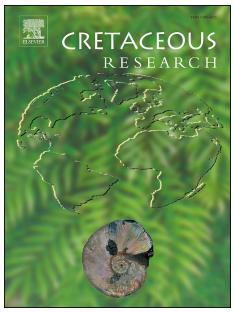
Accepted Manuscript



Climate of the Late Cretaceous North American Gulf and Atlantic Coasts

Kyle W. Meyer, Sierra V. Petersen, Kyger C. Lohmann, Ian Z. Winkelstern

PII: S0195-6671(17)30203-3

DOI: 10.1016/j.cretres.2018.03.017

Reference: YCRES 3837

To appear in: *Cretaceous Research*

Received Date: 2 May 2017

Revised Date: 15 December 2017

Accepted Date: 18 March 2018

Please cite this article as: Meyer, K.W., Petersen, S.V., Lohmann, K.C., Winkelstern, I.Z., Climate of the Late Cretaceous North American Gulf and Atlantic Coasts, *Cretaceous Research* (2018), doi: 10.1016/j.cretres.2018.03.017.

Climate of the Late Cretaceous North American Gulf and Atlantic Coasts

Kyle W. Meyer[1†], Sierra V. Petersen[1], Kyger C Lohmann[1], and Ian Z. Winkelstern[1]

[1]*Department of Earth and Environmental Sciences, University of Michigan, 1100 N. University Ave., Ann Arbor, MI, 48109, USA*

[†]*Corresponding Author, meyerkw@umich.edu*

ABSTRACT

Understanding the response of temperature to elevated atmospheric CO_2 during past greenhouse intervals such as the Late Cretaceous can constrain hypotheses of expected future warming tied to the rise of modern atmospheric CO_2 levels. Here we present new reconstructions of Gulf and Atlantic Coast coastal marine temperatures through the Late Campanian (~76 – 72 Ma) and Maastrichtian (72 Ma – 66 Ma), as determined by carbonate clumped isotope analysis of marine bivalves and gastropods. We find temperatures in the range of ~7 – 25 °C across multiple sites located between 31°N and 36°N paleolatitude, and cooler temperatures of ~3 – 14 °C at sites around 39°N paleolatitude. Temperatures agree across a variety of taxa, indicating no appreciable organism-specific vital effects. The calculated paleotemperatures are very similar to modern marine temperatures at the same locations, despite the Late Cretaceous generally being considered a warmer interval. Clumped isotope temperatures are cooler than published temperatures from a nearby site measured using the TEX_{86} paleotemperature proxy, revealing a potential warm bias in TEX_{86} temperature estimates. The best agreement between clumped isotope and TEX_{86} temperatures is achieved when using the TEX_{86}^{L} calibration over TEX_{86}^{H} or BAYSPAR calibrations.