

LUNAR AND PLANETARY INSTITUTE

3303 NASA ROAD 1 HOUSTON, TEXAS 77058



WORKSHOP ON THE ARCHEAN MANTLE

First Announcement

A workshop on "The Archean Mantle" will be held at the Lunar and Planetary Institute January 11-13, 1989. The meeting will be sponsored by LPI as part of NASA's Early Crustal Genesis Program.

The objectives of the Workshop are to consider and discuss evidence for the nature of the Archean mantle (including its composition, age, and structure), its influence on the evolution of Earth's crust, and its relationship to mantle and crustal evolution of the other terrestrial planets. Several lines of evidence have developed over the past few years including petrologic, geochemical, and isotopic data from:

1. Archean basalts and komatiites
2. Nodules and xenocrysts of Archean mantle
3. Possible tectonic slices of Archean mantle
4. Averages of Precambrian sediments

In addition, theoretical studies of thermal, chemical, and tectonic models of the Archean mantle and their implications for further evolution of the mantle and crust have been developed. We expect these to be topics of discussion of the Workshop.

The workshop attendance will be limited to about 75. Costs will be relatively low, as the meeting will be held at LPI. There will be invited talks designed to introduce a subject, but contributed talks are welcomed. Lengthy discussion times are planned. We encourage student participation. Poster sessions during the evenings are a possibility, if sufficient interest exists. Abstracts for invited and contributed presentations will be due at LPI by December 1, 1988. For more information, or to suggest additional discussion topics, contact one of the conveners listed below. Please indicate your interest in attending the Workshop by completing and returning the enclosed form by September 1, 1988.

PROGRAM COMMITTEE

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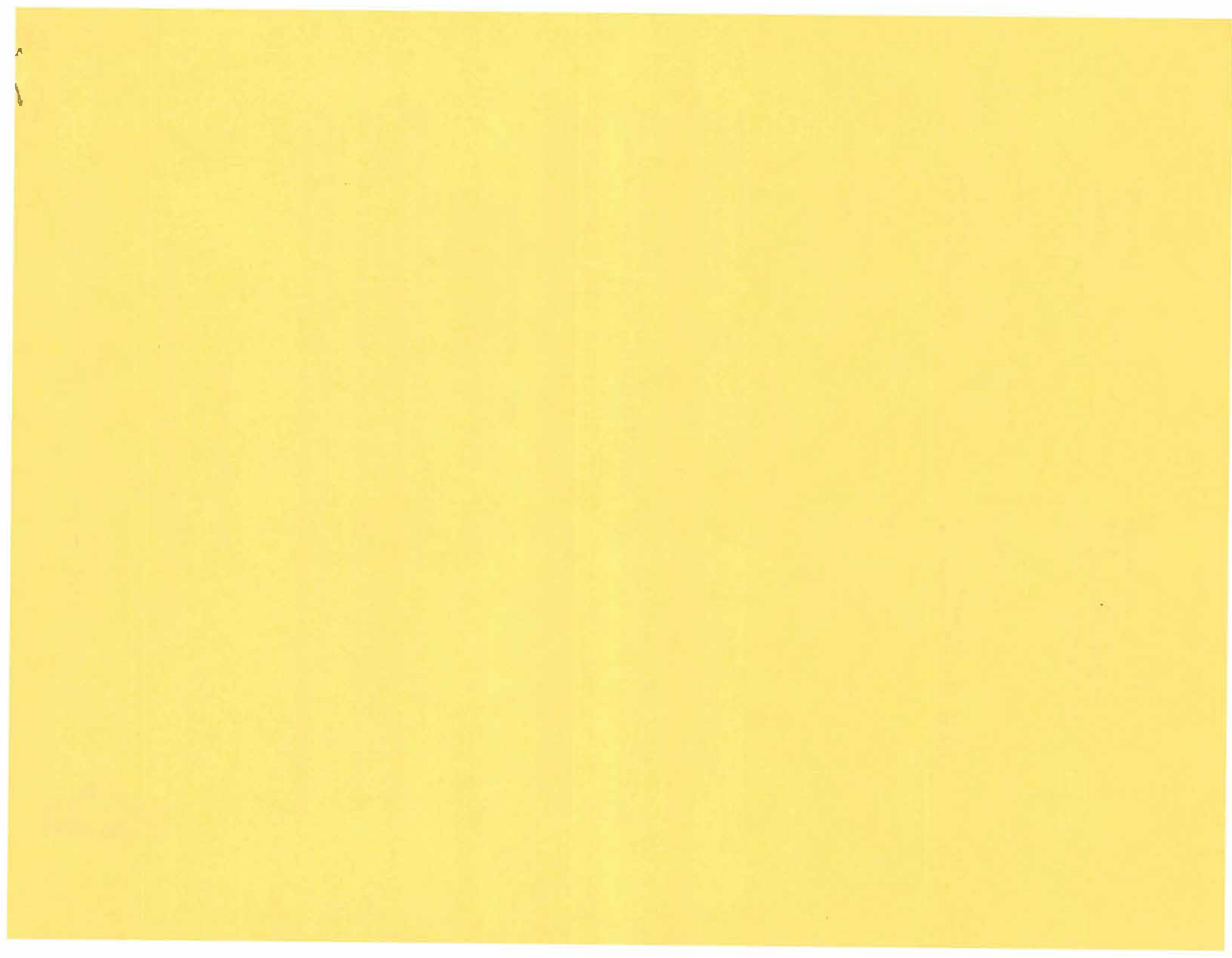
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WORKSHOP ON "THE ARCHEAN MANTLE"
Lunar and Planetary Institute, Houston, Texas, January 11-13, 1989



SECOND CIRCULAR

September 21, 1988

This is the second circular for the Workshop on "The Archean Mantle", which will be held at the Lunar and Planetary Institute January 11-13, 1989.

The objectives of the Workshop are to consider and discuss evidence for the nature of the Archean mantle (including its composition, age, and structure), its influence on the evolution of Earth's crust, and its relationship to mantle and crustal evolution of the other terrestrial planets. Several lines of evidence have developed over the past few years including petrologic, geochemical, and isotopic data from:

1. Archean basalts and komatiites
2. Xenoliths and xenocrysts of Archean mantle
3. Possible tectonic slices of Archean mantle
4. Averages of Precambrian sediments.

In addition, theoretical studies of thermal, chemical, and tectonic models of the Archean mantle and their implications for further evolution of the mantle and crust have been developed. We expect these to be the topics of discussion at the Workshop.

CALL FOR ABSTRACTS: Abstracts for the Workshop are hereby solicited. Forms and instructions are enclosed. Abstracts are to be a maximum of three (3) pages, including text, figures, tables and references. You may use abbreviated references.

The deadline for receipt of abstracts at the LPI Publications Office is **December 1, 1988**. A set of completed forms must accompany the original and seven (7) copies of each abstract. Be sure to indicate whether you prefer an oral or poster presentation. A Technical Report, including abstracts, summaries of technical sessions, and suggestions for future research will be published after the Workshop. Questions concerning abstract submission should be directed to Ms. Stephanie Tindell, LPI Publications Office, at (713) 486-2143.

WORKSHOP FORMAT: After all abstracts have been received, they will be divided into discussion topics. We expect each topic to be introduced by a keynote talk that will provide background information and outline unsolved problems. These will be followed by a discussion period, during which contributed talks will be presented. Contributed talks will be allowed ten or fifteen minutes, depending on the number of requests for speaking time. We feel that group discussion will be more fruitful than individual presentations, and we expect to schedule discussion periods on the order of 30-45 minutes. Participants are asked to arrive armed with slides or viewgraphs to show when appropriate during discussions.

POSTERS: Poster presentations will be up throughout the meeting, and we also will dedicate one or two evening keg sessions to poster viewing and discussion.

LOGISTICS: The Workshop will be held January 11-13, 1989 at the LPI in Houston. Information about the registration fee, hotels, airports and restaurants will be sent in mid-December. For more information please contact one of the following:

Lewis D. Ashwal, LPI, 713-486-2147
Ian D. MacGregor, NSF, 202-357-9591
Tony J. Naldrett, Univ. Toronto, 416-978-3022
William C. Phinney, NASA/JSC, 713-483-5310
Frank Richter, Univ. Chicago, 312-702-8118
Steven B. Shirey, DTM, 202-686-4370)
Pamela A. Jones (LPI, 713-486-2150).

PLEASE ADHERE TO THE ABSTRACT DEADLINE OF DECEMBER 1, 1988.

WORKSHOP ON "THE ARCHEAN MANTLE"
Lunar and Planetary Institute, Houston, Texas, January 11-13, 1989



FINAL CIRCULAR

November 19, 1988

The workshop on the Archean Mantle will begin at 8:30 a.m. on Wednesday, January 11, 1989. We are anticipating an exciting program and are looking forward to your participation in the meeting.

REGISTRATION: You may pre-register using the enclosed form. The fee for pre-registration is \$25 (payment by January 6). The registration fee after January 6 is \$35.00. Foreign participants may claim an exemption from the late charge by indicating they will pay on arrival after exchanging currency. Checks must be in US dollars and should be made payable to LPI. We are not able to accept credit card payments. During the meeting registration will be held from 7:30 a.m. to 8:30 a.m. on Wednesday, January 11th, and from 8:00 a.m. to 9:00 a.m. on Thursday. Coffee, danish and juice will be served each morning of the meeting from 8:00 to 8:30.

SPEAKERS: Two 35mm projectors and one overhead projector will be available for speakers. If you need any other equipment for your presentation, please call the Projects Office well in advance of the meeting (713-486-2166). The enclosed cue sheet should be given to the projectionist at least 15 minutes before the session starts.

PROGRAM: The workshop program is currently being constructed by the organizing committee. Copies will be mailed in advance to pre-registered attendees and available to all participants at the meeting.

PUBLICATIONS: Abstracts submitted to LPI for the workshop by December 1st will be compiled in a volume to be distributed at the meeting. All presentations must be supported by an abstract. If your abstract has not been received at LPI by December 1st, you should bring your original and 40 copies to the registration desk. The copies will be made available to the other workshop participants and the original will be included in the Technical Report to be published following the workshop. Revised abstracts for the Technical Report may be submitted to the LPI Publications Office through February 15th, 1989. If you have any questions concerning your submitted abstract, please contact the Publications Office at 713-486-2143.

MESSAGES: During the workshop, messages will be taken and delivered to the registration desk. The sessions will not be interrupted to deliver telephone messages unless there is an emergency. Messages should be called left at 713-486-2166.

SOCIAL EVENT: A workshop wine and chese social will be held at LPI the evening of January 12th following the afternoon session. All registered participants are invited to attend. Keg sessions will be held in conjunction with poster discussions during each evening of the workshop.

LOCAL HOTELS/TRANSPORTATION: A list of all the local hotels with their current range of rates and a map of their location is enclosed. The prices are subject to change without notice, so please verify the rate with reservations clerk at the time you make your reservations.

The routes from Hobby Airport and Houston Intercontinental Airport are shown on the inset (lower-right corner) of the local area map. Ground transportation is available by Galveston Limousine from either airport to the local hotels for a \$16 one-way fare. A taxi fare from Hobby Airport is about \$20 and from Intercontinental, about \$50. Rental cars are available at both airports.

If you have questions regarding your trip to this workshop please call the LPI Projects Office at 713-486-2150. Questions regarding the program should be directed to Bill Phinney or Lew Ashwal.

PROGRAM COMMITTEE

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**WORKSHOP ON THE ARCHEAN MANTLE
PRELIMINARY PROGRAM
January 11-13, 1989 Houston, TX**

Wednesday, January 11, 1989

7:30 a.m. Registration

**SESSION I ISOTOPIC AND CHEMICAL ASPECTS OF MANTLE EVOLUTION
8:30 a.m.**

Chairman: G. N. Hanson

Summarizer: L. D. Ashwal

Jones J.

Boundary Conditions for The Archean Mantle

Arculus R.

Secular Change in the Archean Mantle

Shirey S. B. Carlson R. W.

The Pb and Nd Isotopic Evolution of The Archean Mantle

DISCUSSION (30 MINUTES)

Jacobsen S. B.

Isotopic Evolution of The Archean Mantle

Smith A. D.* Ludden J. N.

Isotopic Evolution of the Archaean Depleted Mantle

Walker R. J. Shirey S. B. Carlson R. W. Morgan J. W.

Re-Os Isotopic Constraints on the Chemical Evolution of the Archean Mantle

DISCUSSION (30 MINUTES)

LUNCH BREAK

**SESSION I ISOTOPIC AND CHEMICAL ASPECTS
OF MANTLE EVOLUTION (cont.)**

1:30 p.m.

Chairman: R. Arculus

Summarizer: S. McLennan

Mueller P. A. Wooden J. L.

Archean Crustal Recycling: Implications for Isotopic Heterogeneity in the Mantle

Chauvel C.

Geochemical and Isotopic Constraints on the Composition of the Archean Mantle

Jahn B. M.* Gruau G.

Geochemistry and Isotopic Characteristics of Archean Basalts and Komatiites and Their Inference on Early Crust-Mantle Differentiation

DISCUSSION (30 MINUTES)

**SESSION II CONSTRAINTS ON MANTLE EVOLUTION
FROM SEDIMENTARY MATERIALS**

McLennan S. M.*

Archean Sedimentary Rocks and the Archean Mantle

Sims K. W.* Newsom H. E. Gladney E. S.

Abundances of As, Sb, W and Mo in Early Archean and Phanerozoic Mantle-derived and Continental Crustal Rocks

DISCUSSION (30 MINUTES)

Thursday, January 12, 1989

SESSION III PHYSICAL ASPECTS OF MANTLE EVOLUTION

8:30 a.m.

Chairman: K. Burke

Summarizer: P. Morgan

F. M. Richter

Models for the Thermal Evolution of the Earth

P. Morgan

3The Diamond-Komatiite Paradox: Hot Mantle-Thick Lithosphere

Head J. W.*

The Geology and Tectonics of Venus and Some Possible Implications for the Archean Earth

Helmstaedt H. H. Schulze D. J.

Evidence for Subduction and spreading in the Archean Rock Record: Implication for Archean Tectonic Style and the Evolution of the Sub-continental Lithosphere

DISCUSSION (30 MINUTES)

SESSION IV: CONSTRAINTS ON MANTLE EVOLUTION FROM XENOLITHS

Chairman: A. J. Naldrett

Summarizer: A. J. Irving

Irving A. J. O'Brian H. McCallum I. S.

Precambrian Mantle Beneath Montana and British Columbia: Geochemical Evidence from Eocene Volcanics and Their Xenoliths

Eggler D. H.

The Archean Mantle Lithosphere Beneath the Wyoming Province

DISCUSSION (30 MINUTES)

LUNCH

**SESSION IV: CONSTRAINTS ON MANTLE EVOLUTION
FROM XENOLITHS (contd.)**

1:30 p.m.

Schulze D.

The Constitution of the "Real" Upper Mantle as Seen from Xenoliths

Neal C. R.* Taylor L. A. Halliday A. N. Holden P. Davidson J. P. Clayton R. N.
Mayeda T. K.

*Evidence for a Differentiated Mantle and Plate Tectonics During the Late Archean Deduced
from Eclogite Xenoliths in the Bellsbank Kimberlite*

DISCUSSION (30 MINUTES)

**SESSION V: CONSTRAINTS ON MANTLE EVOLUTION FROM
MANTLE DERIVED MELTS**

Balakrishnan S. Hanson G. N.* Rajamani V.

Kolar Amphibolites-Archean Analogues of Modern Basaltic Volcanism?

Rajamani V. Balakrishnan S. Krogstad E. J. Hanson G. N.

The Kolar Schist Belt, South India: Implications to the Nature of the Late Archean Mantle

DISCUSSION (30 MINUTES)

Byerly G. R.

*Mendon Formation Komatiites: Extreme Al₂O₃/TiO₂ Variation in the Uppermost Onverwacht
Group of the Barberton Greenstone Belt*

Rogers N. W.* Marsh J. S.

*Archean Flood Basalts from South Africa: Implications for Local Heterogeneity in the Archean
Mantle*

Ernst W. G.* Jahn, B-M

*Geochemistry and Geochronology of Late Archean Mafic-Ultramafic Supracrustal Amphibolites
from the Northeastern Sino-Korean Craton, China*

DISCUSSION (30 MINUTES)

Friday, January 13, 1989

**SESSION VI: CONSTRAINTS ON MANTLE EVOLUTION FROM
MANTLE DERIVED (continued)**

Chairman: L. D. Ashwal

Summarizer: T. Barrie

Stern R. A.* Hanson G. N. Shirey S. B.

Petrogenesis of High Mg, LILE-enriched Archean Monzodiorites and Trachyandesites (Sanukitoids) and Granodioritic Derivatives in Southwest Superior Province

Barrie C. T.* Shirey S. B.

Geochemistry and Nd-Sr Isotope Systematics of the Koamiskotia Area, Western Abitibi Subprovince, Canada: Implications for Mantle Processes During the Formation of the Southern Superior Craton

DISCUSSION (30 MINUTES)

Smith P. E. Farquhar R. M.

Mantle-Crust Relationships in the Eastern Superior Province Inferred from Hf and Pb Isotope Studies

Lambert D. D. Walker R. J. Shirey S. B. Carlson R. W. Morgan J. W.

Magma Evolution in the Stillwater Complex, Montana: REE, Sr, and Nd Isotopic Evidence for Archean Lithospheric Interaction

Smaglik S. M.

Mantle Heterogeneity as Evidenced by Archean Mafic and Ultramafic Volcanic Rocks from the Laramie Range, Wyoming

DISCUSSION (30 MINUTES)

ADJOURN WORKSHOP