

WORKSHOP ON GEOLOGY OF THE APOLLO 17 LANDING SITE



LPI Technical Report Number 92-09, Part 2

Lunar and Planetary Institute 3600 Bay Area Boulevard Houston TX 77058-1113
LPI/TR--92-09, Part 2

**WORKSHOP ON
GEOLOGY OF THE APOLLO 17 LANDING SITE**

Edited by

G. Ryder, H. H. Schmitt, and P. D. Spudis

Held at
Houston, Texas

December 2-4, 1992

Sponsored by
Lunar and Planetary Sample Team
Lunar and Planetary Institute

Lunar and Planetary Institute 3600 Bay Area Boulevard Houston TX 77058-1113

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Cover: Station 4 at Taurus-Littrow, Apollo 17 landing site. The rover is on the rim of Shorty Crater, an impact crater 10 m in diameter, which has excavated dark material (volcanic pyroclastic glasses) from beneath the light mantle (highland debris). LM Pilot Jack Schmitt prepares to study, sample, and characterize the dark ejecta deposits of this crater.

Preface

The Lunar and Planetary Sample Team (LAPST) and the Lunar and Planetary Institute (LPI) co-sponsored the Workshop on the Geology of the Apollo 17 Landing Site. The workshop was held at the LPI on December 2–4, 1992, one week before the twentieth anniversary of the final Apollo mission to the Moon. Co-conveners were Harrison H. Schmitt (Apollo 17 Lunar Module Pilot) and Graham Ryder and Paul Spudis (LPI Staff Scientists).

The Apollo 17 site was specifically chosen as the topic of this workshop because of its geological diversity; many aspects of lunar processes and history may be studied at the site. The workshop began with an overview of the Apollo 17 site and technical sessions covered such topics as the origin and evolution of the lunar crust in the Apollo 17 region, lunar highlands geology and basin formation, mare volcanism, postmare geological history and processes, and our future on the Moon.

The workshop format consisted of 30-minute invited talks interspersed with 10-minute contributed talks. The meeting was well attended, with 78 participants from such diverse disciplines as photogeology, petrology, geochemistry, geophysics, remote sensing, and resource utilization.

Program

Wednesday morning, December 2, 1992

7:30–8:30 Registration

8:30–8:45 Opening Remarks

OVERVIEW OF THE APOLLO 17 SITE

8:45 a.m.–12:20 p.m.

Chair: Jack Sevier

8:45–9:25 Wilhelms D. E.*
Last Chance at Taurus-Littrow

9:25–10:05 Muehlberger W. R.*
Geology of the Apollo 17 Site

10:05–10:20 COFFEE BREAK

10:20–10:40 Neal C. R.* Taylor L. A.
The Apollo 17 Mare Basalts: Serenely Sampling Taurus-Littrow

10:40–11:00 Ryder G.*
The Apollo 17 Samples: The Massifs and Landslide

11:00–11:45 Cernan E. Schmitt H.
Crew Observations

11:45–2:00 LUNCH

ORIGIN AND EVOLUTION OF THE LUNAR CRUST IN APOLLO 17 REGION

2:00–4:45 p.m.

Chair: Paul Warren

2:00–2:40 James O. B.*
The Ancient Lunar Crust, Apollo 17 Region

2:40–3:10 Premo W. R.* Tatsumoto M.
*Isotopic Ages and Characteristics of Ancient (Pre-Serenitatis) Lunar Crustal
Rocks at Apollo 17*

3:10–3:30 COFFEE BREAK

* Denotes speaker

- 3:30–3:45 Jolliff B. L.* Bishop K. M. Haskin L. A.
Possible Petrogenetic Associations Among Igneous Components in North Massif Soils: Evidence in 2–4-mm Soil Particles from 76503
- 3:45–4:00 Bishop K. M.* Jolliff B. L. Korotev R. L. Haskin L. A.
North Massif Lithologies and Chemical Compositions Viewed from 2–4-mm Particles of Soil Sample 76503
- 4:00–4:15 Warren P. H.* Kallemeyn G. W.
Troctolitic Anorthosite from 77115: A Magnesian Member of the Alkalic Suite
- 4:15–4:45 Discussion
- 5:00–6:30 RECEPTION—LPI Great Room

Thursday morning, December 3, 1992

LUNAR HIGHLANDS GEOLOGY AND BASIN FORMATION

8:30 a.m.–12:00 p.m.

Chair: Mark Cintala

- 8:30–9:10 Head J. W.*
The Serenitatis Basin and the Taurus-Littrow Highlands: Geological Context and History
- 9:10–9:25 Ryder G.*
Impact Melt Breccias at the Apollo 17 Landing Site
- 9:25–9:40 Spudis P. D.*
Basaltic Impact Melts in the Apollo Collections: How Many Impacts and Which Events are Recorded?
- 9:40–9:55 Norman M. D.* Taylor G. J. Spudis P. Ryder G.
Lithologies Contributing to the Clast Population in Apollo 17 LKFM Basaltic Impact Melts
- 9:55–10:10 Warren P. H.*
The Sudbury-Serenitatis Analogy and “So-Called” Pristine Nonmare Rocks
- 10:10–10:30 COFFEE BREAK
- 10:30–10:45 Cushing J. A.* Taylor G. J. Norman M. D. Keil K.
Refining the Granulite Suite
- 10:45–11:00 Hawke B. R.* Peterson C. A. Lucey P. G. Blewett D. T. Bell J. F. III
Spudis P. D.
A Spectral Survey of the Serenitatis Basin Region of the Moon

11:00–11:15 Jaumann R.* Neukum G.
The Apollo 17 Region: A Compositional Overview

11:15–12:00 Discussion

12:00–1:30 LUNCH

MARE VOLCANISM AT APOLLO 17

1:30–4:15 p.m.

Chair: Ian Ridley

1:30–2:10 Delano J. W.*
Mare Volcanism in the Taurus-Littrow Region

2:10–2:25 Neal C. R.* Taylor L. A.
Using Apollo 17 High-Ti Mare Basalts as Windows to the Lunar Mantle

2:25–2:40 Snyder G. A.* Taylor L. A. Halliday A. N.
Melting of Cogenetic Depleted and Enriched Reservoirs and the Production of High-Ti Mare Basalts

2:40–2:55 Jerde E. A.* Snyder G. A. Taylor L. A.
NeoKREEP: A New Lunar Component at Apollo 17

2:55–3:15 COFFEE BREAK

3:15–3:30 Delano J. W.* McGuire J.
Abundances of Sodium, Sulfur, and Potassium in Lunar Volcanic Glasses: Evidence for Volatile Loss During Eruption

3:30–3:45 McKay D. S.* Wentworth S. J.
Morphology and Composition of Condensates on Apollo 17 Orange and Black Glass

3:45–4:15 Discussion

Friday morning, December 4, 1992

POST-MARE GEOLOGICAL HISTORY AND PROCESSES

8:30–10:10 a.m.

Chair: Arch Reid

8:30–9:10 Sharpton V. L.*
Apollo 17: One Giant Step Toward Understanding the Tectonic Evolution of the Moon

- 9:10–9:25 Luchitta B. K.*
The Taurus-Littrow Dark Mantle, Light Mantle, Crater Cluster, and Scarp
- 9:25–10:05 Korotev R. L.*
The Apollo 17 Regolith
- 10:05–10:20 Norris J. A.* Keller L. P. McKay D. S.
Impact Glasses from the <20- μ m Fraction of Apollo 17 Soils 72501 and 78221
- 10:20–10:35 Lindstrom D. J.* Wentworth S. J. Martinez R. R. McKay D. S.
Geochemistry of HASP, VLT, and Other Glasses from Double Drive Tube 79001/2

APOLLO 17 SITE AND OUR FUTURE ON THE MOON

10:10–11:45 a.m.

Chair: Wendell Mendell

- 10:35–11:15 Taylor G. J.*
Future Scientific Exploration of Taurus-Littrow
- 11:15–11:55 Haskin L. A.* Colson R. O.
Resource Availability at Taurus-Littrow
- 11:55–12:10 Allen C. C.* Gibson M. A. Knudsen C. W. Kanamori H. Morris R. V.
Keller L. P. McKay D. S.
Lunar Resources—Oxygen from Rocks and Soil

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