

# THIRD INTERNATIONAL COLLOQUIUM ON MARS

Pasadena, California

August 31–September 2, 1981

## FIRST ANNOUNCEMENT

March 9, 1981

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The Jet Propulsion Laboratory and the California Institute of Technology will host the Third International Colloquium on Mars on the Caltech campus from August 31 to September 2, 1981. Cosponsors are the National Aeronautics and Space Administration, the Lunar and Planetary Institute, and the Division of Planetary Sciences of the American Astronomical Society. Scientists who are engaged in or interested in the scientific investigation of Mars are welcome to attend.

The First Mars Colloquium was held in 1973 after the conclusion of the American and Russian missions to Mars in 1971-1972; the Second was in 1979. Now, at the conclusion of the Viking missions which gathered data on the planet for more than four years, a large body of information is being processed, analyzed and interpreted by scientists around the world. The Third Mars Colloquium will provide an opportunity for planetary scientists to discuss their results and ideas as they apply to major scientific questions about Mars.

The tentative Colloquium program will include five sessions, each devoted to a class of important scientific questions about the planet. Papers presented at these sessions should represent significant contributions or summaries of broad topics. They will be selected from submitted abstracts that address the key questions outlined in this announcement. Reports of minor results or progress in continuing research should be deferred to other meetings. There will also be a summary session with invited papers.

Abstracts should be submitted to the Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058, by June 1, 1981. They should be typed on the standard LPI abstract form (enclosed) and should not exceed three pages. Abstracts should contain substantive information; they will be published and distributed in early July to everyone who (1) returns the enclosed intention card, (2) submits an abstract, or (3) requests a copy by June 1. For each abstract, the author should indicate his preference for 30-minute oral presentation, 15-minute oral presentation, poster presentation or abstract publication only.

The *Journal of Geophysical Research* will publish a special issue containing the papers presented at the Colloquium and other pertinent papers. Manuscripts for this issue must be received by the editor no later than November 1, 1981. They should be addressed to Ronald Greeley, Department of Geology, Arizona State University, Tempe, AZ 85281. Publication is planned for early autumn, 1982.

Please indicate your intention to attend or not to attend the Colloquium and your expected participation by returning the enclosed card no later than April 1. This will greatly simplify the task of the organizing committee. The final announcement, including the agenda, hotel reservation forms and miscellaneous instructions, will be mailed to everyone who expresses an interest.

Requests for particular information about the Colloquium should be addressed to Conway W. Snyder, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Mail Stop 108-704, Pasadena, CA 91109.



## TENTATIVE PROGRAM

### **Session 1: *The Geophysics of Mars***

**Session Chairman: Roger J. Phillips**

#### **Theme Questions:**

1. *Tharsis*—What is the origin and nature of the Tharsis province; a structural dome?, a volcanic construct? What constraints do its tectonic features provide for its origin and evolution?
2. *Lithosphere*—How has the Martian lithosphere evolved, and what can be learned from modeling the thermal history or the volcanic loading history? Is its thickness variable, and if so, why?
3. *Polar Wandering*—What is the evidence for it; what mechanisms may cause it; and what is its importance?

### **Session 2: *Volcanism on Mars***

**Session Chairman: Ronald Greeley**

#### **Theme Questions:**

1. *Volcanic Features*—What features on Mars are volcanic, and what is their geographic distribution?
2. *History*—When and over what interval were the various volcanos formed? What are the relationships of volcanic activity to other events, such as atmospheric evolution?
3. *Properties*—What are the chemical composition and physical properties of the volcanic materials?
4. *Magma*—What are the sources of the magma bodies involved, and what were their geochemical, petrologic and geophysical properties?

### **Session 3: *The Geology of Mars***

**Session Chairman: Raymond E. Arvidson**

#### **Theme Questions:**

1. *Channels*—How did the various types of channels form and when? What role did water play in the formation, and what were the volumes and discharge rates required? Where did the eroded material and the released water go?
2. *The Aeolian History of Mars*—What are the character of the aeolian processes and the rate of resulting deposition and erosion? How have these varied during climatic fluctuations associated with orbital changes, and what has been the long-term cumulative effect? How thick is the aeolian regolith?
3. *Periglacial Phenomena*—Is the patterned ground of the northern plains related to freeze-thaw processes, dessication, or tectonism? How much water and carbon dioxide is stored in the regolith? What other periglacial processes have been operative?
4. *Weathering Phenomena*—What set of processes—chemical or mechanical—produced the Martian regolith?

**Session 4: *The Atmosphere of Mars***

**Session Chairman: James B. Pollack**

**Theme Questions:**

1. *Atmospheric Circulation*—What are the basic dynamical regimes of the atmosphere, and how do they compare with those of the Earth?
2. *Aerosols*—How are the local and global dust storms generated, and what are the dynamic and thermal effects of suspended dust? What are the sinks for these particles?
3. *Atmospheric Cycles*—What is the nature of the seasonal cycles of water vapor, carbon dioxide, clouds and dust, and what are the sources and sinks of each?
4. *Atmospheric History*—In what ways and through what processes has the composition and mass of the atmosphere evolved with time?

**Session 5: *Long-term History of the Atmosphere-Cap-Regolith Volatile Regime***

**Session Chairman: Fraser P. Fanale**

**Theme Questions:**

1. *Sources of Volatiles*—What is the bulk volatile inventory of Mars, and how does it compare with that of other planets? What is the total inventory of degassed “surface” volatiles? What were the dominant styles and times of release?
2. *Sinks of Volatiles*—How much of the volatile inventory has been reincorporated into the regolith by practically “irreversible” processes, and what were the processes? How much has been reincorporated reversibly, and by what processes? How significant has escape to space been?
3. *Dynamics of Volatile Exchange and Climatic Effect*—Do the periodic changes in the orbit of Mars cause major relocations of volatiles, and what changes in the atmosphere result? How do they affect the general character of the surface and near-surface environment? Have there been nonperiodic long-term drifts in the surface climatic environment, and if so, what was their nature and cause?
4. *Soil Chemistry*—What is the nature of the Martian soil chemistry? Why were organic molecules undetectable?

**Summary Session: *The Key Scientific Questions about Mars***

**Session Chairman: Thomas B. McCord**

Several invited speakers will discuss the key scientific questions relevant to the various aspects of Mars. Each will summarize the current state of the answers to these questions, what new contributions to these answers are expected, and how they might be made. These presentations will be followed by a period of discussion among the speakers and the audience.