

Cambridge University Press
978-1-108-72338-1 — Earth History of Oxygen and the iprOxy
Zunli Lu , Wanyi Lu , Rosalind E. M. Rickaby , Ellen Thomas
Frontmatter
[More Information](#)

Cambridge Elements[≡]

Elements in Geochemical Tracers in Earth System Science

edited by
Timothy Lyons
University of California
Alexandra Turchyn
University of Cambridge
Chris Reinhard
Georgia Institute of Technology

EARTH HISTORY OF OXYGEN AND THE IPROXY

Zunli Lu
Syracuse University, New York
Wanyi Lu
Syracuse University, New York
Rosalind E. M. Rickaby
University of Oxford
Ellen Thomas
Yale University and Wesleyan University



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press
978-1-108-72338-1 — Earth History of Oxygen and the iprOxy
Zunli Lu , Wanyi Lu , Rosalind E. M. Rickaby , Ellen Thomas
Frontmatter
[More Information](#)

CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025, India

79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of
education, learning, and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781108723381

DOI: 10.1017/9781108688604

© Zunli Lu, Wanyi Lu, Rosalind E. M. Rickaby, and Ellen Thomas 2020

This publication is in copyright. Subject to statutory exception
and to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without the written
permission of Cambridge University Press.

First published 2020

A catalogue record for this publication is available from the British Library.

ISBN 978-1-108-72338-1 Paperback

ISSN 2515-7027 (online)

ISSN 2515-6454 (print)

Cambridge University Press has no responsibility for the persistence or accuracy of
URLs for external or third-party internet websites referred to in this publication
and does not guarantee that any content on such websites is, or will remain,
accurate or appropriate.

Cambridge University Press
978-1-108-72338-1 — Earth History of Oxygen and the iprOxy
Zunli Lu , Wanyi Lu , Rosalind E. M. Rickaby , Ellen Thomas
Frontmatter
[More Information](#)

Earth History of Oxygen and the iprOxy

Elements in Geochemical Tracers in Earth System Science

DOI: 10.1017/9781108688604
First published online: September 2020

Zunli Lu
Syracuse University, New York

Wanyi Lu
Syracuse University, New York

Rosalind E. M. Rickaby
University of Oxford

Ellen Thomas
Yale University and Wesleyan University

Author for correspondence: Zunli Lu, zunlilu@syr.edu

Abstract: How oxygen levels in Earth's atmosphere and oceans evolved has always been a central question in Earth System Science. Researchers have developed numerous tracers to tackle this question, utilizing geochemical characteristics of different elements. Iodine incorporated in calcium carbonate (including biogenic) minerals, reported as I/Ca, is a proxy for dissolved oxygen in seawater. Here we review the rationale behind this proxy, its recent applications, and some potential future research directions.

Keywords: upper ocean, I/Ca, deoxygenation, carbonate, hypoxic

© Zunli Lu, Wanyi Lu, Rosalind E. M. Rickaby, and Ellen Thomas 2020
ISBNs: 9781108723381 (PB), 9781108688604 (OC)
ISSNs: 2515-7027 (online), 2515-6454 (print)

Contents

1 Introduction	1
2 Proxy Systematics	1
3 Methods	3
4 Sample Materials and Post-depositional Alterations	5
5 Long-Term I/Ca Trends Through Earth History	5
6 Short-Term Ocean Deoxygenation Events	9
7 Quaternary Glacial–Interglacial Cycles	11
8 Future Prospects	13
References	15