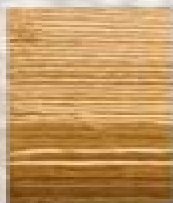


Isotopes in Palaeoenvironmental Research

Volume 10

Edited by
Melanie J. Leng



Isotopes In Palaeoenvironmental Research

Developments In Paleoenvironmental Research

VM Jensen

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Isotopes In Palaeoenvironmental Research Developments In Paleoenvironmental Research:

Isotopes in Palaeoenvironmental Research Melanie J. Leng, 2006-01-27 This volume is intended to show how stable isotopes can be applied to understanding the palaeoenvironment There are chapters on the interpretation of isotopes in water tree rings bones and teeth lake sediments speleothems and marine sediments Crucial to the understanding of the environmental signal contained within the isotope composition of different materials is to gain more information about how rainfall isotope compositions are determined by climate Chapter 1 Darling et al describes O H and C stable isotope compositions in the modern day water and aqueous carbon cycles to provide a framework for the interpretation of these isotopes in the past The chapter on the water cycle divides naturally into a number of sections The starting point precipitation is especially important because it is the precursor to which most O and H isotope proxy studies are attempting to relate While much is understood about the isotope systematics of precipitation largely owing to the existence of the IAEA WMO Global Network for Isotopes in Precipitation GNIP important questions remain to be answered in relation to the isotope temperature gradients of past climatic conditions The chapter describes the three reservoirs of water sustaining all terrestrial proxies soil and vadose zone moisture groundwater and surface waters In each reservoir isotope effects intervene to modify to a greater or lesser extent the isotope signature of antecedent precipitation groundwaters are least affected and surface waters the most

Isotopes in Palaeoenvironmental Research Melanie J. Leng, 2006-03-09 This thorough reference shows how stable isotopes can be applied to understanding the palaeoenvironment with chapters on the interpretation of isotopes in water tree rings bones and teeth lake sediments speleothems and marine sediments The book offers detailed advice on calibration including a multi proxy approach using isotope signals from different materials or combined with other palaeoenvironmental techniques to enhance the reliability of readings

Applications of Paleoenvironmental

Techniques in Estuarine Studies Kaarina Weckström, Krystyna M. Saunders, Peter A. Gell, C. Gregory Skilbeck, 2017-02-13 The aim of this edited volume is to introduce the scientific community to paleoenvironmental studies of estuaries to highlight the types of information that can be obtained from such studies and to promote the use of paleoenvironmental studies in estuarine management Readers will learn about the the application of different paleoecological approaches used in estuaries that develop our understanding of their response to natural and human influences Particular attention is given to the essential steps required for undertaking a paleoecological study in particular with regard to site selection core extraction and chronological techniques followed by the range of indicators that can be used A series of case studies are discussed in the book to demonstrate how paleoecological studies can be used to address key questions and to sustainably manage these important coastal environments in the future This book will appeal to professional scientists interested in estuarine studies and or paleoenvironmental research as well as estuarine managers who are interested in the incorporation of paleoenvironmental research into their management programs

Earth Surface Processes and Environmental

Changes in East Asia Kenji Kashiwaya, Ji Shen, Ju Yong Kim, 2015-06-11 This book examines relationships between climate hydrological changes and other phenomena including land use and natural disasters during the Holocene and recent past. In particular, periods of rapid climatic shifts such as global warming and global cooling are examined through paleohydrological and other studies of various lake catchment systems in East Asia from Mongolia in the north to Taiwan in the south. A number of different research techniques are used in the work presented here, including sediment analysis and optically stimulated luminescence dating, and the reader learns how the lake catchment system functions as a proxy observatory for past and present environmental monitoring. The lake catchments studied by the authors of this volume are under similar climatic conditions, i.e. under the East Asia monsoon, with some systematic difference in climatic factors. Both proxy and observation data are available for the surrounding countries. Provisions against natural disasters that are related to climate hydrological events and readers will see how present instrumental observation data can be connected to past proxy data. Sediment information in the system.

Encyclopedia of Quaternary Science, 2006-11-24 The quaternary sciences constitute a dynamic multidisciplinary field of research that has been growing in scientific and societal importance in recent years. This branch of the Earth sciences links ancient prehistory to modern environments. Quaternary terrestrial sediments contain the fossil remains of existing species of flora and fauna and their immediate predecessors. Quaternary science plays an integral part in such important issues for modern society as groundwater resources and contamination, sea level change, geologic hazards, earthquakes, volcanic eruptions, tsunamis, and soil erosion. With over 360 articles and 2,600 pages, many in full color, the Encyclopedia of Quaternary Science provides broad ranging up to date articles on all of the major topics in the field. Written by a team of leading experts and under the guidance of an international editorial board, the articles are at a level that allows undergraduate students to understand the material while providing active researchers with the latest information in the field. Also available online via ScienceDirect 2006 featuring extensive browsing, searching, and internal cross referencing between articles in the work, plus dynamic linking to journal articles and abstract databases, making navigation flexible and easy. For more information, pricing options, and availability, visit www.info.sciencedirect.com. 360 individual articles written by prominent international authorities encompassing all important aspects of quaternary science. Each entry provides comprehensive in depth treatment of an overview topic and is presented in a functional, clear, and uniform layout. Reference section provides guidance for further research on the topic. Article text supported by full color photos, drawings, tables, and other visual material. Writing level is suited to both the expert and non expert.

Quaternary Environmental Change in the Tropics Sarah E. Metcalfe, David J. Nash, 2012-08-24 The global climate changes that led to the expansion and contraction of high latitude ice sheets during the Quaternary period were associated with equally dramatic changes in tropical environments. These included shifts in vegetation zones, changes in the hydrology and ecology of lakes and rivers, and fluctuations in the size of mountain glaciers and sandy deserts. Until recently it was thought that such changes were

triggered by fluctuations in the distribution of polar ice cover Now there is increasing recognition that the tropics themselves have acted as drivers of global climate change over a range of timescales The aim of Quaternary Environmental Change in the Tropics is to provide a synthesis of the changes that occurred in tropical terrestrial and marine systems during the Pleistocene and Holocene complementing data derived reconstructions with output from state of the art climate models It is targeted at final year undergraduate students and research specialists but will provide an introduction to tropical Quaternary research for a variety of other readers

Encyclopedia of Quaternary Science Cary Mock,2013-03-25 The second revised edition of the Encyclopedia of Quaternary Science Four Volume Set provides both students and professionals with an up to date reference work on this important and highly varied area of research There are lots of new articles and many of the articles that appeared in the first edition have been updated to reflect advances in knowledge since 2006 when the original articles were written The second edition will contain about 375 articles written by leading experts around the world This major reference work is richly illustrated with more than 3 000 illustrations most of them in colour Research in the Quaternary sciences has advanced greatly in the last 10 years especially since topics like global climate change geologic hazards and soil erosion were put high on the political agenda This second edition builds upon its award winning predecessor to provide the reader assured quality along with essential updated coverage Contains 357 broad ranging articles 4310 pages written at a level that allows undergraduate students to understand the material while providing active researchers with a ready reference resource for information in the field Facilitates teaching and learning The first edition was regarded by many as the most significant single overview of Quaternary science ever yet Editor in Chief Scott Elias has managed to surpass that in this second edition by securing even more expert reviews whilst retaining his renowned editorial consistency that enables readers to navigate seamlessly from one unfamiliar topic to the next

Stable Isotope Forensics Wolfram Meier-Augenstein,2017-09-28 The number one guide internationally to all aspects of forensic isotope analysis thoroughly updated and revised and featuring many new case studies This edition of the internationally acclaimed guide to forensic stable isotope analysis uses real world examples to bridge discussions of the basic science instrumentation and analytical techniques underlying forensic isotope profiling and its various technical applications Case studies describe an array of applications many of which were developed by the author himself They include cases in which isotope profiling was used in murder and drugs related crime investigations as well as for pharmaceutical and food authenticity control studies Updated with coverage of exciting advances occurring in the field since the publication of the 1st edition this 2nd edition explores innovative new techniques and applications in forensic isotope profiling as well as key findings from original research More than a simple update though this edition has been significantly revised in order to address serious problems that can arise from non comparable and unfit for purpose stable isotope data To that end Part II has been virtually rewritten with greater emphasis now being placed on important quality control issues in stable isotope analysis in general and forensic stable

isotope analysis in particular Written in a highly accessible style that will appeal to practitioners researchers and students alike Illustrates the many strengths and potential pitfalls of forensic stable isotope analysis Uses recent case examples to bridge underlying principles with technical applications Presents hands on applications that let experienced researchers and forensic practitioners match problems with success stories Includes new chapters devoted to aspects of quality control and quality assurance including scale normalisation the identical treatment principle hydrogen exchange and accreditation Stable Isotope Forensics 2nd Edition is an important professional resource for forensic scientists law enforcement officials public prosecutors defence attorneys forensic anthropologists and others for whom isotope profiling has become an indispensable tool of the trade It is also an excellent introduction to the field for senior undergraduate and graduate forensic science students All students of forensic criminology and all law enforcement officers responsible for the investigation of serious crime will want to study this book Wolfram highlights the value and future potential of Stable Isotope Forensics as an emerging powerful tool in the investigation of crime Roy McComb Deputy Director Specialist Investigations National Crime Agency NCA UK A single author text in these days is rare and the value of this book lies in the dedication and experience of the author which is evident in the clarity of prose the honest illustration of evidence and the realistic practical application of the subject it makes this a text of genuine scientific value Prof Dame Sue Black PhD DBE OBE FRSE Leverhulme Research Centre for Forensic Science University of Dundee UK The book provides an excellent vivid and comprehensible introduction into the world of stable isotope science and analytics Compared to the first edition the aspects of quality control and assurance in the analysis of stable isotopes in general and forensic application in particular are now taking much more room This allows the book to serve the target groups students academic professionals and practitioners and serves as a solid resource of basic and applicable information about the strengths and potential pitfalls of the application of stable isotope signatures The present high quality book shows the great potential of stable isotopes and is a must for everyone interested in isotope forensics M E B ttcher U Flenker Isotopes in Environmental and Health Studies January 2018 A list of errata is available at <http://booksupport.wiley.com>

Natural Methane Emissions in a Changing Arctic - Implications for Climate and Environment Karin Andreassen, Jochen Knies, Susanne Liebner, Andrew Jonathan Hodson, Carolyn

Ruppel, 2024-11-06 Natural emissions of methane have received much attention over the last decade due to the documented increase of methane in the atmosphere and high global warming potential relative to CO₂ Over the past few decades the Arctic has been warming approximately four times faster than the rest of the planet driving a pressing need to assess the current and future vulnerability of various natural methane sources In the Arctic vast amounts of methane is stored in soils and permafrost or is being generated as permafrost thaw continues Additionally there are large stores of methane in Arctic gas hydrates a solid form of concentrated methane and water and in numerous settings including deep water marine areas on continental shelves hosting relict subsea permafrost and gas hydrate in and beneath onshore permafrost and likely

beneath the Greenland Ice Sheet Continued climate warming is making methane leakage more likely Even deeper conventional gas reservoirs could leak methane as the overlying permafrost degrades

Arctic Ice Shelves and Ice Islands Luke Copland,Derek Mueller,2017-05-30 This book provides an overview of the current state of knowledge of Arctic ice shelves ice islands and related features Ice shelves are permanent areas of ice which float on the ocean surface while attached to the coast and typically occur in very cold environments where perennial sea ice builds up to great thickness and or where glaciers flow off the land and are preserved on the ocean surface These landscape features are relatively poorly studied in the Arctic yet they are potentially highly sensitive indicators of climate change because they respond to changes in atmospheric oceanic and glaciological conditions Recent fracturing and breakup events of ice shelves in the Canadian High Arctic have attracted significant scientific and public attention and produced large ice islands which may pose a risk to Arctic shipping and offshore infrastructure Much has been published about Antarctic ice shelves but to date there has not been a dedicated book about Arctic ice shelves or ice islands This book fills that gap

Canadian Journal of Forest Research ,2012

Integrating Conservation Biology and Paleobiology to Manage Biodiversity and Ecosystems in a Changing World G. Lynn Wingard,Chris Schneider,Gregory P. Dietl ,Damien Fordham, Policy makers and resource managers must make decisions that affect the resilience and sustainability of natural resources including biodiversity and ecosystem services However these decisions are often based on evidence or theory derived from highly altered systems and over short time periods of low magnitude environmental and climatic change Because natural systems change and evolve across multiple timescales from instantaneous to millennial long term understanding of how past life has responded to perturbations can inform resource managers By using these natural laboratories of the past conservation paleobiology and paleoecology provide the framework necessary to anticipate and plan for future changes The goal of this Research Topic is to heighten awareness among conservation and restoration practitioners to the value and applications of long term perspectives provided by conservation paleobiology and paleoecology Most conservation studies focus on systems already impacted by anthropogenic change these studies would benefit from paleontological data through expanded temporal scales identification of baselines and an understanding of how organisms have responded to past changes However resource management decisions rarely include input from paleontologists and paleoecological research is rarely incorporated into conservation decision making We seek to bridge this research implementation gap by highlighting the application of paleoecological data to issues such as biodiversity dynamics extinction risks and resilience to perturbations among other topics We hope to foster new cross disciplinary synergies by encouraging conservation scientists and managers to collaborate with paleontologists to improve conservation decision making and by increasing awareness among paleontologists to the needs of the resource management community This Research Topic will provide a forum for both the paleontological and resource management communities to exchange ideas that will enhance restoration and conservation decision making We invite papers on conceptual advances reviews of

specific topics to guide efforts in research or practice case studies of successful applications articles describing datasets with applied value and perspective papers summarizing a body of paleontological research with relevance to the resource management community Topics can include but are not limited to Responses of species communities and ecosystems to perturbations Strategies to achieve the direct integration of paleobiology and paleoecology into on ground resource management Identifying baselines and reference conditions Increasing the robustness of forecasting models through the incorporation of paleontological data Identifying key species interactions and other phenomena as indicators of impending change New methodologies analytical tools and or proxies in the application of paleontological data to conservation and restoration practice Lynn Wingard Damien Fordham and Greg Dietl have no conflicts of interest Chris Schneider has a potential conflict of interest where manuscripts pertain to stakeholders in the petroleum industry as she is an independent contractor in the Alberta Oil Sands mining area

Stable Isotopes as Indicators of Ecological Change, 2011-09-21 The 20th century has experienced environmental changes that appear to be unprecedented in their rate and magnitude during the Earth's history For the first time Stable Isotopes as Indicators of Ecological Change brings together a wide range of perspectives and data that speak directly to the issues of ecological change using stable isotope tracers The information presented originates from a range of biological and geochemical sources and from research fields within biological climatological and physical disciplines covering time scales from days to centuries Unlike any other reference editors discuss where isotope data can detect record trace and help to interpret environmental change Provides researchers with groundbreaking data on how to predict the terrestrial ecosystems response to the ongoing rapid alterations Reveals how ecosystems have responded to environmental and biotic fluctuations in the past Includes examples from research by a wide range of biological and physical scientists who are using isotopic records to both detect and interpret environmental change

Pollution of Lakes and Rivers John P. Smol, 2009-03-12 Now in its second edition Pollution of Lakes and Rivers provides essential insights into present day water quality problems from an international perspective Explains simply and effectively how lake sediments can be used to reconstruct pollution history Includes over 200 additional references and a new chapter on recent climatic change and its effects on water quality and quantity Tackles present day water quality problems from an international perspective Previously published by Hodder Arnold PowerPoint slides of the artwork from the book are available from <http://post.queensu.ca/pearl/textbook/htm> Reviews This is a very well written and wide ranging volume that is both instructive and topical It is likely to prove useful as an introduction to the general area a reference source and for teaching purposes The Holocene November 2008 If you thought that paleolimnology was just mud pollen and diatoms then you will likely be both struck by the complexity of this field of research and grateful that John Smol FRSC has described it so clearly and broadly Simply put the second edition is an excellent book Journal of Phycology 2008 This is a useful text It provides a good level of detail so that the beginner in this area can appreciate what palaeolimnology can and cannot achieve

It goes beyond the simple introduction to provide a detailed understanding of how techniques can be applied. This is a different take on the usual pollution text and would be of great use to those wishing to understand more from sedimentary records. Taken from the British Ecological Society's Teaching Ecology website, John Smol has extensive experience in this field of paleoenvironmental research which he combines well with his excellent written communication skills to produce a text that is easy to read but also thought provoking. *Quaternary Science Reviews* 2009. The breadth of coverage in this text is impressive. *Lake and Reservoir Management* 2009. If I could speak with fluidity and clarity in my lectures as consistently as John Smol writes, my students would be very grateful. *Journal of Paleolimnology* 2009. *Краткие сообщения Института археологии. Выпуск 234. Сборник статей*, 2015-09-15. 2013. [Development and Novel Applications of Geochemical Proxies in Marine and Terrestrial Carbonate Records](#) Johan Schijf, Tsuyoshi Watanabe, Ed Hathorne, Hali Kilbourne, 2024-12-04. Information on parameters like global ice volume or nutrient availability is critical for developing and testing models of climate and environmental conditions in the past few thousand years. However, reliable measurements of such parameters only go back about a century and before the advent of satellites were sparsely distributed across the planet. Instrumental records can be extended through the use of geochemical proxies in well-dated carbonate deposits, for example Sr/Ca ratios in coral aragonite cores as a proxy for sea surface temperature. Due to ongoing advances in analytical and micro-sampling techniques, these proxies now comprise a multitude of elemental ratios, isotopic systems, and redox couples incorporated in carbonate minerals precipitated by numerous organisms and processes. Novel geochemical proxies in carbonate mineral records are being developed by scientists from an increasingly broad spectrum of fields and applied to an ever-growing number of environmental systems and questions using a wide variety of advanced analytical instruments and methods. Concurrently, these developments are leading to new insights that enable established proxies to be reevaluated and improved. The time is right for a Research Topic that brings these experts together and helps them push their efforts forward by comparing notes, reviewing the present state of the science, and highlighting outstanding problems or controversies. [The Hadley Circulation: Present, Past and Future](#) Henry F. Diaz, Raymond S. Bradley, 2007-11-05. Climate dynamicists generally characterize the Hadley circulation in terms of some derived meteorological parameters such as the mass stream function, the nondivergent part of the flow, or the velocity potential, the divergent circulation, both of which are based on measurements of the three-dimensional wind field. Yet we know very little about how such indices have varied in the past beyond the most recent decades. Paleoclimatologists are unable to reconstruct such indices, so long-term reconstructions of the Hadley circulation must be based on indirect characteristics that can be in some way plausibly linked to the dynamics of the system. Reconstructed quantities such as precipitation amount, position, and strength of the trade winds, and the location of the Intertropical Convergence Zone (ITCZ) have all been derived from different types of paleoclimatic proxy data and could be potentially useful in understanding key aspects of past variability in the Hadley system. While these studies all provide an

important perspective on changes that have taken place within the Hadley circulation there has been little effort to tie individual studies together to obtain a more comprehensive perspective on the overall variability of the system. With this in mind a three day meeting was held at the International Pacific Research Center Honolulu Hawaii in November 2002. This was the first time that climatologists, paleoclimatologists and modelers had met with the specific goal of examining this important part of the climate system.

Tracking Environmental Change Using Lake Sediments John B.H. Birks, André F. Lotter, Steve Juggins, John P. Smol, 2012-04-08. Numerical and statistical methods have rapidly become part of a palaeolimnologist's tool kit. They are used to explore and summarise complex data, reconstruct past environmental variables from fossil assemblages and test competing hypotheses about the causes of observed changes in lake biota through history. This book brings together a wide array of numerical and statistical techniques currently available for use in palaeolimnology and other branches of palaeoecology. Visit <http://extras.springer.com> the Springer's Extras website to view data sets, figures, software and R scripts used or mentioned in this book.

Canadian Journal of Earth Sciences, 2007

Tracking Environmental Change Using Lake Sediments H. John B. Birks, André F. Lotter, Steve Juggins, John P. Smol, 2012-04-06. Numerical and statistical methods have rapidly become part of a palaeolimnologist's tool kit. They are used to explore and summarise complex data, reconstruct past environmental variables from fossil assemblages and test competing hypotheses about the causes of observed changes in lake biota through history. This book brings together a wide array of numerical and statistical techniques currently available for use in palaeolimnology and other branches of palaeoecology. Visit <http://extras.springer.com> the Springer's Extras website to view data sets, figures, software and R scripts used or mentioned in this book.

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