EGU21-12647 | vPICO presentations | SSP2.1

A terrestrial temperature peak in the first millennia after the Cretaceous-Paleogene Boundary

Gregory Price[1], Emily Dearing Crampton-Flood[2], Rhodri Jerrett[2], Sabine Lengger[1], Bart van Dongen[2], David Naafs[3], Richard Pancost[3], Aris Lempotesis-Davies[2], and Paul McCormack[1]

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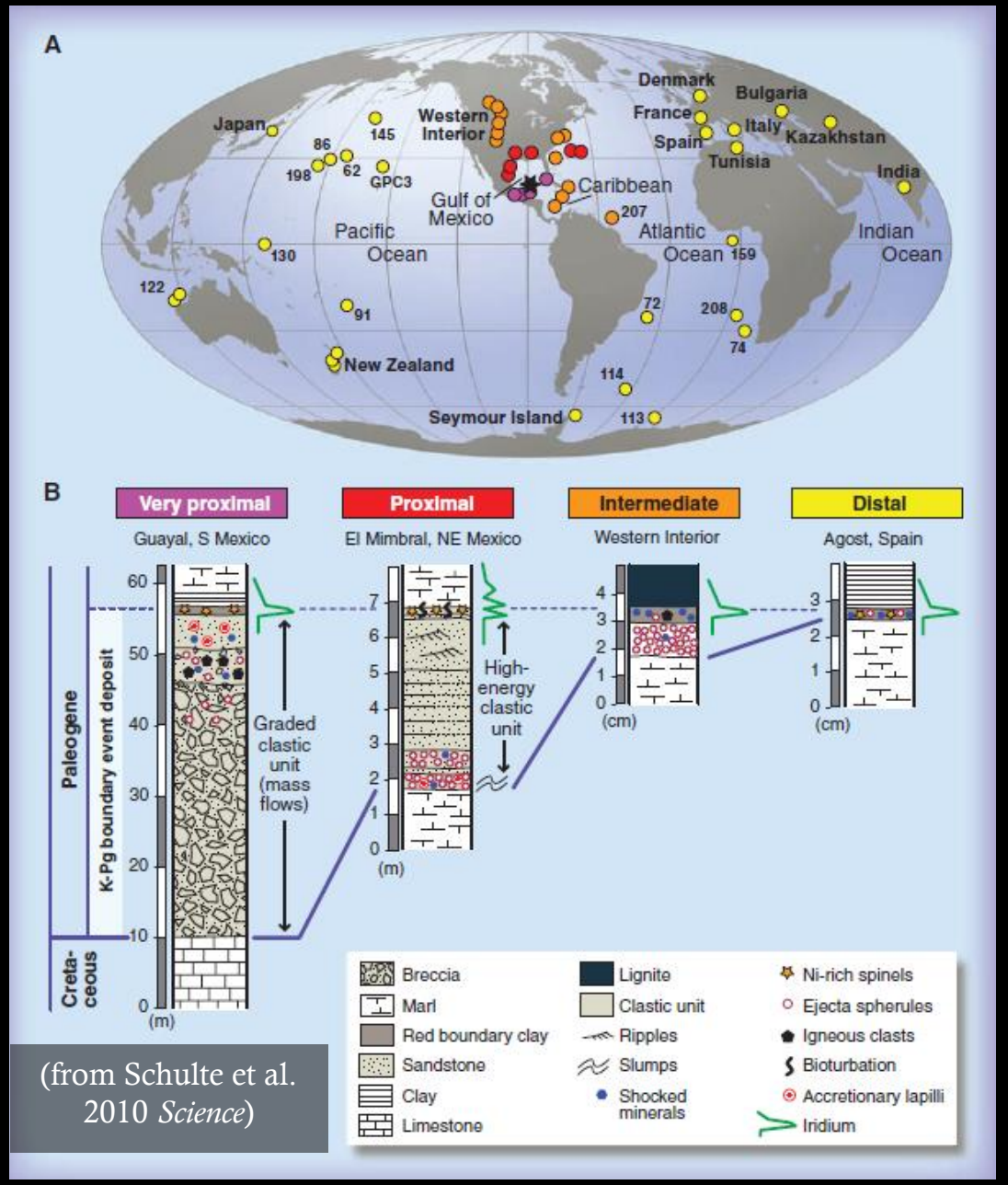
The University of Manchester

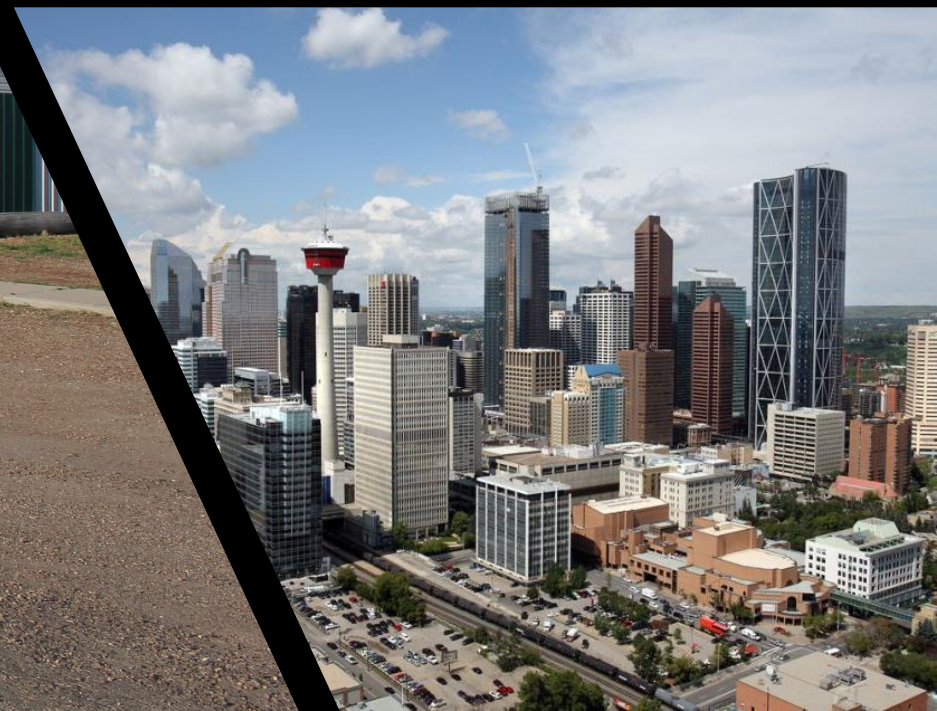
UNIVERSITY OF PLYMOUTH
School of Geography, Earth and Environmental Sciences

… or What really killed the dinosaurs ?



(from Schulte et al. 2010 *Science*)


ROYAL HOTEL

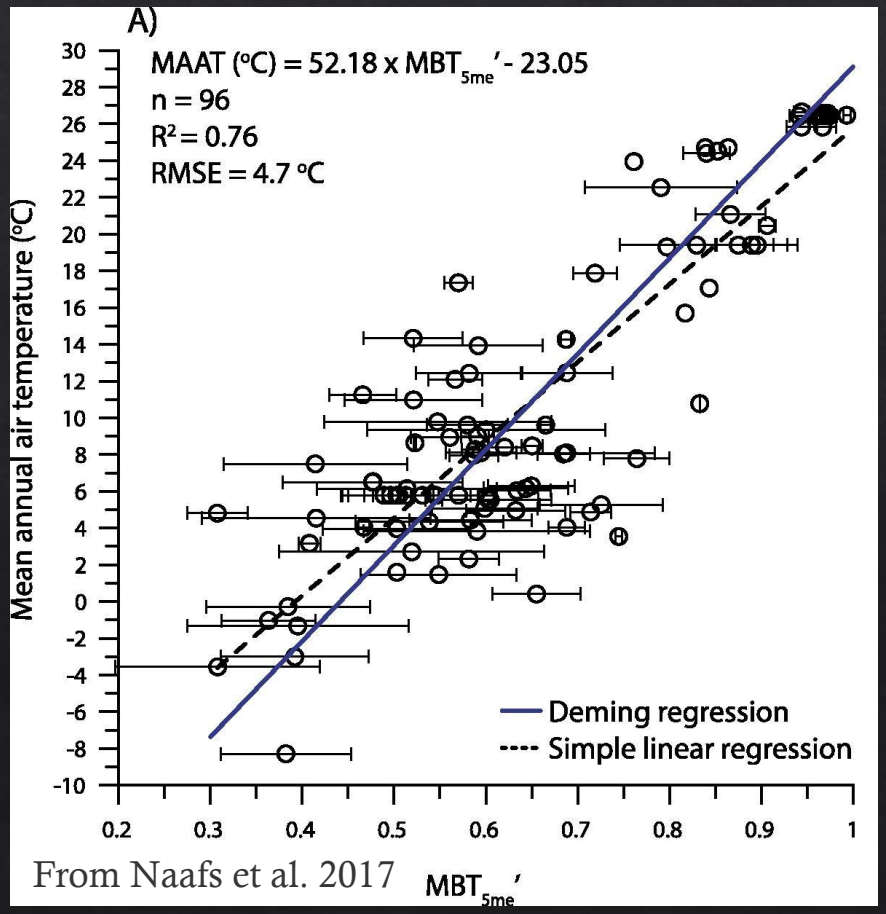



TYRANNOSAU

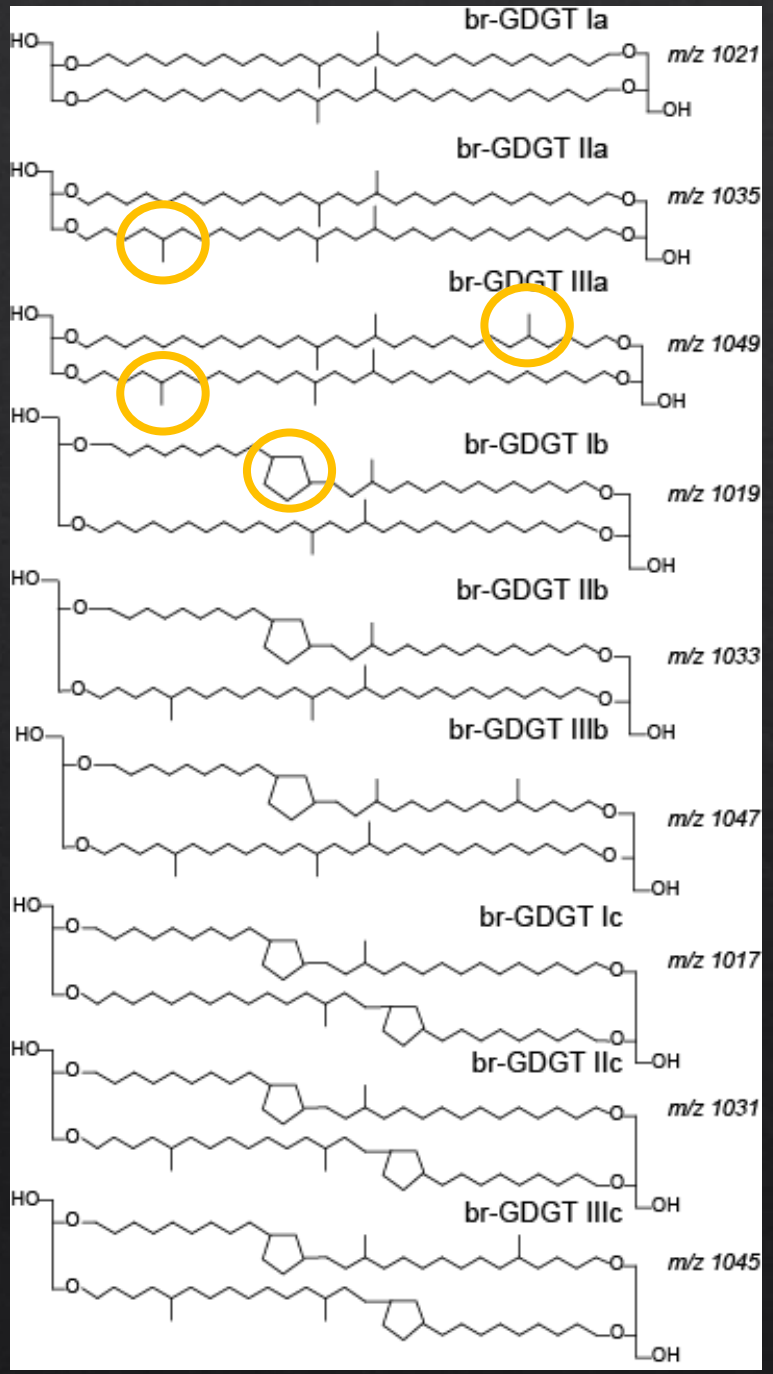

No Dinosaurs
Impact layer
Last of the Dinosaurs

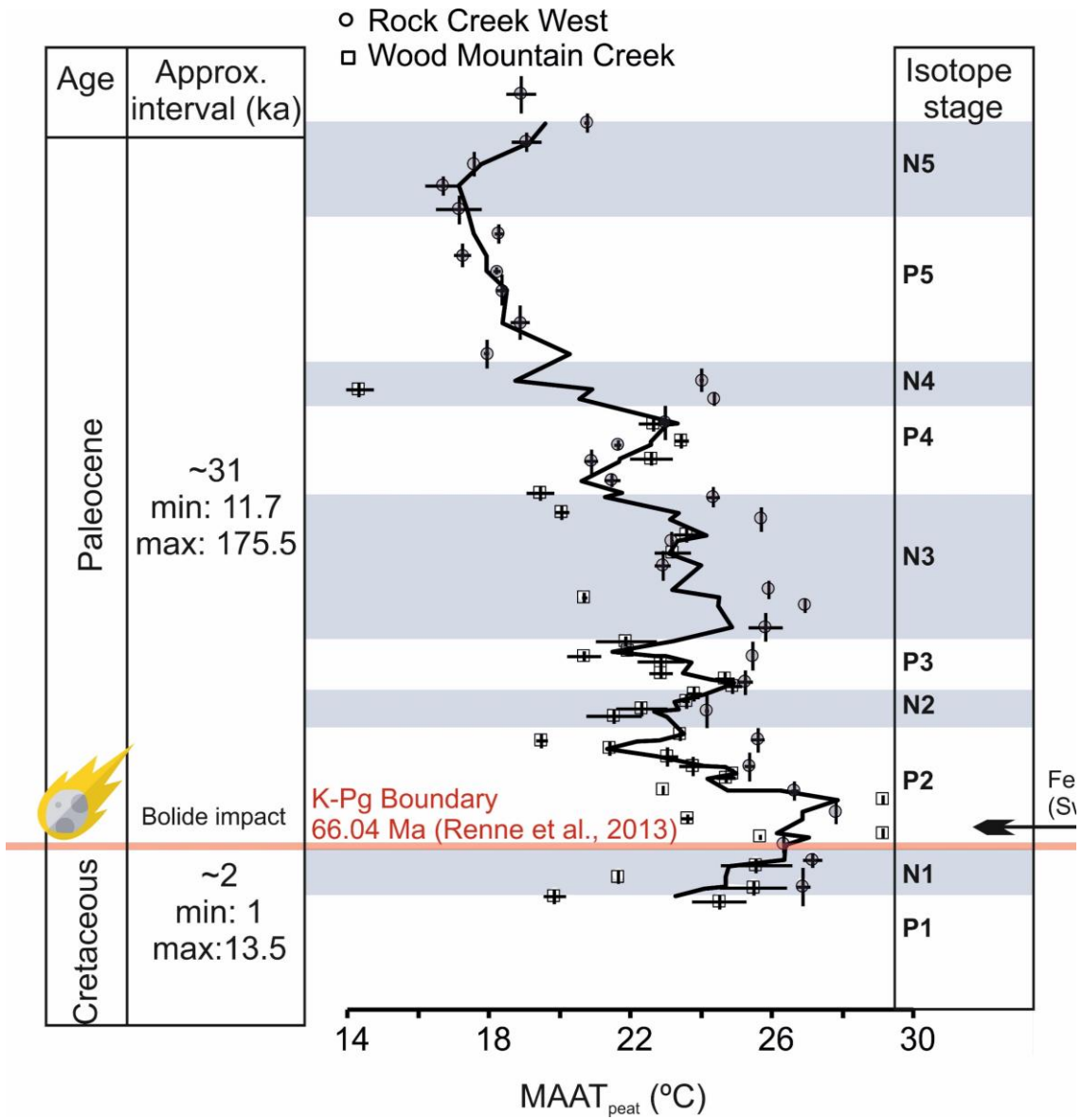
Using fossil bacteria from a past greenhouse world to help constrain Earth's climate

- Fossil bacteria (bacteria-derived branched glycerol dialkyl glycerol tetraethers, brGDGTs) in peats and whose distribution depends on the air temperature at the time
- discovered in 2000



From Naafs et al. 2017




Rock Creek West
Wood Mountain Creek
Age
Approx. interval (ka)
Isotope stage
Paleocene
Cretaceous
~31
min: 11.7
max: 175.5
~2
min: 1
max:13.5
N5
P5
N4
P4
N3
P3
N2
P2
N1
P1
Bolide impact
K-Pg Boundary
66.04 Ma (Renne et al., 2013)
14
18
22
26
30
MAAT peat (ºC)

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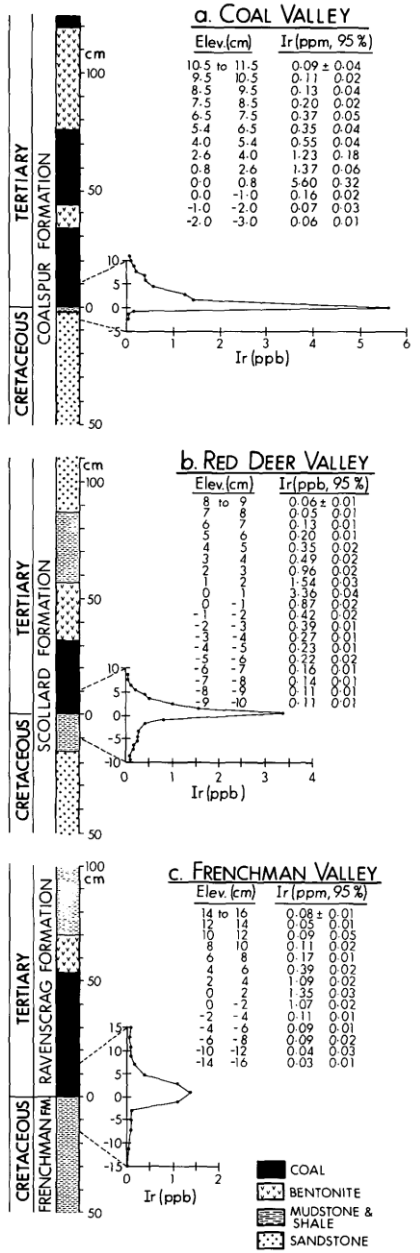
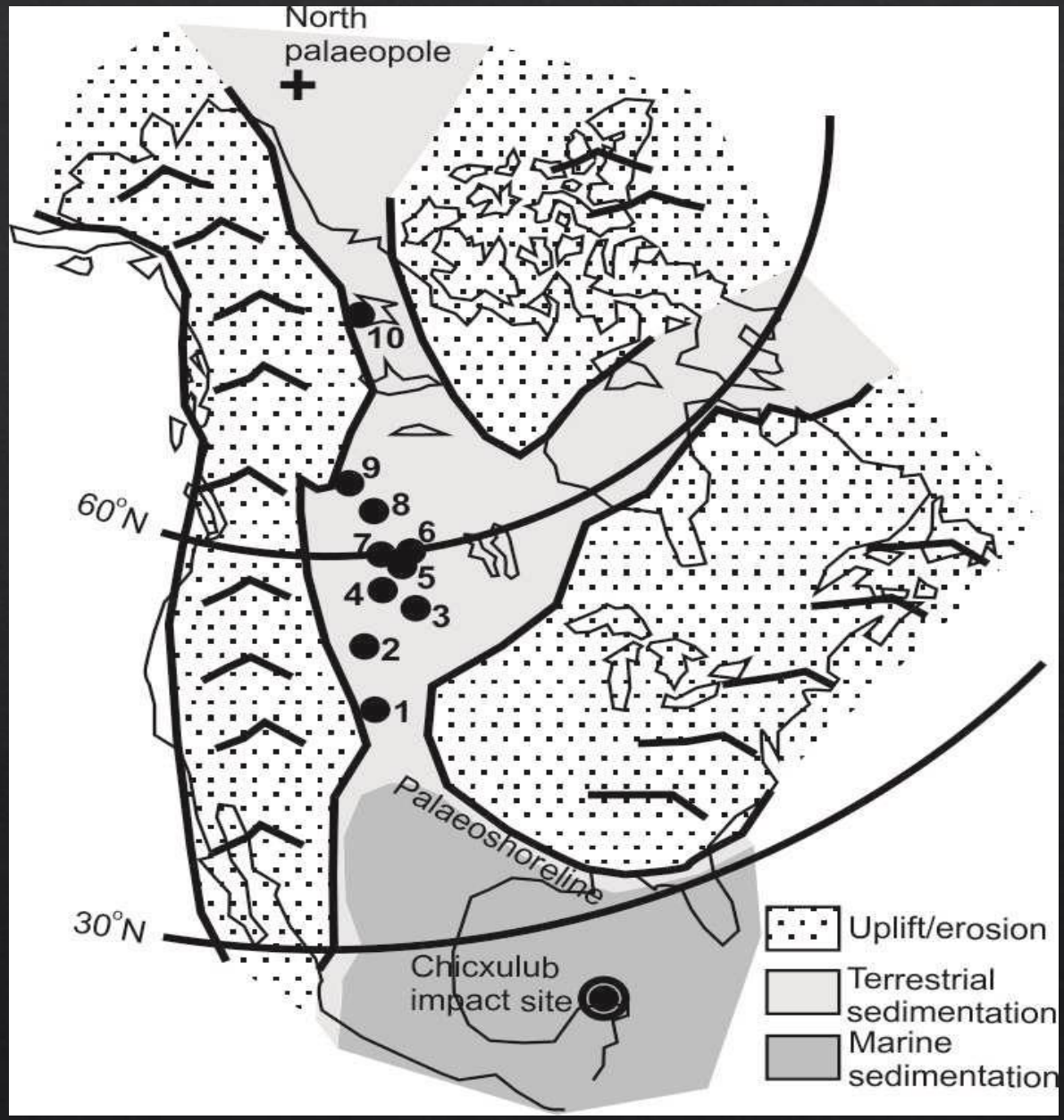


Figure 4. Iridium abundances at the Cretaceous-Tertiary boundary at three localities in western Canada.


582


North
palaeopole
10
9
8
7
6
5
4
3
2
1
60°N
30°N
Palaeoshoreline
Chicxulub
impact site
Uplift/erosion
Terrestrial
sedimentation
Marine
sedimentation

Suumary

- For the first time, brGDGT-derived terrestrial MAAT profiles for coals spanning the K-Pg boundary have been produced
  - These data test the major hypotheses for mass extinction
  - A substantial warming is seen at the across the K-Pg boundary

  - … is this the kill mechanism?
  - … was this a lethal temperature rise that wiped out the dinosaurs?

RECONSTRUCTING LATITUDINAL TERRESTRIAL TEMPERATURE GRADIENTS AT THE CRETACEOUS-PALAEOGENE (K-Pg) BOUNDARY: TESTING THE "EQUABLE EARTH" HYPOTHESIS

This is a collaboration with Dr Sabine Lengger (University of Plymouth) and Drs Rhodri Jerrett; Bart Van dongen and Emily Dearing Crampton-Flood at the University of Manchester

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