

LUNAR AND PLANETARY INSTITUTE

3303 NASA ROAD 1 HOUSTON, TEXAS 77058



WORKSHOP ON "MOON IN TRANSITION: APOLLO 14, KREEP, AND EVOLVED LUNAR ROCKS"

November 14-16, 1988, Lunar and Planetary Institute

FIRST CIRCULAR

May 3, 1988

The Lunar and Planetary Sample Team is organizing a workshop that will focus on the transition from the earliest (magma ocean?) lunar differentiation to subsequent magmatic activity, including the production of ancient (4.3 Gy) mare basalts. This period of lunar history involved the formation of highly evolved materials, such as granites and KREEP. The workshop will center around Apollo 14 samples and the Apollo 14 site, as this site contains an extensive suite of evolved materials. Among the topics and questions that will be discussed at the workshop are the following:

- 1) **Regional geology of the Apollo 14 landing site.** This landing site was chosen primarily to sample the Fra Mauro Formation, but many questions remain. What proportion of the Fra Mauro Formation is Imbrium ejecta, rather than derived locally? How much material could come from other, older basins? Did the abundant KREEP at the site come from Imbrium? Why is KREEP so abundant at this site? Why is the distribution of KREEP apparently asymmetric on the Moon?
- 2) **Apollo 14 mare basalts.** Many fragments of aluminous mare basalts have been found as clasts in Apollo 14 breccias, including the oldest mare basalts (4.3 Gy). What is the origin of aluminous mare basalts in general, and very-high-potassium aluminous basalts in particular? What is the volumetric abundance of pre-4.0 Gy mare basalt in the crust? What other types of mare basalt types are found among the Apollo 14 lithic fragments? What roles did assimilation and fractional crystallization or other petrologic processes play in the evolution of these mare basalts? What was the nature of the material assimilated? What information do Apollo 14 mare basalts contain about the isotopic evolution of the Moon?
- 3) **KREEP and evolved lunar rocks.** Why is pristine KREEP so rare among Apollo samples? What was Apollo 14 KREEP like before being mixed into breccias? How does it compare to KREEP at other sites? How does KREEP relate to the magma ocean?
- 4) **Apollo 14 plutonic rocks.** How did highly evolved rocks, such as granites, form? Are they related to KREEP? Was liquid immiscibility involved? Are magnesian cumulates, such as Apollo 14 troctolites, related to KREEP? How old are they? Why are ferroan anorthosites and plutonic norites so rare at Apollo 14? How and when did alkali anorthosites form?
- 5) **Relation of Apollo 14 lithologies to the magma ocean hypothesis and other models of early lunar differentiation.**

The workshop will be held November 14-16, 1988, at the LPI. There will be invited talks designed to introduce a subject, but contributed talks are welcomed. There will be ample time for discussion. Abstracts for contributed and invited contributions are due at the LPI by September 15, 1988. For more information or to suggest additional discussion topics, contact one of the convenors (G. Jeffrey Taylor, University of New Mexico, 505-277-9159; and Paul Warren, UCLA, 213-825-2015) or Pam Jones (LPI, 713-486-2150).

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WORKSHOP ON "MOON IN TRANSITION: APOLLO 14, KREEP, AND EVOLVED LUNAR ROCKS" November 14-16, 1988, Lunar and Planetary Institute

SECOND CIRCULAR

July 27, 1988

CALL FOR ABSTRACTS: Abstracts for the Workshop on "Moon in Transition: Apollo 14; KREEP, and Evolved Lunar Rocks" are solicited. Forms and instructions are enclosed. Contributed abstracts are to be a maximum of three (3) pages plus as many pages of references as desired. Invited abstracts are to be a maximum of five (5) pages plus as many pages of references as desired. Please use full reference listings, including complete titles of papers.

The **deadline** for receipt of abstracts at the LPI Publications Office is **September 15, 1988**. A set of completed forms must accompany the original and four (4) copies of each abstract. Method of presentation for all abstracts will be oral. A technical report 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: Workshop discussions have been divided into seven topics. Each topic will be introduced by an invited 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. The contributed talks will be allowed a maximum time of ten minutes, but the organizers urge shorter presentations. We encourage participants to arrive armed with slides or viewgraphs to show when appropriate during discussions. The seven topics are the following:

- 1) Regional geology and the role of impacts
- 2) Brecciated nature of the Apollo 14 suite
- 3) What is KREEP?
- 4) Apollo 14 plutonic rocks
- 5) Apollo 14 mare basalts
- 6) Isotopic constraints on early lunar differentiation
- 7) Relation of evolved lithologies to the magma ocean or other early lunar differentiation events.

The workshop will be held November 14-16, 1988, at the LPI. Logistics information and a pre-registration form will be included in the final announcement to be mailed in early October. For more information contact one of the convenors (G. Jeffrey Taylor, University of New Mexico, 505-277-9159; and Paul Warren, UCLA, 213-825-2015) or LeBecca Turner (LPI, 713-486-2158).



**WORKSHOP ON "MOON IN TRANSITION: APOLLO 14,
KREEP, AND EVOLVED LUNAR ROCKS"
November 14-16, 1988, Lunar and Planetary Institute**

FINAL CIRCULAR

October 13, 1988

The preliminary program for the Workshop on "Moon in Transition: Apollo 14, KREEP, and Evolved Lunar Rocks" as developed by the Workshop Program Committee is enclosed. We are anticipating a productive and interesting meeting. Workshop sessions will begin at 9:00 a.m. on Monday, November 14th in the Berkner Room at the Lunar and Planetary Institute in Houston. The following are details concerning registration, audio-visual support, local hotels and transportation, etc.

REGISTRATION: You may pre-register using the enclosed form. The fee for pre-registration is \$10 (payment by Nov. 4th). The late fee is \$15 for registrations received in the mail after November 4th or at the workshop. The fees must be paid by check (payable to LPI) or cash in U.S. dollars. We are not able to accept credit card payments. Registration at the meeting will be held from 8 - 9:00 a.m. on Monday, November 14th in the LPI living room. Coffee, danish, and juice will be served during this registration period and each following morning of the workshop at 8:30 a.m.

SPEAKERS: Two 35mm projectors and one overhead projector will be available for you to use during your presentation. If you need any other equipment for your presentation, please notify LeBecca Turner in the LPI Projects Office at 713-486-2158 as soon as possible. The enclosed cue sheet should be given to the projectionist at least 15 minutes before the session starts.

PUBLICATIONS: Abstracts submitted to LPI for the workshop by October 14th 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 October 14th, 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 December 16, 1988. 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 in to 713-486-2158.

LOCAL HOTELS/TRANSPORTATION: A sheet listing all the hotels in the local area is enclosed for your information. A map of the area with the location of these hotels and of LPI is on the reverse side of this sheet. The rates that are shown are subject to change without notice, so please verify the rate with the reservation 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; the rate from Intercontinental is about \$50. Rental cars are available at both airports.

American Airlines is offering discounted rates for this meeting. You may have your travel agent call their toll-free number 800-433-1790, and ask for Star File #S-56083. You must use both of these numbers to receive the discounted rates. A brochure with details is enclosed.

SOCIAL EVENT: Monday evening at 5:30 p.m. we will have a social hour and barbeque dinner with the participants of the "Sample Acquisition Analysis and Preservation Technical Instrument" Workshop being held at NASA Johnson Space Center on the same dates as our meeting. Jeff Plescia and Doug Ming are convening the workshop at JSC and have arranged for the social and dinner to be a joint-meeting event. All participants are invited. The social and dinner will be held at LPI.

If you have questions concerning the program, you may contact one of the conveners, G. Jeffrey Taylor, University of New Mexico (505-277-9159) or Paul Warren, UCLA (213-825-2015). For assistance with your travel arrangements or questions concerning registration, please contact LeBecca Turner, LPI Projects Office (713-486-2158).