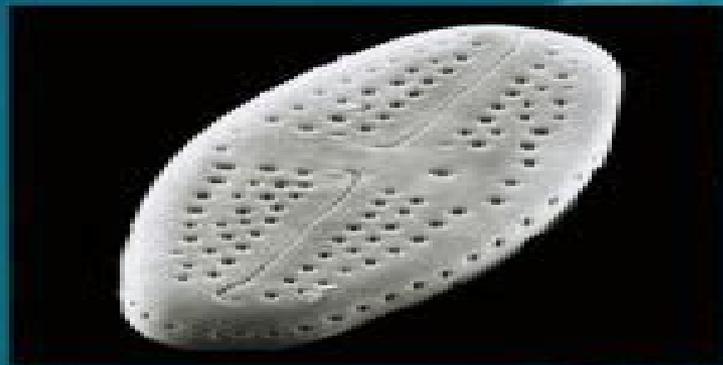


# Tracking Environmental Change Using Lake Sediments

Volume 3

Terrestrial, Algal,  
and Siliceous Indicators

Edited by  
John P. Smol, H. John B. Birks  
and William M. Last



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# Tracking Environmental Change Using Lake Sediments

**Xiang Xie**



## **Tracking Environmental Change Using Lake Sediments:**

**Tracking Environmental Change Using Lake Sediments** John P. Smol, H.J. Birks, William M. Last, 2006-04-11 This third volume in the Developments in Paleoenvironmental Research series deals with the major terrestrial algal and siliceous indicators used in paleolimnology. Other volumes deal with the acquisition and archiving of lake sediment cores, chronological techniques and large scale basin analysis methods. Volume 1: physical and geochemical parameters and methods; Volume 2: zoological techniques; Volume 4: and statistical and data handling methods; Volume 5: These monographs will provide sufficient detail and breadth to be useful handbooks for both seasoned practitioners as well as newcomers to the area of paleolimnology. Although the chapters in these volumes target mainly lacustrine settings, many of the techniques described can also be readily applied to fluvial, glacial, marine, estuarine and peatland environments.

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**Tracking Environmental Change Using Lake Sediments** William M. Last, John P. Smol, 2002-06-30 Theory, Instrumentation, NIR analysis of sediment samples, Uses of NIRS in palaeolimnology, Future perspectives, Summary, References, Fly ash particles, Neil Rose 319-12 Introduction, A brief history, Methods of extraction and enumeration, Temporal distribution, Spatial distribution, Source apportionment, The future, Summary, Acknowledgements, References, Part III Stable Isotope Techniques, 13 Application of stable isotope techniques to inorganic and biogenic carbonates, Emi Ito 351 Introduction, Nomenclature and systematics of lake water Mg, Ca and Sr, Ca ratios of lake water of dissolved inorganic carbon, DIC, Carbonates in lake sediments, Mollusks, Ostracodes, Charophytes, Isotope analysis, Preparation of carbonate samples for isotope analysis, Conclusions, Summary, Acknowledgments, References, 14 Carbon and oxygen isotope analysis of lake sediment cellulose, methods and applications, Brent B Wolfe, Thomas W D Edwards, Richard J Elgood, Kristina R M Beuning 373-xi Introduction, Stable isotope tracers in lake, Historical development, Methods, Key criteria for paleohydrologic reconstruction, Applications, Future research directions, Summary, Acknowledgements, References, Nitrogen isotopes in palaeolimnology, Michael R Talbot 15-401 Introduction, Nitrogen in lakes, forms and distribution, Nitrogen isotopes, Nitrogen isotope studies in palaeolimnology, sampling and measurement, Some examples

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The explosive growth of paleolimnology over the past two decades has provided impetus for the publication of this series of monographs detailing the numerous advances and new techniques being applied to the interpretation of lake histories This is the second volume in the series and deals mainly with physical and geochemical analytical techniques *Tracking Environmental Change Using Lake Sediments* William M. Last, Smol, John P. Smol, John B. Birks, 2004 [Tracking Environmental Change Using Lake Sediments](#) John P. Smol, H. J. Birks, William M. Last, 2004-12-30 Paleolimnology is a rapidly developing science that is now being used to study a suite of environmental and ecological problems This volume is the fourth handbook in the Developments in Paleoenvironmental Research book series The first volume Last Smol 2001a examined the acquisition and archiving of sediment cores chronological techniques and large scale basin analysis methods Volume 2 Last Smol 2001b focused on physical and chemical methods Volume 3 Smol et al 2001 along with this book summarize the many biological methods and techniques that are available to study long term environmental change using information preserved in sedimentary profiles A subsequent volume Birks et al in preparation will deal with statistical and data handling procedures It is our intent that these books will provide sufficient detail and breadth to be useful handbooks for both seasoned practitioners as well as newcomers to the area of paleolimnology These books will also hopefully be useful to non paleolimnologists e g limnologists archeologists palynologists geographers geologists etc who continue to hear and read about pal limnology but have little chance to explore the vast and sometimes difficult to access journal based reference material for this rapidly expanding field Although the chapters in these volumes target mainly lacustrine settings many of the techniques described can also be readily applied to fluvial glacial marine estuarine and peatland environments This current volume focuses on zoological indicators preserved in lake sediments whilst Volume 3 focused on terrestrial algal and siliceous indicators *Tracking Environmental Change Using Lake Sediments: Terrestrial, algal, and siliceous indicators* John P. Smol, William M. Last, 2001 *Tracking Environmental Change Using Lake Sediments* J. P. Smol, H. J. B. Birks, W. M. Last, 2001 **Tracking Environmental Change Using Lake Sediments** William M. Last, John P. Smol, 2006-04-11 Origins of fallout radionuclides Sediment records of fallout radionuclides Simple dating models Vertical mixing Numerical techniques Radiometric techniques Discussion Summary Acknowledgements References 10 chronostratigraphic techniques in paleolimnology Svante Björck Barbara Wohlfarth 205 Introduction Methods and problems Radiocarbon dating different fractions of the sediment as a chronostratigraphic tool Dating of long old stratigraphies High resolution dating and wiggle matching dating versus absolute dating techniques of lacustrine sediments Concluding remarks Summary Useful www addresses Acknowledgements References 11 Varve chronology techniques Scott Lamoureux 247 Introduction Methods Summary and future directions Acknowledgements References 12 Luminescence dating Olav B Lian D J Huntley 261 Introduction The mechanism responsible for luminescence Dating and estimation of the paleodose Thermoluminescence

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over the last five years. Alongside numerous ecological findings, several sedimentary DNA studies have been dedicated to understanding the reliability of this approach to reconstruct past ecosystem changes. Despite the major surge of interest, a comprehensive compilation of sedimentary DNA approaches and applications has yet to be attempted. The overall aim of this DPER volume is to fill this knowledge gap. **Tracking Environmental Change Using Lake Sediments**, 2001

**Tracking Environmental Change Using Lake Sediments: Basin analysis, coring, and chronological techniques**, 2001. Cameron R. Turner, 2016. *Tracking Environmental Change Using Lake Sediments* John P. Smol, H.J. Birks, William M. Last, 2004-12-30. Paleolimnology is a rapidly developing science that is now being used to study a suite of environmental and ecological problems. This volume is the fourth handbook in the Developments in Paleoenvironmental Research book series. The first volume, Last and Smol 2001a, examined the acquisition and archiving of sediment cores, chronological techniques, and large scale basin analysis methods. Volume 2, Last and Smol 2001b, focused on physical and chemical methods. Volume 3, Smol et al 2001, along with this book, summarize the many biological methods and techniques that are available to study long term environmental change using information preserved in sedimentary profiles. A subsequent volume, Birks et al in preparation, will deal with statistical and data handling procedures. It is our intent that these books will provide sufficient detail and breadth to be useful handbooks for both seasoned practitioners as well as newcomers to the area of paleolimnology. These books will also hopefully be useful to non-paleolimnologists, e.g. limnologists, archeologists, palynologists, geographers, geologists, etc. who continue to hear and read about paleolimnology but have little chance to explore the vast and sometimes difficult to access journal based reference material for this rapidly expanding field. Although the chapters in these volumes target mainly lacustrine settings, many of the techniques described can also be readily applied to fluvial, glacial, marine, estuarine, and peatland environments. This current volume focuses on zoological indicators preserved in lake sediments, whilst Volume 3 focused on terrestrial algal and siliceous indicators.

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