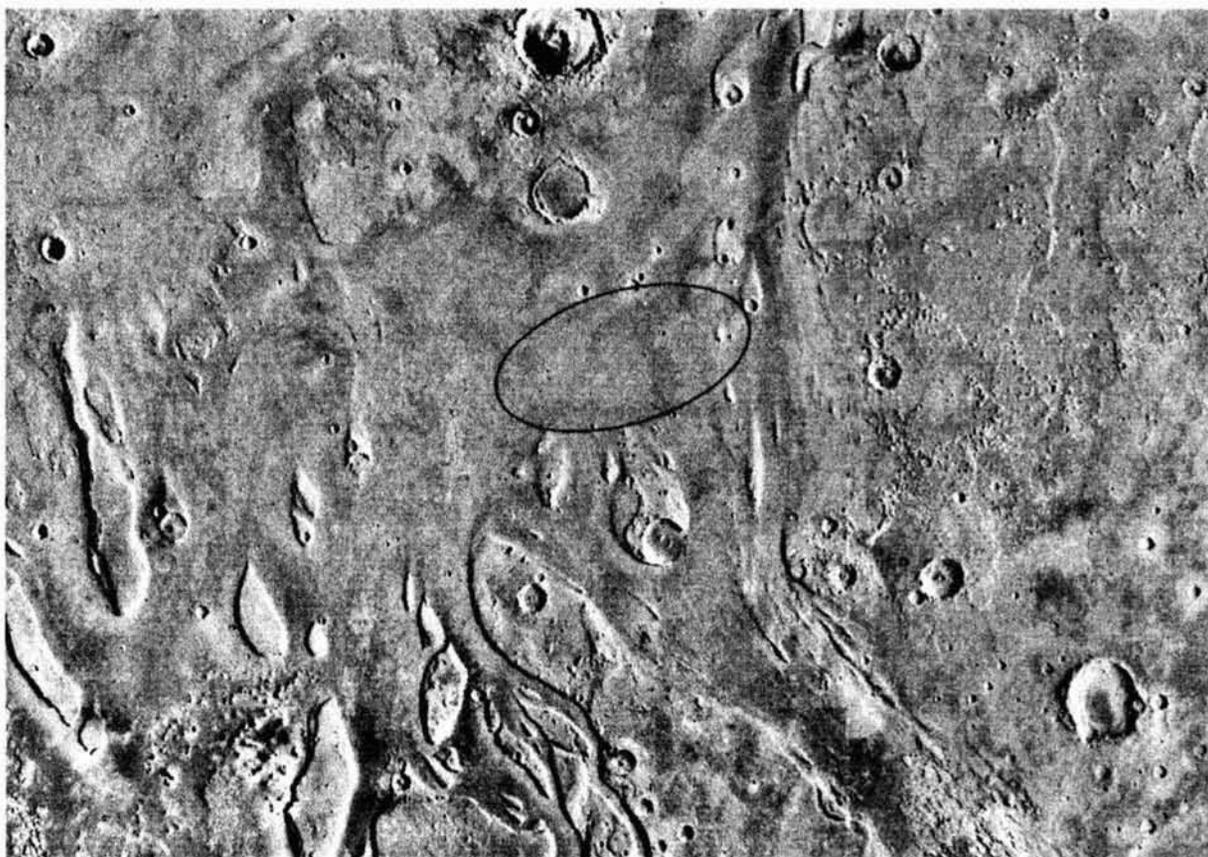


MARS PATHFINDER LANDING SITE
WORKSHOP II: CHARACTERISTICS
OF THE ARES VALLIS REGION
AND
FIELD TRIPS IN THE CHANNELED
SCABLAND, WASHINGTON



LPI Technical Report Number 95-01, Part 2

Lunar and Planetary Institute 3600 Bay Area Boulevard Houston TX 77058-1113
LPI/TR--95-01, Part 2

**MARS PATHFINDER LANDING SITE WORKSHOP II:
CHARACTERISTICS OF THE ARES VALLIS REGION
AND
FIELD TRIPS TO THE CHANNELED SCABLAND, WASHINGTON**

Edited by

M. P. Golombek, K. S. Edgett, and J. W. Rice Jr.

Held at
Spokane, Washington

September 24–30, 1995

Sponsored by
Arizona State University
Jet Propulsion Laboratory
Lunar and Planetary Institute
National Aeronautics and Space Administration

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

LPI Technical Report Number 95-01, Part 2
LPI/TR--95-01, Part 2

Compiled in 1995 by
LUNAR AND PLANETARY INSTITUTE

The Institute is operated by the Universities Space Research Association under Contract No. NASW-4574 with the National Aeronautics and Space Administration.

Material in this volume may be copied without restraint for library, abstract service, education, or personal research purposes; however, republication of any paper or portion thereof requires the written permission of the authors as well as the appropriate acknowledgment of this publication.

This report may be cited as

Golombek M. P., Edgett K. S. and Rice J. W. Jr., eds. (1995) *Mars Pathfinder Landing Site Workshop II: Characteristics of the Ares Vallis Region and Field Trips to the Channeled Scabland*. LPI Tech. Rpt. 95-01, Part 2, Lunar and Planetary Institute, Houston. 47 pp.

This report is distributed by

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

Mail order requestors will be invoiced for the cost of shipping and handling.

Cover: Regional mosaic showing the Mars Pathfinder landing site (100 km × 200 km landing ellipse shown). The mosaic shows large catastrophic outflow channels debouching into Chryse Planitia. Ares Vallis flowed to the northwest (from the southeast) across the landing site. Tiu Valles is just to the west of Ares Vallis and may also have flowed across the landing area. The landing site itself is a very smooth depositional surface, where the flood waters deposited the sediments carved from the channels. Landing at this location should allow analysis of a wide variety of rock types deposited by the flood. These catastrophic outflow channels on Mars are much larger analogs to the Channeled Scabland in Washington state.

Introduction

Mars Pathfinder, our next mission to arrive at Mars, will place a single lander on the surface of Mars on July 4, 1997, following a December 1996 launch. As a result of the very successful first Mars Pathfinder Landing Site Workshop held April 18–19, 1994, at the Lunar and Planetary Institute, the project has selected the Ares Vallis outflow channel in Chryse Planitia as the landing site. This location is where a large catastrophic outflow channel debouches into the northern lowlands. Landing on the material deposited by the flood (a so-called “grab bag” site) provides the opportunity to analyze a variety of different rocks that make up the martian crust (ancient Noachian highlands as well as Hesperian ridged plains). On September 24–30, 1995, a second workshop and series of field trips, entitled Mars Pathfinder Landing Site Workshop II: Characteristics of the Ares Vallis Region and Field Trips in the Channeled Scabland, Washington, were held in Spokane and Moses Lake, Washington.

The purpose of the workshop was to provide a focus for learning as much as possible about the Ares Vallis region on Mars before landing there. The rationale is that the more that can be learned about the general area prior to landing, the better scientists will be able to interpret the observations made by the lander and rover and place them in the proper geologic context. The field trip included overflights and surface investigations of the Channeled Scabland (an Earth analog for the martian catastrophic outflow channels), focusing on areas particularly analogous to Ares Vallis and the landing site. The overflights were essential for placing the enormous erosional and depositional features of the Channeled Scabland into proper three-dimensional context. The field trips were a joint educational outreach activity involving K–12 science educators, competitively selected from Washington and Idaho, Mars Pathfinder scientists and engineers, and interested scientists from the Mars scientific community. The workshop was convened by M. Golombek of the Jet Propulsion Laboratory, who authored the “Mission Description” (pp. 1–8) found in Part 1 of this technical report. The field trip was convened by K. Edgett and J. Rice of Arizona State University and led by V. Baker of the University of Arizona.

Part 1 of this technical report includes a description of the Mars Pathfinder mission, abstracts accepted for presentation at the workshop, an introduction to the Channeled Scabland, and field trip guides for the overflight and two field trips. Part 2 includes the program for the workshop, summaries of the workshop technical sessions, a summary of the field trips and ensuing discussions, late abstracts of workshop presentations, reports on the education and public outreach activities carried out by the educators, and a list of the workshop and field trip participants.

Program

Thursday, September 28, 1995

7:30–8:30 a.m. Registration and Continental Breakfast

8:30–8:35 a.m. Welcome and Introduction
M. P. Golombek

SESSION I: THE MARS PATHFINDER MISSION, PROJECT, AND LANDING SITE

Chair: A. Treiman

8:35–10:30 a.m.

The Mars Pathfinder Mission

M. P. Golombek

Status of the Mars Pathfinder Project

A. J. Spear

Engineering Constraints on Pathfinder Landing

R. Cook

Mars Pathfinder Landing Site Selection

M. P. Golombek

SESSION II: REGIONAL GEOLOGY OF CHRYSE PLANITIA

Chair: V. Baker

10:45 a.m.–12:00 noon

Regional Geology and Sedimentary Stratigraphy of Chryse Planitia, Mars

K. L. Tanaka

The Geologic Mapping of the Ares Vallis Region

J. W. Rice Jr.

SESSION II: REGIONAL GEOLOGY OF CHRYSE PLANITIA (continued)

Chair: V. Baker

1:30–2:00 p.m.

Geologic Mapping Traverse of the Highland-to-Lowland Transition in an Area Adjacent to the Mars Pathfinder Region

L. S. Crumpler

SESSION III: CHRYSE FLOODING

Chair: R. Kuzmin

2:00–3:30 p.m.

Facies on Mars: A Model for the Chryse Basin Outflow Sediments Based on Analog Studies of Icelandic Sandar and the Ephrata Fan of the Channeled Scabland, Washington

J. W. Rice Jr. and K. S. Edgett

Catastrophic Paleoflooding at the Pathfinder Landing Site: Ares Vallis, Mars

G. Komatsu and V. R. Baker

Estimates of the Maximum and Minimum Flow Velocities of the Circum-Chryse Outflow Channels

R. A. Craddock and K. L. Tanaka

**SESSION IV: LANDING ELLIPSE GEOLOGY, SEDIMENTOLOGY,
AND EXOPALEONTOLOGY**

Chair: K. Tanaka

3:30–5:00 p.m.

Mars Pathfinder: Geology of the Landing Site Ellipse

R. O. Kuzmin and R. Greeley

Viking Stereo of the Ares Vallis Site: Sedimentological Implications

T. J. Parker

An Exopaleontological Framework for the Mars Pathfinder Landing Site

J. Farmer

SESSION V: POSTERS

Chair: M. Golombek

5:00–5:30 p.m.

Morphologic Map of Ares Vallis

F. Costard

Preliminary Cartographic Analysis of the Pathfinder Landing Site Using Viking Orbiter Images
T. C. Duxbury

Viking IRTM Observations of the Anticipated Mars Pathfinder Landing Site at Ares Vallis
K. S. Edgett

*Viking IRTM High Resolution (2–5 km) Observations of Ares Vallis and the Mars
Pathfinder Landing Site Region*
K. S. Edgett and J. R. Zimbelman

Characteristics of the Mars Pathfinder Landing Site
M. P. Golombek, T. J. Parker, H. J. Moore, M. A. Slade, R. F. Jurgens, and D. L. Mitchell

Topographic Map of the Ares Tiu Landing Site from Viking Orbiter Data
E. Howington-Kraus, R. L. Kirk, B. Redding, and L. A. Soderblom

Possibility of Highly Contrasting Rock Types at Martian Highland/Lowland Contact
G. G. Kochemasov

5:30–6:30 p.m. Reception (Field Trip I Overflight Video Film Review)

Friday, September 29, 1995

SESSION VI: WHAT WILL PATHFINDER FIND?

Chair: R. Craddock

8:30 a.m.–12:00 noon

Potential Source Rocks of Sedimentary Deposits at the Pathfinder Landing Site
K. L. Tanaka

*A Sojourner's Prospectus: Provenance of Flood-transported Clasts at the Mars
Pathfinder Landing Site*
J. W. Rice Jr. and K. S. Edgett

Hardpan and Other Diagenetic "Rock" in the Catchment of Ares Vallis and Surrounding Areas
A. H. Treiman

Ground Ice at the Mars Pathfinder Landing Site
M. T. Mellon

What Will Pathfinder See and Do on Mars?
H. J. Moore

