

Radiocarbon

An International Journal of Cosmogenic Isotope Research

VOLUME 64 • NUMBER 4 • 2022

14

COMMEMORATIVE ISSUE

Seven Decades of
Radiocarbon Dating:
Remembering the Pioneers &
Looking Towards the Future
Part 2 of 2



Editor

A.J.T. Jull

CAMBRIDGE
UNIVERSITY PRESS

Radiocarbon

An International Journal of Cosmogenic Isotope Research

EDITOR

A. J. T. Jull · University of Arizona

MANAGING EDITOR

Kimberley Tanner Elliott · University of Arizona

ASSOCIATE EDITORS

Edouard Bard · Collège de France
Nancy Beavan · ESR, New Zealand
Warren Beck · University of Arizona
Ravi Bhushan · PRL, Gujarat, India
Elisabetta Boaretto · Weizmann Institute
Christopher Bronk Ramsey · Oxford University
George S. Burr · University of Arizona
Alexander Cherkinsky · University of Georgia
Owen K. Davis · University of Arizona
Ellen R. M. Druffel · University of California-Irvine
Pieter Grootes · Christian-Albrechts University
Carla S. Hadden · University of Georgia
Irka Hajdas · ETH Zurich
Derek Hamilton · University of Glasgow
Christine Hatté · LSCE, Gif-sur-Yvette
Gregory Hodgins · University of Arizona
Quan Hua · ANSTO, Australia
Yaroslav Kuzmin · Russian Academy of Sciences

Steven W. Leavitt · University of Arizona
Susanne Lindauer · CEZA, Mannheim
Kita Macario · UFF, Rio de Janeiro
Ann P. McNichol · WHOI, USA
Mihály Molnár · Lab. of Envir. Studies, Hungary
Toshio Nakamura · Nagoya University
Jesper Olsen · Aarhus AMS Center
Charlotte Pearson · University of Arizona
Pavel Povinec · Comenius University, Slovakia
Andrzej Rakowski · Silesian Univ. of Tech., Gliwice
Paula J. Reimer · Queen's University Belfast
E. Marian Scott · University of Glasgow
Corina Solis · UNAM, Mexico City
John R. Southon · University of California-Irvine
Jocelyn Turnbull · GNS Science, New Zealand
Johannes van der Plicht · Groningen University
Antoine Zazzo · Mus. Nat. d'Histoire naturelle
Weijian Zhou · Inst. of Earth Environ., Chinese Acad. of Sci.

Radiocarbon (ISSN 0033-8222) is published quarterly by Cambridge University Press, One Liberty Plaza 20th Floor New York, NY 10006. © 2022 by the Arizona Board of Regents on behalf of the University of Arizona. All rights reserved.

Editorial Office

Communications should be addressed to the Managing Editor, *Radiocarbon*, Department of Geosciences, The University of Arizona, 4717 East Fort Lowell Road, Tucson, AZ 85712-1201 USA. Tel.: +1 (520) 621-0641; Email: kimelliott@arizona.edu. Contributors should consult the Instructions for Contributors, which is available on the journal's Web site: cambridge.org/rdc.

Subscriptions

Annual subscription rates for Volume 64, 2022: Institutional rate is (print and electronic) \$614 in the USA, Canada, and Mexico, £396 + VAT elsewhere. Institutional rate (electronic only) \$427 in the USA, Canada, and Mexico, £274 + VAT elsewhere. Individual rate is (print and electronic) \$202 in the USA, Canada, and Mexico, £130 + VAT elsewhere. Individual rate (electronic only) \$147 in the USA, Canada, and Mexico, £96 + VAT elsewhere. Please direct subscription inquiries and requests for back issues to Customer Services at Cambridge University Press, email: subscriptions_newyork@cambridge.org (USA, Canada, and Mexico) or journals@cambridge.org (outside of USA, Canada, and Mexico).

Advertising

To advertise in the journal email advertising@cambridge.org or telephone +1 (212) 337 5062 in the USA, Canada, or Mexico; email ad_sales@cambridge.org or telephone +44 (01223) 325898 in the rest of the world.

Abstracting and indexing

Radiocarbon is indexed and/or abstracted by the following sources: *Anthropological Index*; *Anthropological Literature*; *Art and Archaeology Technical Abstracts*; *Bibliography and Index of Geology* (GeoRef); *British Archaeological Bibliography*; *Chemical Abstracts*; *Chemistry Citation Index*; *Current Advances in Ecological and Environmental Sciences*; *Current Contents* (ISI); FRANCIS (Institut de l'Information Scientifique et Technique – CNRS); *Geographical Abstracts*; *Geological Abstracts*; *Oceanographic Literature Review*; *Science Citation Index*; *Social Sciences Citation Index*.

List of laboratories

Our comprehensive list of laboratories is published annually, and is also available at www.radiocarbon.org. We ask all laboratory directors to provide their laboratory code designation, as well as current telephone and fax numbers, and email addresses. Changes in names or addresses, additions or deletions should be reported to the managing editor. Conventional and AMS laboratories are arranged in alphabetical order by country, and we include laboratories listed by code designation.

Permissions

No part of this publication may be reproduced, in any form or by any means, electronic, photocopying or otherwise, without permission in writing from Cambridge University Press. Policies, request forms and contacts are available at: <http://journals.cambridge.org/action/rightsAndPermissions>. Permission to copy (for users in the USA) is available from Copyright Clearance Center: <http://www.copyright.com>, email: info@copyright.com.

Postmaster: Send address changes to *Radiocarbon*, Cambridge University Press, One Liberty Plaza, New York, NY 10006, USA.

Radiocarbon

Vol 64, Nr 4, 2022

CONTENTS

EDITORIAL

From the Editors

A J Timothy Jull, Kimberley Elliott..... 671

Radiocarbon in the Marine Environment: An Overview

Ann P McNichol, Susanne Lindauer..... 673

ARTICLES

Global Ocean Radiocarbon Programs

Ann P McNichol, Robert M Key, Thomas P Guilderson..... 675

Marine Biogenic Carbonates and Radiocarbon—A Retrospective on Shells and Corals with an Outlook on Challenges and Opportunities

Susanne Lindauer, Carla S Hadden, Kita Macario, Thomas P Guilderson..... 689

Marine Organic Carbon and Radiocarbon—Present and Future Challenges

Ellen R M Druffel, Steven R Beaupré, Hendrik Grotheer, Christian B Lewis, Ann P McNichol, Gesine Mollenhauer, Brett D Walker..... 705

Atmospheric Radiocarbon for the Period 1950–2019

Quan Hua, Jocelyn C Turnbull, Guaciara M Santos, Andrzej Z Rakowski, Santiago Ancapichún, Ricardo De Pol-Holz, Samuel Hammer, Scott J Lehman, Ingeborg Levin, John B Miller, Jonathan G Palmer, Chris S M Turney..... 723

Reminiscing on the Use and Abuse of ^{14}C and ^{13}C in Atmospheric CO_2

Pieter Tans..... 747

Cosmogenic ^{14}C for Assessing the OH-Based Self-Cleaning Capacity of the Troposphere

Carl A M Brenninkmeijer, Sergey S Gromov, Patrick Jöckel..... 761

Radiocarbon in Global Tropospheric Carbon Dioxide

Ingeborg Levin, Samuel Hammer, Bernd Kromer, Susanne Preunkert, Rolf Weller, Douglas E Worthy..... 781

Recent Progress in Atmospheric Fossil Fuel CO_2 Trends Traced by Radiocarbon in China

Weijian Zhou, Zhenchuan Niu, Shugang Wu, Xiaohu Xiong, Peng Wang, Peng Cheng, Yaoyao Hou, Hua Du, Ning Chen, Xuefeng Lu..... 793

Application of ^{14}C Method to Chronology of the Croatian Dinaric Karst—A Case of the Plitvice Lakes

Ines Krajcar Bronić, Jadranka Barešić, Andreja Sironić..... 805

¹⁴ C Dating of the Erlitou Site <i>Xuelian Zhang, Shihua Qiu, Lianzhen Cai, Hong Xu, Haitao Zhao, Guoliang Chen</i>	819
¹⁴ C Geochronology and Radiocarbon Reservoir Effect of Reviewed Lakes Study in China <i>Weijian Zhou, Yuda Chui, Ling Yang, Peng Cheng, Ning Chen, Guodong Ming, Yan Hu, Wenli Li, Xuefeng Lu</i>	833
Initial Human Colonization of the Americas, Redux <i>Stuart J Fiedel</i>	845

TECHNICAL NOTE

Correcting Fiedel, Once Again: Monte Verde and the Peopling of South America <i>Tom D Dillehay, Mario Pino, Carlos Ocampo, James Adovasio, Michael B Collins, Jose Saavedra, Jack Rossen, David Pollock</i>	899
--	-----

CORRIGENDUM

Cosmogenic ¹⁴ CO for Assessing the OH-Based Self-Cleaning Capacity of the Troposphere – Corrigendum <i>Carl A M Brenninkmeijer, Sergey S Gromov, Patrick Jöckel</i>	905
---	-----