

Radiocarbon

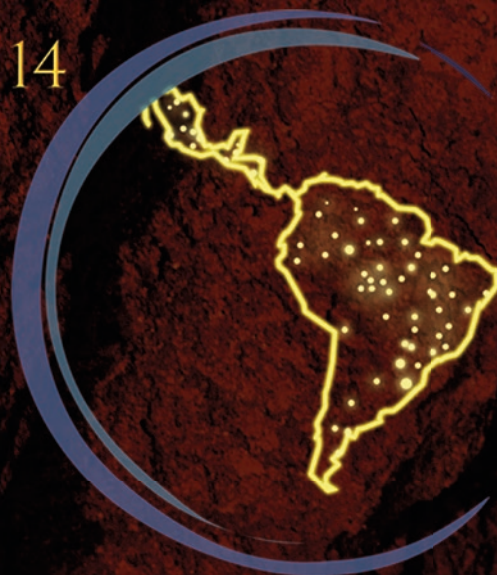
An International Journal of Cosmogenic Isotope Research

VOLUME 63 • NUMBER 4 • 2021

14

Special Section: CLARa
Proceedings of the 1st Latin
American Radiocarbon
Conference

Guest Editors
Kita Macario & Corina Solís



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 · Cardiff University

Warren Beck · University of Arizona

Elisabetta Boaretto · Weizmann Institute

Christopher Bronk Ramsey · Oxford University

George S. Burr · University of Arizona

Owen K. Davis · University of Arizona

Ellen R. M. Druffel · University of California-Irvine

Pieter Grootes · Christian-Albrechts University

Irka Hajdas · ETH Zurich

Derek Hamilton · University of Glasgow

Christine Hatté · Laboratoire des Sciences du Climat et

l'Environnement

Gregory Hodgins · University of Arizona

Quan Hua · Australian Nuclear Science and Technology

Organisation

Yaroslav Kuzmin · Russian Academy of Sciences

Steven W. Leavitt · University of Arizona

Ann P. McNichol · Woods Hole Oceanographic Institution

Mihály Molnár · Hertelendi Laboratory of Environmental
Studies, Hungary

Toshio Nakamura · Nagoya University

Jesper Olsen · Aarhus AMS Center

Charlotte Pearson · University of Arizona

Pavel Povinec · Comenius University

Paula J. Reimer · Queen's University Belfast

E. Marian Scott · University of Glasgow

John R. Southon · University of California-Irvine

Jocelyn Turnbull · GNS Science

Johannes van der Plicht · Groningen University

Antoine Zazzo · Muséum national d'Histoire naturelle

Weijian Zhou · Institute of Earth Environment, Chinese

Academy of Science

Radiocarbon (ISSN 0033-8222) is published quarterly by Cambridge University Press, One Liberty Plaza 20th Floor New York, NY 10006. © 2021 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; Fax: +1 (520) 621-0584; Email: kimelliott@email.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 63, 2021: Institutional rate is (print and electronic) \$596 in the USA, Canada, and Mexico, £384 + VAT elsewhere. Institutional rate (electronic only) \$435 in the USA, Canada, and Mexico, £279 + VAT elsewhere. Individual rate is (print and electronic) \$196 in the USA, Canada, and Mexico, £126 + VAT elsewhere. Individual rate (electronic only) \$150 in the USA, Canada, and Mexico, £98 + 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 (0)1223 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.

Featuring: CLARa
Proceedings of the 1st Latin American
Radiocarbon Conference

Radiocarbon

Vol 63, Nr 4, 2021

CONTENTS

INTRODUCTION

Editorial: From the Guest Editors of CLARa

Kita Macario, Corina Solís..... v

CLARa: PROCEEDINGS OF THE 1ST LATIN AMERICAN RADIOCARBON CONFERENCE

A High-Resolution Chronology for the Palatial Complex of Xalla in Teotihuacan, Mexico,
Combining Radiocarbon Ages and Archaeomagnetic Dates in a Bayesian Model

*Laura E Beramendi-Orosco, Galia Gonzalez-Hernandez, Ana M Soler-Arechalde,
Linda R Manzanilla*..... 1073

Amourins Shellmound: Uncovering Biodiversity and Chronology Through Charcoal Analyses

*Kita D Macario, Rita Scheel-Ybert, Natacha Ribeiro-Pinto, Bruna B Pereira,
Dayanne Amaral, Eduardo Q Alves*..... 1085

Preliminary Radiocarbon Dating Results of Bone Samples at the LAC-UFF, Brazil

*Fabiana Oliveira, Kita Macario, Karolayne Silva, Bruna Pereira, Ingrid Chanca,
Eduardo Alves, Alberto Cid, Rita Scheel-Ybert, Dayanne Amaral, Natacha Ribeiro-Pinto,
Luiz C Ruiz Pessenda*..... 1103

¹⁴C-AMS in Mexico and Pre-Columbian Archaeology

*C Solís, M Rodríguez-Ceja, E Chávez-Lomeli, A Alcántara, J Gazzola, J Balcells,
J C Jimenez, Y de la Rosa, M A Martínez-Carrillo*..... 1115

Radiocarbon Dating of Archaeological Material Recovered from the Basin of Mexico

*Francisco Antonio Balcorta Yépez, Montserrat Alavez Ortúzar,
Zulema Berenice Flores Montes de Oca, Miguel Ángel Martínez-Carrillo, Corina Solís,
María Rodríguez-Ceja, María Esther Ortiz*..... 1123

When Did the Incas Build Machu Picchu and Its Satellite Sites? New Approches Based on
Radiocarbon Dating

*Mariusz Ziolkowski, Jose Bastante Abuhadba, Alan Hogg, Dominika Sieczkowska,
Andrzej Rakowski, Jacek Pawlyta, Sturt W Manning*..... 1133

Bioindicators of Sea-Level Fluctuations in Southeastern Brazil: New Data and
Methodological Review

*Julia Caon Araujo, Kita Chaves Damasio Macario, Vinicius Nunes Moreira,
Anderson dos Santos Passos, Perla Baptista de Jesus, José Carlos Scoli Seoane,
Fabio Ferreira Dias*..... 1149

Fossil Fuel Environmental Contamination: A Strategy Using Radiocarbon, N-Alkanes, and Algae <i>Túlio César Aguiar Silva, Carla Carvalho, Bruno Libardoni, Kita Macario, Felipe Braga de Lima, Mariana Cruz Pimenta, Maria Isabela Nascimento de Oliveira, Marcelo Corrêa Bernardes, Gabriela da Silva Marques, Fernanda Pinto, Rosa de Souza, Diana Negrão Cavalcanti</i>	1165
Holocene Evolution of a Wave-Dominated Barrier-Lagoon System in Rio de Janeiro, Brazil <i>Rafael Cuellar de Oliveira e Silva, Gilberto Tavares de Macedo Dias, Rodrigo Coutinho Abuchacra, Sérgio Cadena de Vasconcelos, Kita Chaves Damasio Macario, Estefan Monteiro da Fonseca</i>	1175
Surface Ocean Radiocarbon from a <i>Porites</i> Coral Record in the Great Barrier Reef: 1945–2017 <i>Yang Wu, Stewart J Fallon, Neal E Cantin, Janice M Lough</i>	1193
Absolute Dendrochronological Scale for Pine (<i>Pinus Sylvestris</i> L.) from Ujście (NW Poland), Dated Using Rapid Atmospheric ¹⁴ C Changes <i>Marek Krapiec, Andrzej Rakowski, Jacek Pawlyta, Damian Wiktorowski, Monika Bolka</i>	1205
Radiocarbon and Dendrochronology Applied in a Legal Dispute: A Case from Colombia <i>Jorge I del Valle, Jorge A Giraldo</i>	1215
Establishing Water Sample Protocols for Radiocarbon Analysis at LAC-UFF, Brazil <i>Daniela Bragança, Fabiana Oliveira, Kita Macario, Vinicius Nunes, Marcelo Muniz, Fernando Lamego, Gwenaël Abril, Aguinaldo Nepomuceno, Corina Solís, Maria Rodriguez-Ceja</i>	1225
LAC-UFF Status Report: Current Protocols and Recent Developments <i>Fabiana Oliveira, Kita Macario, Carla Carvalho, Vinicius Moreira, Eduardo Q Alves, Ingrid Chanca, Maikel Diaz, Renata Jou, Izabela Hammerschlag, Bruna M Netto, Maria Isabela Oliveira, Ayrton Assumpção, Dayanne Fernandes</i>	1233
RADIOCARBON 2018 CONFERENCE PROCEEDINGS	
Publication Notice	1247
Northeast Pacific Seawater Radiocarbon Recorded in Abalone Shells Obtained from Otsuchi Bay, Japan <i>Kosuke Ota, Yusuke Yokoyama, Yosuke Miyairi, Jun Hayakawa, Naomi Satoh, Hideki Fukuda, Kiyoshi Tanaka</i>	1249
RESEARCH ARTICLES	
¹⁴ C Dates and Stable Isotope Ecology of Marine Vertebrates in the Late Pleistocene-Early Holocene Champlain Sea <i>Robert S Feranec, Mario E Cournoyer, Andrew L Kozlowski</i>	1259
A New Ramped Pyrooxidation/Combustion Facility at ¹⁴ CHRONO, Belfast: Setup Description and Initial Results <i>Evelyn M Keaveney, Gerard T Barrett, Kerry Allen, Paula J Reimer</i>	1273
New Marine Reservoir Correction Values (ΔR) Applicable to Dates on Neolithic Shells from the South Coast of Korea <i>Habeom Kim, Hyunsoo Lee, Gyoung-Ah Lee</i>	1287
Time-Integrated Collection of CO ₂ for ¹⁴ C Analysis from Soils <i>Shawn Pedron, X Xu, J C Walker, J C Ferguson, R G Jespersen, J M Welker, E S Klein, C I Czimczik</i>	1303

Local Marine Reservoir Age (ΔR) Reconstructed Based on the Tsunami Deposit from Pangani Bay (Tanzania) <i>Guillaume Soulet, Vittorio Maselli</i>	1321
A Simple CO ₂ Extraction Method for Radiocarbon Analyses of Dissolved Inorganic Carbon in Water Samples Without a Carrier Gas <i>Hiroshi A Takahashi, Hiroko Handa, Masayo Minami</i>	1339
TECHNICAL NOTE	
A Highly Portable and Inexpensive Field Sampling Kit for Radiocarbon Analysis of Carbon Dioxide <i>Mark H Garnett, Josephine-Anne Newton, Thomas C Parker</i>	1355