of proxy data. Hope for a middle ground is found.