

LUNAR AND PLANETARY INSTITUTE
SMITHSONIAN INSTITUTION'S
NATIONAL AIR AND SPACE MUSEUM

WASHINGTON D.C.

JULY 17-19, 1986



EVOLUTION
OF ITS
CLIMATE
AND
ATMOSPHERE

MECA
SYMPOSIUM
ON MARS:

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GENERAL INFORMATION

Registration/Information Desk

The registration/information desk in the Hirschhorn Museum will be staffed for registration and logistics assistance from 8:00 a.m. until 5:00 p.m. Thursday and Friday. Saturday hours will be 8:00 to 11:00 a.m.

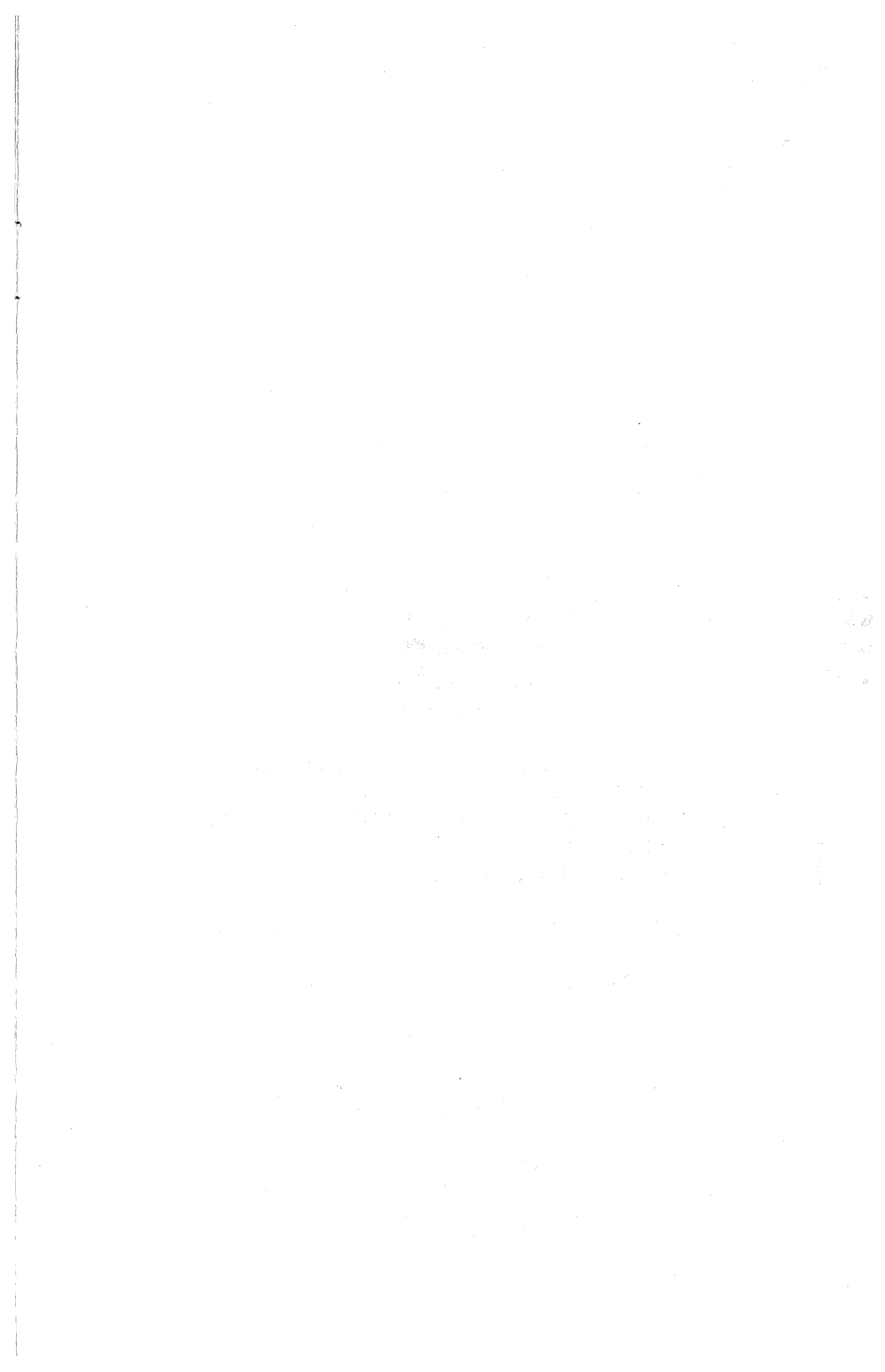
Messages received during the technical sessions will be posted near the desk. The number for messages is 202-357-1424.

Reception

A hosted reception will be held at the National Air and Space Museum's Exhibit Gallery "Looking at Earth," Thursday, July 17 beginning at 6:00 p.m. The NASM's newest IMAX movie "On the Wing" will be shown at 7:15 p.m. All symposium participants and their guests are invited to attend the reception and movie.

Symposium Publication

A special issue of *Icarus* has been chosen for publishing post symposium papers. The deadline for papers submitted to this special issue is October 17, 1986. An invitation to publish in this special issue will be extended to all those on the MECA Project mailing list. Questionnaires and instructions concerning papers submitted to *Icarus* are available at the Information Desk.



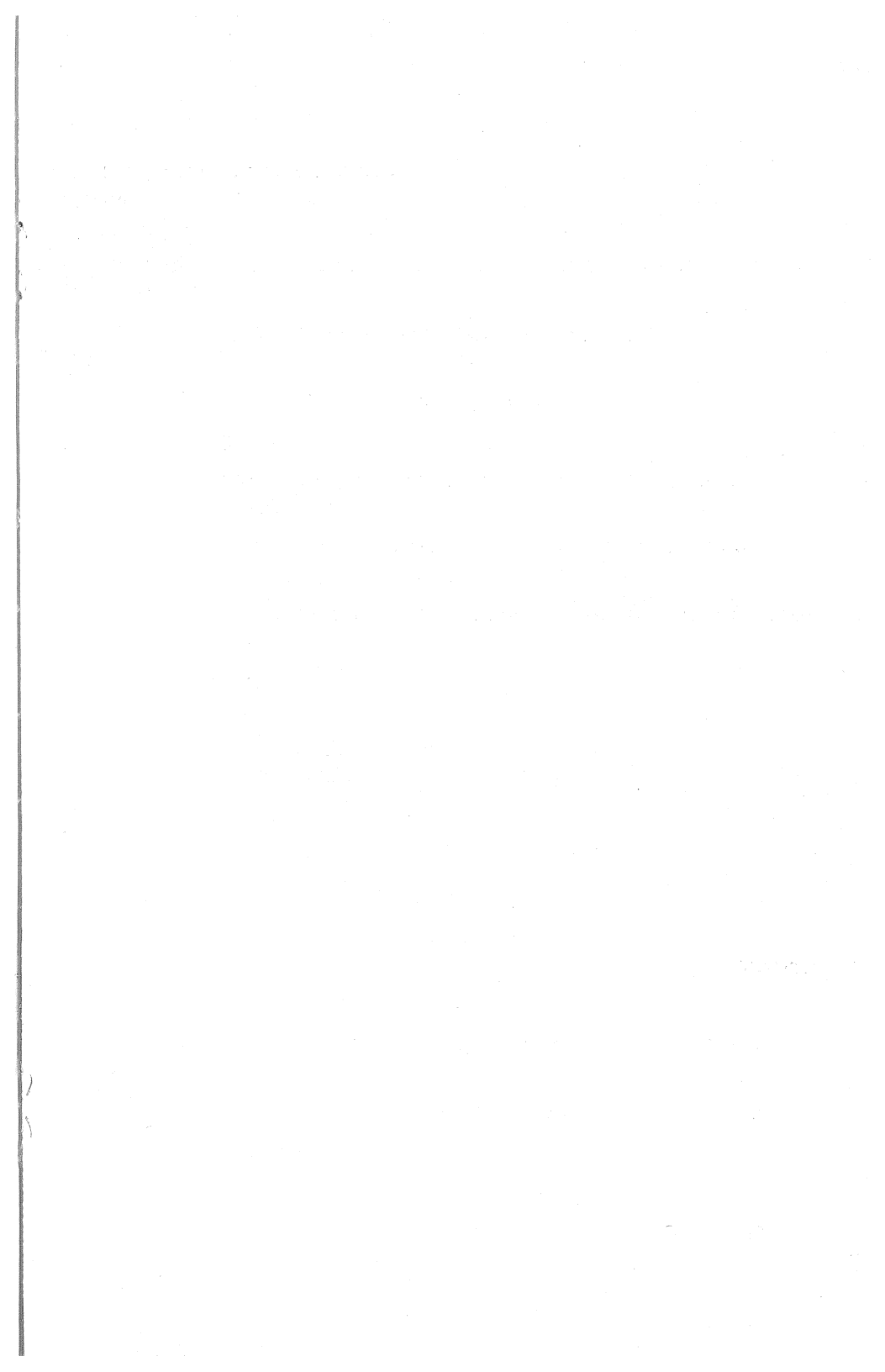
THE PROGRAM COMMITTEE

Co-conveners:

Ronald Greeley, Arizona State University
Ted Maxwell, National Air and Space Museum

Committee Members:

Victor Baker, University of Arizona
Michael Carr, NASA Ames Research Center
Stephen Clifford, Lunar and Planetary Institute
Fraser Fanale, University of Hawaii
Robert Haberle, NASA Ames Research Center
Conway Leovy, University of Washington
Tobias Owen, State University of New York, Stony Brook
Robert Pepin, University of Minnesota
Stephen Saunders, Jet Propulsion Laboratory



Thursday, July 17, 1986

7:30 a.m. Registration
8:30 a.m. Welcome - Walter J. Boyne, Director of National Air & Space Museum
Opening Remarks - Ronald Greeley, Chairman, MECA Steering Committee

8:45 a.m.

SESSION I - SEASONAL CYCLES

Chairmen: Robert Haberle

Conway Leovy

A. Water and CO₂

Jakosky B. M.* Lapointe M. R. Zurek R. W.
The Observed Day-to-Day Variability of Mars Water Vapor

Narumi Y.*

Optical Thickness of the Olympus Cloud

James P. B.*

The Direction of Water Transport on Mars: A Possible Pumping Mechanism

Iwasaki K. Saito Y. Akabane T.

Interannual Differences in the Regressions of the Polar Caps of Mars

Kieffer H. H.* Paige D. A.

Influence of Polar-cap Albedo on Past and Current Martian Climate

10:25 a.m. COFFEE BREAK

B. Dust and Dynamics

Greeley R.*

The Martian Dust Cycle: A Proposed Model (BY TITLE ONLY)

Lee S. W.*

Regional Sources and Sinks of Dust on Mars: Viking Observations of Cerberus, Solis Planum, and Syrtis Major

Martin L. J. James P. B.

The Great Dust Storm of 1986(?)

Haberle R. M.*

Interannual Variability of Global Dust Storms on Mars

11:40 a.m.

LUNCH BREAK

1:30 p.m.

Dust and Dynamics - Continued

Barnes J. R.* Hollingsworth J. L.

Numerical Simulations of Dust Transport into Northern High Latitudes During a Martian Polar Warming

Murphy J. Leovy C.* Tillman J.

Seasonal Wind Variations in the Martian Subtropics

Tillman J. E.*

Mars Global Atmospheric Oscillations: Transients and Dust Storm Relations

Tyler A. L.* Hunten D. M.

Vertical O₃ Distribution as a Diagnostic for Eddy Diffusion Profile

2:50 p.m. COFFEE BREAK

3:05 p.m.

**SESSION II - VOLATILE SOURCES, INVENTORIES &
OUTGASSING HISTORY**

Chairmen: Tobias Owen

Robert Pepin

Pepin R. O.*

Volatile Inventory of Mars - II: Primordial Sources and Fractionating Processes

Rao A. S. P.

*Implications of Isotopic Signatures of Noble Gases for the Origin and Evolution
of Terrestrial Atmospheres (BY TITLE ONLY)*

Owen T.*

Could Icy Impacts Reconcile Venus with Earth and Mars?

Wänke H.* Dreibus G.

Water on Mars

Grealey R.*

Release of Magmatic Water on Mars: Estimated Timing and Volumes

Clark B. C.*

Comets, Volcanism, the Salt Rich Regolith and Cycling of Volatiles on Mars

Carr M. H.*

Mars: A Water-Rich Planet

5:05 p.m. ADJOURN

6:30 p.m. RECEPTION at National Air & Space Museum

7:15 p.m. IMAX MOVIE: "On the Wing"

Friday, July 18, 1986
8:30 a.m.

SESSION III - SURFACE PROCESSES AND CLIMATE HISTORY

Chairmen: Victor Baker

Fraser Farnale

A. Atmosphere

Kasting J. F.*

Climatic Effects of Enhanced CO₂ Levels in Mars' Early Atmosphere

Pollack J. B.* Kasting J. Richardson S.

Partitioning of Carbon Dioxide Between the Atmosphere and Lithosphere on Early Mars

Warren P. H.*

Mars Regolith Versus SNC Meteorites: Evidence for Abundant Crustal Carbonates?

B. Regolith, Surface Properties, Weathering

Zent A. P.* Farnale J. P. Postawko S. E.

Adsorption on the Martian Regolith: Specific Surface Area and Missing CO₂

Farnale J. P.* Postawko S. Zent A. P. Salvail J. R.

Is Regolith Adsorption the Explanation for the Transition from Early to Present Mars Climate?

10:10 COFFEE BREAK

Harris S. L. Huguenin R. L.

Chemical Frost Weathering of Olivine: Experimental Study and Implications

Huguenin R. L.*

Photochemical Weathering and Contemporary Volatile Loss on Mars

Paige D. A.* Kieffer H. H.

The Thermal Properties of Martian Surface Materials at High Latitudes: Possible Evidence for Permafrost

Zimbelman J. R.*

Thermal Properties of Channels in the Aeolis Quadrangle: Topographic Traps for Aeolian Materials

Huguenin R. L.*

Mars Low Albedo Regions: Possible Map of Near-Surface H₂O

Garvin J. B.* Ulaby F. T. Smith D. E. Frey H. V.
Solomon S. C. Zwally H. J.
*Martian Surface Physical Properties to be Derived by Radar Altimeter on
the Mars Observer Spacecraft*
12:25 LUNCH BREAK

Clifford S. M.*
*Mars: Crustal Pore Volume, Cryospheric Depth, and the Global Occurrence
of Groundwater*
Mouginis-Mark P. J.*
*Ice or Liquid Water in the Martian Regolith? Morphologic Indicators from
Rampart Craters*
Schultz P. H.*
Crater Ejecta Morphology and the Presence of Water on Mars
Anderson D. M.* Brandstrom G. W.
Evidence for Glaciation in Elysium
Moore H. J.* Davis P. A.
Ablation of Martian Glaciers
3:40 COFFEE BREAK

Lucchitta B. K.*
Water and Ice on Mars: Evidence from Valles Marineris
Nedell S. S.* Squyres S. W.
Formation of the Layered Deposits in the Valles Marineris, Mars
Parker T. J.* Schneeberger D. M. Pieri D. C. Saunders R. S.
Geomorphic Evidence for Ancient Seas on Mars
Brandenburg J. E.*
The Paleo-Ocean of Mars
5:15 p.m. ADJOURN

C. Geomorphology

2:00 p.m.

8:30 a.m.

Saturday, July 19, 1986

SESSION IV - MARS: THE FUTURE

Chairmen: Michael Carr
Stephen Saunders

Carr M. H.*

Martian Volcanism: A Review

Katterfeld G. N. Vitayz V. I.

Areal and Time Distributions of Volcanic Formations on Mars (BY TITLE ONLY)

Phillips R.*

Martian Tectonics: A Review

Singer S. F.*

Phobos and Deimos: A Base for Sampling the Martian Past

Page T.

Seismic Exploration for Water on Mars (BY TITLE ONLY)

Albee A.*

Mars Observer Review

10:40 a.m. Discussion MEVTV: (MECA Follow-on Project)

11:00 a.m. ADJOURN

