# Coccolith based clumped isotope sea surface temperatures during the Cretaceous Thermal Maximum

* A. FERNANDEZ[1], L.M. MEJÍA[1], J. GUITIÁN-BERMEJO[1], H. ZHANG[1], H. STOLL[1], S. M. BERNASCONI[1]

[1]Geological Institute, ETH Zürich, Sonneggstrasse 5, 8092 Zürich. *correspondence: [alvaro.bremer@erdw.ethz.ch]

The Cretaceous is believed to have been much warmer than the present, with a green-house climate characterized by a lack of large scale continental ice-sheets, and with thermophilic floras and faunas present at high latitudes (e.g., champsosaurs near the poles). Temperature reconstructions from this time are of crucial societal importance because they help us understand how the Earth system behaves under elevated concentrations of atmospheric $CO_2$. However, new temperature reconstructions are needed because existing data (mostly $\delta^{18}O$ and $TEX_{86}$ based estimates) suffer from limitations that can result in inaccurate estimates. Moreover, there are large periods of time (tens of millions of years) where our knowledge comes from only a few measurements from a single proxy or where no data are available.

Here, we present clumped isotope temperatures from carefully separated coccolith size fractions from Cenomanian and Turonian aged sediments of Demera Rise (Ocean Drilling Site 1260). This site was chosen because of its high clay content, and consequently, low diagenetic potential, and because of the availability of previous paleotemperature estimates from the same sediments (TEX86 and $\delta^{18}O$ of well-preserved planktonic foraminifera). Our observations confirm that equatorial Atlantic ocean temperatures during the 'middle' Cretaceous were markedly warmer than the present, and highlight the potential of clumped isotopes and coccoliths for deep time climate reconstructions.