

Radiocarbon

An International Journal of Cosmogenic Isotope Research



PROGRAM AND ABSTRACTS

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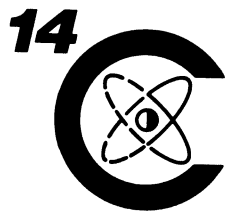
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Program and Abstracts of the
14th International Radiocarbon Conference

Department of Geosciences
The University of Arizona
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TIME	Monday, May 20	Tuesday, May 21	Wednesday, May 22	Thursday, May 23	Friday, May 24
8:00 AM	Opening	POSTERS ORAL 4A	POSTERS ORAL 5 ORAL 6	ORAL 7 ORAL 8A	ORAL and POSTERS 11A ORAL 12
9:00 AM	ORAL 1A				
10:00 AM	Coffee Break	Coffee Break	Coffee Break	Coffee Break	Coffee Break
11:00 AM	ORAL 1A	POSTERS ORAL 3A ORAL 4A	POSTERS ORAL 5 ORAL 6	ORAL 8A	ORAL and POSTERS 11A GENERAL POSTERS
NOON	LUNCH RADIOCARBON Board Meeting	LUNCH	FIELD TRIPS	LUNCH	LUNCH
1:00 PM					
2:00 PM	ORAL 1B ORAL 2	POSTERS ORAL 3B ORAL 4B		ORAL 8B ORAL 10	ORAL 11B
3:00 PM	Coffee Break	Coffee Break		Coffee Break	
4:00 PM	ORAL 1B ORAL 2	POSTERS ORAL 3B ORAL 4B		ORAL 9 ORAL 10	Business Meeting
5:00 PM					
6:00 PM		Laboratory Tours			1st International ¹⁴ C Tennis Tournament
7:00 PM	Mexican Reception	Dine-Around		Conference Barbecue	

PROGRAM OF THE 14TH INTERNATIONAL RADIOCARBON CONFERENCE

MONDAY, MAY 20, 1991

- 8:00 AM – INTRODUCTIONS – Austin Long, Chair, Organizing Committee
8:10 AM – WELCOME – Janet Marcus, Vice-Mayor of Tucson
8:20 AM – INTRODUCTORY REMARKS – Dr Edgar J McCullough, Dean, Faculty of Science
8:30 AM – OPENING LECTURE – Malcolm K Hughes, Director, Laboratory of Tree-Ring Research

9:00 AM – Session 1A. Current Topics in Global Change and ^{14}C Dating

Co-Chairs: Minze Stuiver and Edouard Bard

1. **The Impact of Calcite Dissolution on Radiocarbon Dating of Deep-Sea Sediments**—Wallace S Broecker, Millie Klas, Elizabeth Clark, Georges Bonani, Willy Wölfli and Susan Ivy
2. **$^{230}\text{Th}/^{234}\text{U}$ and ^{14}C Ages Obtained by Mass Spectrometry on Corals From Murora Atoll, French Polynesia**—Edouard Bard, Bruno Hamelin, Maurice Arnold and Danièle Buigues
3. **Past Variations of $\delta^{13}\text{C}$ in Atmospheric CO_2 Reconstructed From Analyses of Polar Ice Cores**—Ulrich Siegenthaler and Markus Leuenberger

BREAK

4. **AMS Radiocarbon Dating of Ice: Progress and New Results**—A T Wilson and D J Donahue
5. **Absolute Minimum Age of the Late Glacial-Holocene Transition by Radiocarbon Calibration and Stable Isotope Analyses of a 1477-Year German Pine Dendrochronology** Bernd Becker, Bernd Kromer and Peter Trimborn
6. **Isotopic Composition of Atmospheric Methane in the Southern Hemisphere** D C Lowe, C A M Brenninkmeijer, M R Manning, R J Sparks, G W Wallace and S C Tyler
7. **The Synergism Between Radiocarbon Data and Multivariable Chemical Data for the Apportionment of Atmospheric Particles**—L A Currie, G A Klouda and Jørgen Schjoldager
8. **Problems and Advances in the Radiocarbon Dating of Bone: A Short Review of the Work of AMS Laboratories**—R E M Hedges and G J van Klinken

LUNCH, *RADIOCARBON* Board Meeting

1:30 PM – Session 1B. Isotopic Indicators of Global Change

Co-Chairs: Owen K Davis and Steven W Leavitt

1. **Implications of $\delta^{13}\text{C}$ Variations in C_3 Plants Over the Past 55,000 Years**—S W Leavitt and S R Danzer
2. **Radiocarbon and Stable Isotope Studies of C_4 Grasses**—L J Toolin, C J Eastoe, A J T Jull and D J Donahue
3. **The Use of Natural ^{14}C and ^{13}C in Soils for Studies on Global Climatic Change** Peter Becker-Heidmann and Hans-Wilhelm Scharpenseel
4. **^{14}C Dating and Measurements of Climatic Proxy Indices of Loess Sequence to Record Paleomonsoon Variation on the Loess Plateau of China During the Last 16,000 Years** Zhou Weijian, An Zhisheng, John Head, D J Donahue, Ren Jianzhang, Lin Benhai, Zhou Mingfu, Yan Yuansheng and Zhang Jingzhao
5. **Anthropogenic Influence on the ^{14}C Activity of Recent Lake Sediments: A Case Study** Dušan Srdoč, Nada Horvatinčić, Marijan Ahel, Walter Giger, Christian Schaffner, Donat Petricioli, Jože Pezdič, Elena Marčenko and Andjelka Plenković-Moraj

BREAK

MONDAY, MAY 20, 1991 (continued)

6. **Geochronologic and Paleoclimatic Characterization of Quaternary Sediments in the Great Hungarian Plain**—Ede Hertelendi, P Sümegi and G Y Szöör
7. **Environments of the Past 20,000 Years Based on AMS ^{14}C , $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ Values on Proteins and Individual Amino Acids**—Thomas W Stafford, Jr
8. **Radiocarbon Anomalies and Late Holocene Climatic Change in Coastal Southern California**—Owen K Davis
9. **Radiocarbon Dating in Paleoeological Studies**—J M Punning
10. **Common Spectral Features in the 5500-Year Record of Total Carbonate in Sea Sediments and Radiocarbon in Tree Rings**—G Cini Castagnoli, G Bonino, M Serio and Charles P Sonett

1:30 PM – Session 2. Geologic Studies – Co-Chairs: Meyer Rubin and Pieter Grootes

1. **Determining Recurrence Intervals of Great Subduction Zone Earthquakes in Southern Alaska by Radiocarbon Dating**—George Plafker, K R Lajoie and Meyer Rubin
2. **Radiocarbon Dating of *Anodonta* in the Mojave River Basin**—Rainer Berger and Norman Meek
3. **AMS Radiocarbon Measurements at the University of Washington**—T A Brown, G W Farwell, P M Grootes, F H Schmidt and Minze Stuiver
4. **Interstadial Marine Deposits at Cape Storm, Ellesmere Island**—Weston Blake, Jr
5. **Radiocarbon Geochronology of the Larsen Cove, Marambio Island (Seymour Island), East of the Antarctic Peninsula**—Kunio Omoto

BREAK

6. **Radiocarbon Ages of Carbonate Materials From Gangetic Alluvium**—G Rajagopalan
7. **Late Pleistocene Geochronology of European USSR**—Kh A Arslanov
8. **The Geochronology of Sediments in Lakes of West China**—Huang Qi, Cai Biqin and Liang Qingsheng
9. **New Perspectives For Radiocarbon Dating Organic Deposits by Accelerator Mass Spectrometry**—Torbjörn E Törnqvist, Arie F M de Jong, Wilma A Oosterbaan and Klaas van der Borg

6:30 PM – MEXICAN RECEPTION

TUESDAY, MAY 21, 1991

8:00 AM – Poster Session – Beta Counting Techniques – Chair: Robert M Kalin

1. **High-Performance ^{14}C Gas-Proportional Counting System Applying Pulse-Shape Discrimination**—O Äikää, P Mäntynen and Tuovi Kankainen
2. **The Statistics of Low-Level Counting Using the New Generation Packard Scintillation Counters**—G T Cook, Robert Anderson and E M Scott
3. **Examination of Background Contamination Levels for Gas Counting and AMS Target Preparation in Trondheim**—Steinar Gulliksen and M S Thomsen
4. **Assessment of 0.3 ML Minivials for Liquid Scintillation Counting of Benzene**—A G Hogg
5. **A Minivial for Small Sample ^{14}C Dating**—Lauri Kaihola, Hannu Kojola and Aarne Heinonen
6. **High-Precision Radiocarbon Measurements at the University of Arizona: Liquid Scintillation Counting Techniques and Laboratory Error Multiplier**—R M Kalin and P E Damon

TUESDAY, MAY 21, 1991 (continued)

7. **The Influence of Optimization Criteria on the Quality of Radiocarbon Dating**
J S Mestres, J F García and Gemma Rauret
8. **A New Radiocarbon Dating Laboratory in Brazil**—Luiz Carlos Ruiz Pessenda and Plinio Barbosa De Camargo
9. **Gamma Radiation in Radiocarbon Dating Laboratories Using Gas Proportional Counters Measured With an NaI Crystal Inside and Outside the Passive Shield**—Páll Theodórsson
10. **A New Data Acquisition System for the Groningen Counters**—Johannes van der Plicht, H J Streurman and G R Schreuder
11. **Instruments and Data Software of Low-Level Liquid Scintillation Counting Used for ¹⁴C Dating**—Guan San Yuan and Xie Yuan Ming

8:00 AM – Poster Session – Accelerator Mass Spectrometry – Chair: L J Toolin

1. **High-Speed Acquisition of Multi-Parameter Data Using a Macintosh II CX**—Anthony Berno, J S Vogel and M W Caffee
2. **Accelerator Mass Spectrometry at the Lund Pelletron Accelerator**—Bengt Erlandsson, Ragnar Hellborg, Göran Skog and Reine Vesanen
3. **AMS Radiocarbon Results Obtained from Graphite Targets Produced at the Woods Hole Oceanographic Institution Between 1986 and 1990**—A R Gagnon and G A Jones
4. **¹⁴C Measurements on Laminated Lake Sediments**—Irena Hajdas, Juerg Beer, Georges Bonani, André Lotter, Michael Sturm and Willy Wölfli
5. **In-Situ Cosmogenic ¹⁴C in Terrestrial Rocks: Analytical Method and Results**—Devendra Lal, A J T Jull and D J Donahue
6. **Reduction of CO₂-to-Graphite Conversion Time for ¹⁴C AMS Samples**—M S Thomsen and Steinar Gulliksen
7. **Design and Performance of a Thermal Diffusion Micro-Column for ¹⁴C Enhancement of Carbon Monoxide**—R Michael Verkouteren and Lloyd A Currie
8. **A New Technique for Converting Carbon Dioxide to AMS Target Graphite**—A T Wilson
9. **A Comparison Between the Orsay and NIST ¹⁰Be Standards**—Françoise Yiou and G M Raisbeck

10:30 AM – Session 3A. Beta Counting Techniques – Gas Proportional**Chair: Robert M Kalin**

1. **The Contribution of Secondary Radiation to the Background of Gas Proportional Counters and the Analysis of Background Components**—Páll Theodórsson and H H Jónsson
2. **Pulse-Height Analysis for Gas Proportional Counters**—Stephen W Robinson
3. **¹⁴C Gas Counting: Is There Still a Future?**—Pavel Povinec

8:30 AM – Session 4A. Accelerator Mass Spectrometry and Applications**Co-Chairs: D J Donahue and A J T Jull**

1. **Accelerator Mass Spectrometry of ¹⁴C at the Australian National University**—L K Fifield, G L Allan, T R Ophel, M J Head and Richard Gillespie
2. **Accuracy, Precision and Throughput of ¹⁴C Measurements at the Center for Accelerator Mass Spectrometry**—J R Southon, J S Vogel, I D Proctor, M L Roberts and D W Heikkinen
3. **PRIME Lab: A Dedicated AMS Facility at Purdue University**—David Elmore, F A Rickey, P C Simms, M E Lipschutz, K A Mueller and T E Miller

TUESDAY, MAY 21, 1991 (continued)

4. **The New National Ocean Sciences Accelerator Mass Spectrometer Facility at Woods Hole Oceanographic Institution: Progress and First Results**—K F von Reden, G A Jones, R J Schneider, A P McNichol, G J Cohen and K H Purser
5. **^{36}Cl in the Stratosphere**—Martin Wahlen, Bruce Deck, Harley Weyer, Peter Kubik, Pankaj Sharma and Harry Gove
6. **A High Resolution ^{10}Be Record in Polar Ice**—Juerg Beer, Georges Bonani, Beate Dietrich, R C Finkel, H J Hofmann, B E Lehmann, Hans Oeschger, Bernhard Stauffer, Martin Suter and Willy Wölfli

BREAK

7. **^{10}Be Profiles as a Stratigraphic Tool**—G M Raisbeck and Françoise Yiou
8. **A Precision High-Throughput Accelerator Mass Spectrometer for ^{14}C** —Kenneth H Purser, R J Schneider and K F von Reden
9. **Measurement of Cosmogenic ^{14}C Produced by Spallation in Terrestrial Rocks and in Meteorites**—A J T Jull, Amy E Wilson, G S Burr, L J Toolin, D J Donahue and Devendra Lal
10. **Cosmogenic *In-Situ* ^{14}C in Polar Firn and Ice Samples**—Devendra Lal, A J T Jull and D J Donahue
11. **Half-Life of ^{41}Ca** —Walter Kutschera, Michael Paul and Irshad Ahmad
12. **Exposure Age Dating of Terrestrial Materials With ^{26}Al and ^{10}Be** —Jeffrey Klein, Roy Middleton, Barbara Lawn and Robert Giegengack

LUNCH

1:30 PM – Session 3B. Beta-Counting Techniques – Liquid Scintillation

Co-Chairs: John E Noakes and Henry Polach

1. **An Evaluation of Chemical Methods to Inhibit Isotope Fraction of Triton During Hydrolysis of Calcium Carbide to Acetylene in Benzene Synthesis**—Stanley De Filippis, John E Noakes and Randy Culp
2. **The Influence of Radon in Benzene Synthesis for Radiocarbon Age Dating**
James D Spaulding, John E Noakes and Stanley De Filippis
3. **Impurities Arising During Benzene Synthesis From Acetylene on Vanadium and Chromium Catalysts**—David Witkin, Mark Rigali, R M Kalin, Bartholomew Nagy and Austin Long
4. **Radiocarbon Dating in the 50,000- to 65,000-Year Range Without Isotopic Enrichment**
Austin Long and R M Kalin
5. **Evaluation of Active/Passive Guard Materials With After-Pulse Electronics for Low-Background Liquid Scintillation Counting**—John E Noakes and Stanley De Filippis

BREAK

6. **Evaluation of High-Purity Synthetic Quartz Vials and Active Plastic Holders in Liquid Scintillation Counting of Benzene**—A G Hogg and John E Noakes
7. **Low-Level Liquid Scintillation Counting for Radiocarbon Dating**—Chuck Passo and Michael Kessler
8. **A ^{14}C Dating Protocol for Use With Packard Scintillation Counters Employing Burst Counting Circuitry**—G T Cook and Robert Anderson
9. **Evaluation of a Prototype Low-Level Liquid Scintillation Multisample Counter**
Sigurður A Einarsson

TUESDAY, MAY 21, 1991 (continued)

1:30 PM – Session 4B. Accelerator Mass Spectrometry – Target Preparation

Chair: A J T Jull

1. **Developments in Sample Combustion to Carbon Dioxide, and in the Carbon Dioxide Ion Source System**–R E M Hedges, G J van Klinken and C R Bronk
2. **A Tandem Time-Of-Flight High-Sensitivity Mass Spectrometer for Cosmogenic Isotope Measurements**–V T Kogan and A K Pavlov
3. **Growth Rate Investigations of Tropical Trees With the New Erlangen AMS Facility**
Thomas Bretschneider, Andreas Buchler, Yves Charasse, Werner Ernst, Eberhard Finckh, Rainer Goblirsch, Fritz Gumbmann, Martin Haller, Rüdiger Höpfl, Ralf Karschnick, Wolfgang Kretschmer, Armin Rauscher, Harald Schielein, Markus Schleicher, Martin Worbes and M A Geyh
4. **The Optimization of Target Production for AMS**–Ann P McNichol, Alan R Gagnon, Glenn A Jones, Robert J Schneider and Karl von Reden
5. **Relationships Among CO₂, CO, CH₄ and H₂ During Reduction of CO₂ to Graphitic Carbon on Iron Wool**–R Michael Verkouteren and George A Klouda

BREAK

6. **Target Error – A Possible Problem in High Precision AMS ¹⁴C Dating**–A T Wilson
7. **Background and Contamination Studies at the IsoTrace AMS Facility**–R P Beukens
8. **Rapid Production of Graphite Without Contamination for Biomedical AMS**–John S Vogel

5:00 PM – LABORATORY TOURS; DINE-AROUND

WEDNESDAY, MAY 22, 1991

8:00 AM – Poster Session – Environmental Sciences, Archaeometry and Archaeology

Chair: Roelf Beukens

1. **Radiocarbon Results for the British Beakers**–Janet Ambers, Sheridan Bowman, Alex Gibson and Ian Kinnes
2. **Radiocarbon Dating of Copper Archaeological Artifacts**–R P Beukens, L A Pavlish, R G V Hancock, R M Farquhar, G C Wilson, P J Julig and W Ross
3. **Radioactive Levels of ¹⁴C and ³H in White Spirits of China**–Deng Guolun
4. **Isotopic Analysis of Carbon in a Geothermal System**–Munevera Hadžišehović and Nada Miljević
5. **A Radiocarbon Chronology of Late Neolithic Settlements in the Tisza-Maros Region of Hungary**–F Horvath and Ede Hertelendi
6. **Variation in Tree-Ring Widths Grown in Mackenzie Delta From AD 1528 to 1572**
Dai Kaimei and Qian Youneng
7. **Radiocarbon Dating the San Pedro Valley, Southeastern Arizona**–Frederick N Robertson
8. **The Reservoir Effect in the Coastal Waters of Portugal and Its Variability During the Holocene**–A M Monge Soares and J M P Cabral
9. **Dating of Precolumbian Museum Objects**–Mark J Y van Strydonck, Klaas van der Borg and Arie F M de Jong

WEDNESDAY, MAY 22, 1991 (continued)

8:15 AM – Session 5. Environmental Sciences – Co-Chairs: Lloyd Currie and Charles Fan

1. **The Origin and Turnover of Dissolved Organic Carbon in Forested Watersheds Determined by Carbon Isotopic (^{14}C and ^{13}C) Measurements**–S L Schiff, Ramon Aravena, R Elgood, S E Trumbore and P J Dillon
2. **Evaluating Dissolved Inorganic Carbon Cycling in a Forested Lake Watershed Using Carbon Isotopes**–Ramon Aravena, S L Schiff, S E Trumbore and P J Dillon
3. **Anthropogenic Radiocarbon in the Irish Sea and Scottish Coastal Waters**–Fiona Begg, G T Cook, E M Scott, M S Baxter and Martin McCartney
4. **Radiocarbon Abundance in Tree Rings: A Tool for Ecological Investigation**
Stefano Cecchini, P E Damon, Menotti Galli, G E Kocharov, A Konstantinov, Austin Long, I Mikheeva, Teresa Nanni and Agostino Salomoni
5. **Bomb-Produced Radiocarbon in Tree Rings**–Dai Kaimei, Qian Youneng and C Y Fan
6. **Identification of Landfill Gas Using Radiocarbon Dating**–D D Coleman and C-L Liu
7. **Remote Detection of Underground Bioremediation by Soil Carbon Dioxide Analyses**
Jonathon E Ericson, Kathleen Neuber, Harry Ridgway and Don Phipps, Jr

BREAK

8. **Radiocarbon Source Apportionment of Atmospheric Aerosols From Boise, Idaho**
G A Klouda, D Barraclough, L A Currie, B A Benner, S A Wise, R K Stevens and C W Lewis
9. **Atmospheric Radiocarbon Activity Variation in Japan**–Tadayoshi Kubozoe
10. **Measurement of ^{14}C Concentrations of Stratospheric CO_2 by Accelerator Mass Spectrometry**–Toshio Nakamura, Takakiyo Nakazawa, Nobuyuki Nakai, Hiroyuki Kitagawa, Hideyuki Honda and Eiji Matsumoto
11. **Determination of Radiocarbon in Austrian Wine and Vinegar**–Franz Schönhofer
12. **Radiocarbon Anomalies Observed for Plants Growing in Icelandic Geothermal Waters**
Árný E Sveinbjörnsdóttir, Jan Heinemeier, Niels Rud and Sigfús Johnsen

8:00 AM – Session 6. Archaeometry and Archaeology – Co-Chairs: Barbara S Ottaway and Robert Hedges

1. **Radiocarbon and Archaeological Contemporaneity**–Dean R Snow
2. **Establishing Calibrated ^{14}C Chronologies: Problematic Time Zones and High-Precision Dating, With Reference to Near Eastern Archaeology**–H J Bruins, J van der Plicht and W G Mook
3. **Radiocarbon Dating of Oylum Hüyük, Turkey**–Andrea M Parker and Rainer Berger
4. **Absolute Radiocarbon Chronology of the Aubrey Clovis Site, Texas, Based on Soil Humate Stratigraphy**–Herbert Haas, Timothy Dalbey and Reid Ferring
5. **Interval Estimation of the Floruit of an Archaeological Phenomenon: A General Method and Approximation for Summarizing a Group of ^{14}C Dates**–T C Aitchison, B S Ottaway and A S Al-Ruzaiza
6. **Radiocarbon Dating of Lime Fractions and Organic Material From Buildings**
Mark J Y van Strydonck, Klaas van der Borg, Arie F M de Jong and Edward Keppens
7. **Radiocarbon Dating of Mortar in Ireland**–Rainer Berger

BREAK

8. **Radiocarbon Dating of Iron Artifacts**–Richard G Cresswell
9. **A Review of Attempts to Date Pottery at Oxford**–R E M Hedges, Chen Tie-mei and R A Housley

WEDNESDAY, MAY 22, 1991 (continued)

10. **Methods for Dating of Oriental Textiles by Accelerator Mass Spectrometry**—J L Barnhill, A J T Jull, Todd Lange and D J Donahue
11. **Radiocarbon Dating of Prehistoric Rock Paintings**—Jon Russ, Marian Hyman & Marvin W Rowe
12. **AMS Radiocarbon Dating of Medieval Documents on Parchment**—D Stulik, D J Donahue and L J Toolin
13. **Radiocarbon Dating of Some of the Dead Sea Scrolls**—Georges Bonani, Susan Ivy, Willy Wölfli, Israel Carmi, Magen Broshi and John Strugnell

**Wednesday Afternoon - FIELD TRIPS TO ARIZONA SONORA DESERT MUSEUM/
OLD TUCSON AND KITT PEAK ASTRONOMICAL OBSERVATORY**

THURSDAY, MAY 23, 1991

8:00 AM – Session 7. Calibration – Co-Chairs: Stephen W Robinson and Malcolm Hughes

1. **A Revised Swedish Clay Varve Chronology: Present State of the Art** Bo Strömberg
2. **Radiocarbon Variations From Tasmanian Conifers: First Results From Late Pleistocene and Holocene Logs**—Mike Barbetti, T Bird, J E Dolezal, G Taylor and R J Francey
3. **Radiocarbon Dating of Fossil Wood From Southern Poland**—Tadeusz Kuc and Marek Krąpiec
4. **A New Tree-Ring Width, $\delta^{13}\text{C}$ and ^{14}C Investigation of the Two Creeks Type Locality** S W Leavitt and R M Kalin
5. **Comparisons of Uranium Series and Radiocarbon Dates on Lacustrine Deposits of the Eastern Sahara**—B J Szabo, C V Haynes, Jr and T A Maxwell
6. **The Use of Continental Carbonates Compared With Other Materials in the Dating of a Paleolake**—J F Garcia, J S Mestres and Gemma Rauret
7. **Dating of Post-AD 1650 Samples by Aspartic Acid Racemization**—Glenn A Goodfriend

8:30 AM – Session 8A. Geochemical Methods and Applications – Co-Chairs: Ronald I Dorn and John Head

1. **The Search for Carbon in Rock Coatings to Constrain the Ages of Land Forms and Archaeological Artifacts**—Ronald I Dorn, A J T Jull, D J Donahue, T W Linick and L J Toolin
2. **Charcoal Dating – Oxidation is Necessary for Complete Humic Removal** Richard Gillespie
3. **On the Possibilities of Using the ^{14}C Method in the Study of Late Pleistocene Geochronology**—Raivo Rajamäe
4. **Submerged Plants and the Slow Response to Changes in Radiocarbon Activity of Atmospheric Carbon Dioxide**—Ingrid U Olsson
5. **Chronology of Lake Sediments From the Kashmir Himalayas and Their Environmental Implications**—Sheela Kusumgar, D P Agrawal, Narendra Bhandari, R D Deshpande, Alok Raina, Chhemendra Sharma and M G Yadava
6. **Calcium-41 as a Long-Term Biological Tracer for Bone Resorption**—David Elmore, Maryka H Bhattacharya, Nancy Sacco-Gibson and David P Peterson

BREAK

THURSDAY, MAY 23, 1991 (continued)

7. **Separation and Characterization of Collagen-Derived Peptides and Amino Acids**
G J van Klinken and R E M Hedges
8. **Radiocarbon Dating of Bone Osteocalcin: Refinements in Procedures for Isolating a Pure Form of Non-Collagen Protein**—Henry O Ajie, Isaac R Kaplan, Elizabeth Stillwell, Donna Kirner, Peter J Slota, Jr and R E Taylor
9. **25 Years of Radiocarbon Dating Soils: A Paradigm of Erring and Learning**
H W Scharpenseel and Peter Becker-Heidmann
10. **Categorization of Organic Sediments in Arid Environments and the Effect of Sunlight on their Composition**—John Head
11. **A Model of Humus Formation in Soils Based on Radiocarbon Data of Natural Ecosystems**—Alexander E Cherkinsky and Victor A Brovkin

LUNCH

1:30 PM – Session 8B. Geochemical Methods and Applications (continued)

1. **^{14}C Dating of Micritic CaCO_3 Pedogenic Nodules From Vlei Deposits, Haaskraal Pan, South Africa**—Timothy Dalbey, Herbert Haas, John C Vogel and Barney Szabo
2. **Experimental Determination of the ^{14}C Initial Activity of Calcareous Deposits**
Ines Krajcar Bronić, Nada Horvatinčić, Dušan Srdoč and Bogomil Obelić
3. **Travertine Radiocarbon Dating: An Approach From the Study of Recent Travertine Isotopic Composition**—Josep Mas, Josep Trilla and Maria Lluïsa Valls

3:15 PM – Session 9. Oceans – Chair: Reidar Nydal

1. **^{14}C Profiles in the Norwegian and Greenland Seas by Conventional and AMS Measurements**—Reidar Nydal, J S Gislefoss, Ingunn Skjelvan, F H Skogseth, A J T Jull and D J Donahue
2. **Distribution of Bomb Radiocarbon in the Antarctic Ocean: Implications Regarding Iron Fertilization**—Tsong-Hung Peng and Wallace S Broecker
3. **High-Precision $\Delta^{14}\text{C}$ in the Surface Ocean and Climatic Variability**—Ellen R M Druffel, Sheila Griffin and Amy E Witter
4. **Radiocarbon Measurements in South Pacific Ocean Waters in the Vicinity of the Subtropical Convergence Zone**—R J Sparks, D C Lowe, K R Lassey, M R Manning, C B Taylor and G Wallace
5. **Preliminary Measurement of Radiocarbon in Black Carbon From Marine Sediments**
David R Schink and Susan E Trumbore
6. **Constraining the Initiation and Evolution of Anoxia in the Black Sea by AMS Radiocarbon Dating**—Glenn A Jones
7. **^{14}C Activity and ^3He Content in Interstitial Waters From Coral Reef: Evidence for the Endo-Upwelling Concept**—Chantal Andrié, Michel Fontugne, Maurice Arnold and Francis Rougerie

1:30 PM – Session 10. Groundwater Studies – Co-Chairs: Jean Charles Fontes and Austin Long

1. **Reaction Path Perspective of Radiocarbon Dating of Groundwater**—Songlin Cheng
2. **Geochemical Modeling and Radiocarbon Dating of Groundwater: Recent Software Developments and Field Examples**—L N Plummer and E C Prestemon

THURSDAY, MAY 23, 1991 (continued)

3. **³⁶Cl in the Snake River Plain Aquifer: Origin and Implications**—T Beasley, L Cecil, L Mann, P W Kubik, Pankaj Sharma and H E Gove
4. **A Comparison of ¹⁴C and U/Th Ages on Continental Carbonates**—J Ch Fontes, J N Andrews, Christiane Causse and Elisabeth Gibert
5. **The Effect of Microbial Respiration on Reaction-Path Modeling of Groundwater Ages**
E M Murphy

BREAK

6. **Investigating Carbon Sources for Methane and Dissolved Organic Carbon in a Regional Confined Aquifer Using ¹⁴C**—Ramon Aravena, L I Wassenaar and J F Barker
7. **Radiocarbon Dating of Groundwater Containing Microbial Methane** K C Hackley, C-L Liu and D D Coleman
8. **Dating Groundwater in Coastal Plain Aquifers in Southern Maryland Using DOC and DIC ¹⁴C Ages: An Evaluation by Comparison With Other Dating Methods**—C B Purdy, George Burr, G R Helz and A C Mignerey

6:30 PM - CONFERENCE DINNER - SOUTHWESTERN BARBECUE

FRIDAY, MAY 24, 1991

8:00 AM - Session 11A. Paleoastronomy and Natural Variations of Cosmogenic Isotopes
Co-Chairs: G E Kocharov and P E Damon

1. **Cosmogenic Isotopes and the Geomagnetic Field in the Past**—A V Blinov, G E Kocharov, A N Konstantinov and V A Levchenko
2. **Implications of Dipole-Moment Secular Variation From 50,000 to 10,000 Years for the Radiocarbon Record**—Robert S Sternberg and Paul E Damon
3. **Recent and Historical Solar Proton Events**—M A Shea and D F Smart
4. **Variation of Radiocarbon Content in Tree Rings During the Maunder Minimum of Solar Activity**—G E Kocharov, I V Zhorzholiani, Z V Lomtadze, R Ya Metskhvarishvili, A N Peristykh and S L Tsereteli
5. **Shared Periodicities in Solar and $\Delta^{14}\text{C}$ Record Variations**—Paul E Damon and John L Jirikowic
6. **Solar Signals From ¹⁴C in Tree Rings**—Elisabetta Pierazzo and Silvia Sartori

BREAK

7. **Theoretical and Experimental Aspects of Solar Flare Manifestation in Radiocarbon Abundance in Tree Rings**—Stefano Cecchini, Menotti Galli, G E Kocharov, A N Konstantinov, V A Levchenko, I Mikheeva, Teresa Nanni and A Salomoni
8. **A Search for ¹⁴C Tree-Ring Solar Flare Effects**—Stefano Cecchini, Menotti Galli, Teresa Nanni, Pavel Povinec, Livio Ruggiero and A Salomoni
9. **The Vostok ¹⁰Be Spikes and an Interstellar Shock Wave?**—Charles P Sonett and Mihaly Horanyi
10. **Fossil Radioactivity From Nearby Supernovae**—Richard E Lingenfelter
11. **The Physics and Astrophysics of Cosmic-Ray Variations**—J R Jokipii
12. **Cosmic-Ray Generation During the Supernovae Explosion**—G E Kocharov, A N Konstantinov and V A Levchenko

FRIDAY, MAY 24, 1991 (continued)

9:00 AM – Session 12. ¹⁴C Intercomparison Study – Chair: E Marian Scott

1. **The IAEA ¹⁴C Intercomparison Exercise 1990**–Roberto Gonfiantini, Kazimierz Rozanski, Willibald Stichler, E M Scott, R P Beukens, Bernd Kromer and Johannes van der Plicht
2. **Announcement of a Further Intercomparison Exercise**–E M Scott, D D Harkness, G T Cook, B F Miller and M S Baxter
3. **Further Announcement of the International Intercomparison Study (ICS)**–E M Scott, G T Cook, D D Harkness, B F Miller and M S Baxter

10:30 AM – Poster Session – General Topics – Chair: Robert M Kalin

1. **Radiocarbon Dating of Paleoseismicity Along an Earthquake Fault in Southern Italy**
Marisa Alessio, Lucia Allegri, Gilberto Calderoni, Salvatore Imbrota and Vincenzo Petrone
2. **Isotopic Composition of Groundwater and the Uppermost Part of Laminated Sediments of Gośiąż Lake**–Marek Dulinski, Tomasz Goslar, Tadeusz Kuc, Anna Pazdur and Mieczysław F Pazdur
3. **300-Year Declines in Atmospheric ¹⁴C Concentration of the Past**–Tomasz Goslar
4. **Gerardia: The Bristlecone Pine of the Deep-Sea?**–Sheila Griffin, A E Witter, E R M Druffel, D E Nelson, J S Vogel and J R Southon
5. **Determining the Origin of Geothermal Waters in Northwestern Yugoslavia by Isotopic Methods**–Nada Horvatinčić, Dušan Srdoč, Jože Pezdič, Henry Chafetz, Adela Sliepčević and Ines Krajcar Bronić
6. **The International Radiocarbon Data Base and the Southeast Mediterranean Project**
Renee Kra, Robert M Kalin and J M Weinstein
7. **CALIBETH – An Interactive Computer Program for Calibration of Radiocarbon Dates**
Thomas R Niklaus, Georges Bonani, Martin Suter and Willy Wölfli
8. **¹⁴C Activity in Different Sections and Chemical Fractions of Oak Tree Rings, AD 1938–1981**–Ingrid U Olsson and Göran Possnert
9. **¹⁴C Measurements in Oak Tree Rings Around 8000 BP**–Pavel Povinec, Alexander Sivo, Michal Grgula, A A Burchuladze, S V Oagava and G I Togonidze
10. **Radiocarbon Dating: A Didactic Videotape**–Gemma Rauret, J S Mestres and J F Garcia
11. **A Fully Relational Data Base for Radiocarbon Projects**–Roy Switsur
12. **Automatic Calibration of Radiocarbon Dates**–Johannes van der Plicht
13. **The New Groningen ¹⁴C Data Base**–Johannes van der Plicht and Ernst Taayke
14. **The Council for British Archaeology/RCD United Kingdom Archaeological Database**
A J Walker, Cherry Lavell and R L Otlet

LUNCH

2:00 PM – Session 11B. Paleoastrophysics and Natural Variations of Cosmogenic Isotopes (continued)

1. **Carbon Isotope Labels as Mirrors of Global Change**–Minze Stuiver and Thomas F Braziunas
2. **Oceanic and Solar Forcing of Natural Geographic Variations in Atmospheric $\Delta^{14}\text{C}$**
Thomas F Braziunas, Inez Y Fung and Minze Stuiver
3. **Interpreting the Small Cosmogenic Isotope Signal**–Pieter M Grootes

FRIDAY, MAY 24, 1991 (Continued)

4. **Proposed Studies of ^{14}C and ^{10}Be in Polar Ice to Delineate Cosmic-Ray Flux Changes in the Past 40,000 Years**—Devendra Lal and A J T Jull
5. **Stochastic Properties of Geophysical Series**—A V Blinov and V M Ostryakov
6. **General Discussion**

All Day – Poster Session – Paleoastronomy

1. **Anomalous 11-Year $\Delta^{14}\text{C}$ Cycle at High Latitudes**—Paul E Damon, William J Cain, Douglas J Donahue and George Burr
2. **Modeling the $\Delta^{14}\text{C}$ Response to a Complex Solar Forcing**—John L Jirikowic and Paul E Damon
3. **Temporal-Spectral Analysis of the Characteristics of Solar Activity Over the Past 400 Years**—G E Kocharov and A N Peristykh
4. **Schwabe Cycle Manifestation in Radiocarbon Abundance in Annual Tree Rings**
G E Kocharov and A N Peristykh

4:00 PM – Business Meeting

PRE-CONFERENCE WORKSHOPS

Saturday, May 18 and Sunday, May 19, 1991

Liquid Scintillation Counting

Chair: Robert M Kalin

Sunday, May 19, 1991

Prospects for Temporal Extension of the Radiocarbon Calibration

Chair: Malcolm K Hughes

Paleoenvironments of the Eastern Mediterranean: Radiometric Dating and the Interpretation of Interdisciplinary Data Sets

Co-Chairs: Ofer Bar-Yosef and Renee Kra

POST-CONFERENCE TOURS

Saturday, May 25–Tuesday, May 28, 1991 – Grand Canyon

Saturday, May 25–Sunday, May 26, 1991 – Southeast Arizona

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Radiocarbon Measurements: Comprehensive Index, 1950-1965. This index covers all published ¹⁴C measurements through Volume 7 of *RADIOCARBON*, and incorporates revisions made by all laboratories. It is available at \$20.00 per copy.

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