

Publications



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Open Access Article

Aging of marine organic matter during cross-shelf lateral transport in the Benguela upwelling system revealed by compound-specific radiocarbon dating

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LETTERS

Environmental precursors to rapid light carbon injection at the Palaeocene/Eocene boundary

Arno Hilde¹, Hans Beekers¹, Stefan Schindler², Steven M. Bohlen³, Colin M. Jahn⁴, James C. Zachos⁵, Gert-Jan de Boer¹, Jeroen S. Sanghaie Dorepel¹, Erica M. Crauch¹ & Gerald R. Dickens⁶

Abstract
 Rapid thermal excursions—a period lasting about 10 million years ago—on the Earth's surface led to a dramatic increase in the $\delta^{13}C$ of atmospheric CO₂ and a decrease in global surface temperatures that characterize the Cretaceous–Paleogene boundary. We present a detailed record of marine carbon isotopes from the Palaeocene/Eocene boundary, showing a rapid increase in $\delta^{13}C$ of about 1‰, which is consistent with the rapid increase in $\delta^{13}C$ of atmospheric CO₂ reported by other authors. Our results indicate that the rapid increase in $\delta^{13}C$ of atmospheric CO₂ is a direct result of the rapid increase in $\delta^{13}C$ of marine carbon isotopes, which is in turn caused by the rapid increase in $\delta^{13}C$ of marine carbon isotopes.

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John W. H. Wilson, et al.
 Science 313, 1701 (2007)
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Malga Koko Fischer, et al.
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Mid-Cretaceous (Albian-Santonian) sea surface temperature record of the tropical Atlantic Ocean

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ABSTRACT
 Paleotemperature records of the past are characterized by extreme global warmth at the end-Cretaceous and by a better understanding of the Earth's climate system opening to an exceptionally warm state. Here we applied an organic geochemical proxy (TEX_{1H}) on organic matter-rich Albian-Santonian sediments, recovered from Ocean Drilling Program Leg 201 sites 129 and 129H in the western North Atlantic, to reconstruct sea surface temperatures (SSTs) in the western equatorial Atlantic. Provided by a respective Cretaceous warming event (M2) in the western equatorial Atlantic, the reconstructed SSTs were stable with the trend -1.1 – 0.9 °C in the west of the Cretaceous thermal maximum warm oceanic regime. Cretaceous-Santonian boundary event, then established, the warm oceanic regime, characterized by averaged annual SSTs close to 32 °C, shifted up to the Santonian-Cretaceous boundary. Two pronounced peaks (approx. $+1.7$ °C) interrupt this otherwise relatively stable record, providing the first (F1) independent evidence for a marine excursion that previously has been attributed to the Santonian (1.2–1.3 °C), when cooling in west progression, resulting a mismatch in the Santonian (1.2–1.3 °C), when cooling in west progression, previously, contemporaneous with the last progressive opening of a deep water passage through the equatorial Atlantic gateway.

Keywords: Cretaceous-Santonian boundary event, paleotemperature, TEX_{1H}, Den Burg, Terschelling, Ocean Drilling Program Leg 201.

INTRODUCTION
 The geological record of the last Cretaceous holds a wide array of paleoclimatic indicators that constrain the evolution of global warmth (1). In the Cretaceous (2), Hilde et al. (3), (4), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), (26), (27), (28), (29), (30), (31), (32), (33), (34), (35), (36), (37), (38), (39), (40), (41), (42), (43), (44), (45), (46), (47), (48), (49), (50), (51), (52), (53), (54), (55), (56), (57), (58), (59), (60), (61), (62), (63), (64), (65), (66), (67), (68), (69), (70), (71), (72), (73), (74), (75), (76), (77), (78), (79), (80), (81), (82), (83), (84), (85), (86), (87), (88), (89), (90), (91), (92), (93), (94), (95), (96), (97), (98), (99), (100), (101), (102), (103), (104), (105), (106), (107), (108), (109), (110), (111), (112), (113), (114), (115), (116), (117), (118), (119), (120), (121), (122), (123), (124), (125), (126), (127), (128), (129), (130), (131), (132), (133), (134), (135), (136), (137), (138), (139), (140), (141), (142), (143), (144), (145), (146), (147), (148), (149), (150), (151), (152), (153), (154), (155), (156), (157), (158), (159), 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Figure 1. Evolution and interpretation of TEX_{1H} values over time from the Cretaceous to the Paleocene. The shaded region indicates the period of the Cretaceous thermal maximum.

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3. Cardoso, J.F.M.F. Growth and Reproduction in Bivalves: an energy budget approach. Groningen University, 207 pp.
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Refereed papers in scientific journals

1. Agawin, N.S.R., S. Rabouille, M.J.W. Veldhuis, L. Servatius, S. Hol, M.J. van Overzee & J. Huisman. Competition and facilitation between unicellular nitrogen-fixing cyanobacteria and non-nitrogen-fixing phytoplankton species. *Limnol. Oceanogr.* 52: 2233–2248.
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Courses

Course 'Introduction to Oceanography' (RUG), 26 March – 5 April. Contact person prof. dr. H.J.W. de Baar.

This annual course started already in 1931 at the Zoological Station in Den Helder, and from 1965 onwards it has been a joint course between NIOZ and the University of Groningen. In 2007 there were 21 students participating including 3 foreign students. The first part was in Groningen in February and comprised introductory lectures and workshop style lectures (mostly presented by the students themselves), followed by a written examination. The practical part coordinated by dr. H. Zemmeling was held at Royal NIOZ from 26 March-5 April. About 20 NIOZ colleagues contributed to various parts of the course. Three teams of 5-6 students were doing fieldwork in a rotating scheme between (i) two day cruises with RV *Navicula* in the Wadden Sea, (ii) two day time series biology at the jetty, and (iii) two days time series chemistry at the jetty. Another, fourth, team of 4 students pursued two parallel projects on (iv) organic contaminants and (v) marine optics. The combined datasets of observations on interacting physics, chemistry and biological primary productivity were assembled, interpreted and finally reported by the students in a suite of powerpoint presentations.

Course 'Marine Ecosystems' (RUG), 11 -29 June. Contact person prof. dr. G.J. Herndl.

During the first week, lectures were given at the Groningen University (RUG) on the composition and regulation of pelagic and benthic food webs in the different ecological provinces of the world's oceans in general and the North Sea in particular. The second and the third week were devoted to practical work performed at NIOZ in the BIO and MEE departments. The 24 students were distributed over 9 different topics. Some of the topics were more lab-oriented, others involved more extensive field work. The program comprised research on the metabolism of selected benthic organisms such as on the cold water coral, *Lophelia pertuso* and on pelagic communities. Sampling was performed in the North and Wadden Sea with the R/V *Navicula*. Underlying research questions, the methods used and the results obtained were discussed during powerpoint presentations by each group at the end of the course and reported in paper-like manuscripts.

NCK summer school 2007, 25 June-6 July. Contact person prof. dr. H. Ridderinkhof

The Netherlands Centre for Coastal Research (NCK) in which different universities and institutes participate, organized a summer school on coastal (morpho) dynamics at NIOZ. The summer school was coordinated by dr. H. Winterwerp. PhD students and some scientists from institutes participated. The summer school consisted of lectures and practical training. Lectures were given by professors and senior scientists from the associated partners of NCK. Practical training was done by executing a short field program and analyzing the data by groups of participants. In the evening general lectures on oceanographic research were given. The summer school was finished with a presentation of the different groups on the results of their data analysis.