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Trace-element deposition in the Cariaco Basin, Venezuela Shelf, under sulfate-reducing conditions: a history of the local hydrography and global climate, 20 ka to the present.

The attached copy is furnished to the author for internal non-commercial research and education use, including for instruction at the authors institution and sharing with colleagues. Other uses, including reproduction and distribution, or selling or licensing copies, or posting to personal, institutional or third party websites are prohibited. In most cases authors are permitted to post their version of the article e. The Cariaco Basin offshore Venezuela, the second largest anoxic basin after the Black Sea, Received 4 October knew intense upwelling activity and maximum primary production during the Younger Dryas. Relatively low total organic carbon TOC contents are, Available online 24 May however, observed in the sediment deposited during this interval. Previous studies have Presented by Jean Dercourt attributed these low TOC values to dilution by inorganic phases during a time of high sediment accumulation rate. The present study demonstrates that the low TOC values Keywords: Consistent with palynological Diatoms observation and biomarker analyses, the lower relative flux of OM to the sediment is Dinoflagellates related to changes in the primary producers, with a significant decrease in the contribution Geochemistry of organic-walled organisms during the Younger Dryas. These results, that highlight the Organic matter need of caution when using TOC values as paleoproductivity or paleoenvironmental indicator, underline the important role of organic-walled primary producers in the organic enrichment of sediments. Bout-Roumazielles, timothy l ucr. Introduction In the present article, we demonstrate by routine calculations that the low TOC values of the YD are not The Cariaco Basin is a small tectonic depression located primarily a product of dilution by biogenic materials. Its depth Consequently, other factors influencing OM accumulation extends to m, but the basin is largely separated from in the sediments of the Cariaco Basin through time and the Caribbean Sea by the Tortuga Bank and is only potentially accounting for these low TOC values are connected to the open sea by two shallow, ca. Due to seasonal upwelling, the modern Cariaco Basin has high primary productivity 2. Material and methods gCorg. The sediment from both offers one of the best low latitude paleoclimatic records of cores was sampled at an average interval of "10 cm the Pleistocene-Holocene Haug et al. Carbonate content was determined using a a; Peterson et al. Its Bernard Calcimeter via acid digestion. These color patterns are HNO₃ dissolution. The biogenic silica content opal was calculated content of the sediment, the organic-rich intervals being as follows: Sediments of the YD are rich in Dean, Consistent with a high abundance of clay biogenic opal and calcium carbonate Piper and Dean, minerals in the sediments of the Cariaco Basin Clayton, contributing to their light color. The accumulation et al. As shown on Fig. Geoscience " Fig. The grey area corresponds to present-day average position of the upwelling cell. The terrigenous content Terr in of 4. Maximum TOC values are weight percentage is calculated as follows: While the CaCO₃ content is cores, the results are discussed in terms of sediment age. Opal is present in the sediments of the BA to previously Haug et al. For PB and disappears after the PB. Despite slight discrepancies and is very well dated Hughen et al. The observed between the two studied cores, the values software used for the correlation was AnalySeries Paillard generally agree with those previously obtained by Aycard et al. The BA and Holocene before present a cal. The sedimentation rates intervals show similar and relatively constant values obtained by this method range from 0. The YD begins with lower which are within the typical range for the Cariaco Basin values that increase during the course of the YD, to reach a Hughen et al. Values then progressively decrease to Holocene values during the course of the 3. Though less pronounced in our These results are very similar to those obtained for core dataset than in other studies Mertens et al. Slight differences are seen between core and Dean, ; Werne et al. In particular, biogenic mineral content during the BA Fig. The we note the relatively low TOC values during the YD mean dissimilarity probably reflects the different location of the 2. Geoscience " 4. The study of Mertens et al. The higher CaCO₃ content of the sediment during the YD therefore reflects a

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lower dissolution of carbonates and more alkaline conditions in the water column. From this observation, it appears that if carbonate dilution contributes to the low TOC values observed during the YD, it is not the major cause. These data show that, during the YD, the flux of all sediment fractions increased, including the flux of OM Fig. This observation led several authors to conclude that the YD was the period of highest primary productivity in the basin over the last Modern trap studies show that mineral ballasting has Fig. Temporal variations of Cariaco sediment color and geochemical parameters. Sediment color from Hughen et al. Piper and Dean, and L. Younger Dryas, in the water column are strongly correlated Thunell BA: Consistent with sediment trap data, Fig. Piper and Dean, et L. The slope of this correlation is, however, lower PB: This lower slope might be related to the location of core PLPC on the margins of the upwelling cell, while the sediment modeling Lane-Serff and Pearce, showed that due to traps were located in the center of the cell Fig. It is third correlation line, with a slope that is lower than for worth noticing the very similar TOC patterns for both cores the rest of core PLPC Fig. This lower slope despite the relatively different biogenic mineral contents. YD compared to the rest of the interglacial. Though there is more scatter, Fig. From these data, it Fig. Cross plot of the total organic carbon content TOC and the appears that during the YD the flux of OM to the different mineral fractions of Cariaco sediments. Data only covering the sediment, though high, was lower than expected. BA to PB interval. The slight increase in YD Increased Pelet, ; Dahl et al. MAR of the different sediment components L. Computed Corg MAR of the different sources of organic carbon. Computed fraction of the TOC for the different sources of organic carbon. Geoscience " palynological and geochemical data indicate that the low isms and in particular dinoflagellates appear as an TOC values observed during the YD are not related to OM important factor controlling the TOC content of the degradation. All other things being equal, a that of carbonate plankton. Variations in the values Table change in surface producers from dinoflagellate-dominat- 2, Supplementary material take account of the higher ed to diatom-dominated should lead to a decreased OM dissolution of CaCO₃ during the BA, PB and Late Holocene content in the sediment, a mechanism that Tyson Mertens et al. This simple scheme, during the Holocene, despite quasi absence of opal in the however, can be complicated by selective degradations or sediment during this interval Fig. Though this model is dissolutions occurring in the water column. In the only indicative, the results are consistent with biomarker Cariaco Basin, diatoms are dominant during periods of data of Dahl et al. If organic-walled organisms nate during non-upwelling seasons Ferraz-Reyes, The recent quantitative and qualitative export of organic carbon to the palynological study performed by Mertens et al. It is gives support to this hypothesis. Despite very good therefore tempting to consider that the OM deposited in preservation, the concentration and MAR of dinoflagellate high productivity environments mainly derives from cysts markedly decrease during the YD Mertens et al. The present study of the sediments of the Cariaco b. Conversely, the PB is marked by an increase in cyst Basin however shows that the contribution of OM derived concentration, despite a lower preservation of very from organic-walled organisms is far from negligible and sensitive cysts Mertens et al. Such picture of the dinoflagellate biomass that existed in the conclusion is consistent with the observation of a water column Head, ; Zonneveld et al. From a high-resolution implies that other organisms contribute to the flux of OM biomarker study, Dahl et al. This conclusion is also supported by marked decrease of dinoflagellates compared to diatoms during the YD, followed by a marked increase at the Table 2 transition to the PB. Geoscience " numerous studies that have shown that marine snow often ciaire. Lille 1 University, p. Indirect climatic control of opal Alldredge et al. Reconstructing the phytoplank- ton community of the Cariaco Basin during the Younger Dryas cold ated with diatoms prior to settling in the water column. In event using chlorin steryl esters. La pyrolyse Rock-Eval et ses et al. Estudio del fitoplancton en la Cuenca Tuy" Cariaco, nant in the formation of very organic-rich sediments and Venezuela. The formation of organic-rich sediment is now R. Biogenic fluxes in the Cariaco Basin: Part I 50, " The sediments of the Cariaco B. Composition and degrada- tion of marine particles with different settling velocities in the Basin, an apparently simple system with high surface northwestern Mediterranean Sea. Organic-walled phytoplank- Head, M. Modern dinoflagellate cysts and their biological

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affini- ton was prominent during the Proterozoic and most of the ties. Principles Phanerozoic; the development of phytoplankton with and Applications. The since the major rise of diatoms during the Tertiary Katz nature of varved sedimentation in the Cariaco Basin, Venezuela, and et al.

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Chapter 2 : Cariaco Basin - Wikipedia

Get this from a library! Trace-element deposition in the Cariaco Basin, Venezuela shelf, under sulfate-reducing conditions: a history of the local hydrography and global climate, 20 ka to the present.

The Cariaco Basin is an east-west trending pull-apart basin [1] located on the continental shelf off the eastern coast of Venezuela. Bacteria inhabit both the oxic and anoxic portions of the water column, with a maximum around the interface where oxygen disappears. As such unique location, the Cariaco Basin has been the site of a variety of studies since the mids. Since , an international Venezuela and United States program has expanded the research in the basin. The CARIACO Carbon Retention in a Colored Ocean; program consists of a time series station in the eastern deep of the basin which is visited on a monthly basis to collect hydrographic, nutrient and primary productivity measurements. A suite of other measurements, including a sediment trap mooring, microbiological studies and current measurements are also conducted at this site. Response to upwelling and implications for vertical export. Volume 2 - Edited by D. Variability in the mean latitude of the Atlantic Intertropical Convergence Zone as recorded by riverine input of sediments to the Cariaco Basin Venezuela. Palaeogeography Palaeoclimatology Palaeoecology 1: Late Quaternary stratigraphy and sedimentation at site , Cariaco Basin Venezuela. Palaeogeography, Palaeoclimatology, Palaeoecology , Trace-element deposition in the Cariaco Basin under sulfate reducing conditionsâ€™a history of the local hydrography and global climate, 20 ka to the present. Alkenone unsaturation estimates of sea-surface temperatures at site over a full glacial cycle. A highâ€™resolution late Quaternary upwelling record from the anoxic Cariaco Basin, Venezuela, Paleooceanography 6, 99â€™ Neotropical vegetation response to rapid climate changes during the last glacial period: Quaternary Research 69, Reconstructing the history of marine productivity of the Cariaco Basin during the Marine Isotope Stages 3 and 4 using organic-walled dinoflagellate cysts. Paleooceanography 23, PA, doi: Journal of Quaternary Science 24 2 , A significant source of mid-water organic carbon production. Continental Shelf Research 24, Organic carbon flux in an anoxic water column: Journal of Foraminiferal Research 33,

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Trace-element deposition in the Cariaco Basin, Venezuela shelf, under sulfate-reducing conditions - A history of the local hydrography and global climate, 20 Ka to the present.

Includes bibliographical references and index. Summary In a compact but comprehensive and clear narrative, this book explores the First World War from a genuinely global perspective. Putting a human face on the war, William Kelleher Storey takes into account individual decisions and experiences as well as environmental and technological factors such as food, geography, manpower, and weapons. He argues that the war profoundly changed the ways in which people imagined the landscape around them and thought about technology and the environment. Before the war, Europe and its colonies generally regarded industrial technology as an instrument of modernity; the landscape existed to be conquered, divided, and ruled. During and after the war, the costs of conquest became much higher, raising significant doubts about the value of progress. Soldiers experienced profound personal degradation, physical injuries, and mental collapse in the midst of nightmarish, technologically induced environmental conditions, which they vividly remembered when they formed new identities in the postwar world. Hurrah for William Storey. Capitalizing on the insights of environmental and technological history, he has retold the story of World War I in a fresh and provocative way. By highlighting the role of nature and machines in that most awful conflict, his story helps us understand wars of today as well as those of the past. Refined aircraft, rain and rats, malnutrition, poignant flickers of imagination in protest: Storey looks at the environmental and technological factors that played a globally significant role in the unfolding of World War I. He contends that the war fundamentally changed the ways in which people took in their surroundings and the manner in which we relate to machines. Before the war, technology, from the viewpoint of industry, was part of the modern age--there to be harnessed. But once technology advanced the tools of war, the results of conquest become greater than anyone had experienced or imagined. A good choice for college students. Library Journal This narrative history of the Great War will better inform general readers concerning the causes and effects of the conflict, which continues to shape the destinies of millions of people across the world Storey offers some fresh perspectives that make this survey interesting and useful This is a well-written, easily digestible examination of a seminal conflict. The most important global dimension of the war was its consequences. There are sections specifically about the environment and technologies, and Storey weaves references to them throughout his narrative It offers original perspectives on aspects of the war that are passed over too briefly in other books, such as the experiences of common soldiers and of women and the contribution of Africans to the war. It will prove valuable for undergraduate courses in twentieth-century world and European history. This is an useful work for anyone interested in the First World War, and a particularly valuable one for those lacking much prior knowledge of the conflict, and as a recommended reading in a modern history course. The Nymas Review Genre.