

PRELIMINARY PROGRAM

**Second International Conference on
Mars Polar Science and Exploration
August 21–25, 2000**

To view an abstract for a particular presentation, use the hand tool and click on the title of the abstract.

* *Denotes speaker*

**Monday, August 21, 2000
EARLY MARS
8:45 a.m. Auditorium**

WELCOME, INTRODUCTIONS, AND REVIEW OF CONFERENCE AGENDA

Parker T. J. * [INVITED]

A Brief Summary of the Geomorphic Evidence for an Active Surface Hydrologic Cycle in Mars' Past

Forget F.* [INVITED]

Evolution of the Early Martian Climate

GENERAL DISCUSSION

10:45–11:00 a.m. BREAK

Monday, August 21, 2000
LATEST RESULTS FROM MARS GLOBAL SURVEYOR
11:00 a.m. Auditorium

Malin M. C. * Edgett K. S. [INVITED]

The Geomorphic Expression of North Versus South Polar Layered Outcrops on Mars at Meter to Decameter Scales

Smith D. E. * Zuber M. T. [INVITED]

An Overview of the Topography of Mars from the Mars Orbiter Laser Altimeter (MOLA)

Christensen P. R. * Kieffer H. H. Pearl J. C. Conrath B. Malin M. C. Clark R. C. Morris R. V.
Bandfield J. L. Lane M. D. Smith M. D. Hamilton V. E. Kuzmin R. O. [INVITED]

TES Observations of the Martian Surface and Atmosphere

12:30–2:00 p.m. LUNCH

Monday, August 21, 2000
MARS POLAR GEOLOGY AND GEOPHYSICS
2:00 p.m. Auditorium

Tanaka K. L. * Kolb E. J. [INVITED]

Regional Geologic History of the Polar Regions of Mars

Herkenhoff K. E. * Kirk R. L. [INVITED]

Topography and Stratigraphy of the Polar Layered Deposits on Mars

Thomas P. C. * Sullivan R. Ingersoll A. P. Murray B. C. Danielson G. E. Herkenhoff K. E. Soderblom L.
Malin M. C. Edgett K. S. James P. B. Hartmann W. K. [INVITED]

The Residual Polar Caps of Mars: Geological Differences and Possible Consequences

Head J. W. * Fishbaugh K. [INVITED]

Evidence for an Extensive South Polar Ice Cap in Middle Mars History

4:00–4:15 p.m. BREAK

Sakimoto S. E. H. * Garvin J. B. Wong M. Wright H.

Topography of Small Volcanoes at the Margin of the Mars North Polar Cap

Monday, August 21, 2000
COMPOSITIONAL, THERMOPHYSICAL, AND SMALL-SCALE PROPERTIES
OF THE MARTIAN POLAR CAPS
4:30 p.m. Auditorium

Garvin J. B. * Frawley J. J. Sakimoto S. E. H.

*Vertical Roughness of the Polar Regions of Mars from Mars Orbiter Laser Altimeter
Pulse-Width Measurements*

Markiewicz W. J. * Kossacki K. J. Keller H. U.

Effect of Surface Roughness on Ice Distribution in the South Subpolar Region of Mars

Johnson J. B. * Lorenz R. D.

Thermophysical Property Measurements of Alaskan Loess as an Analog for the Martian Polar Layered Terrain

Kuhs W. F. * Klapproth A.

CO₂ Clathrate Hydrates on Mars

GENERAL DISCUSSION

Monday, August 21, 2000
POSTER SESSION I
8:00–10:00 p.m. Oddi Building

Arrell J. R. Zuber M. T.

Determination of Martian Northern Polar Insolation Levels Using a Geodetic Elevation Model

Baratoux D. Delacourt C. Mangold N. Allemand P.

Ice-rich Debris Aprons and Lobate Crater: Digital Elevation Modeling Derived from Viking Images

Björnsson H. Pálsson F. Gudmundsson M. T.

The Katla Subglacial Volcano: Topography and Flow Paths of Jökulhlaups

Boynton W. V. Feldman W. C. Trombka J. I. d'Uston C. Mitrofanov I. Arnold J. R. Englert P. A. J. Metzger A. E. Reedy R. C. Squyres S. W. Wänke H. Bailey S. H. Brückner J. Evans L. G. Hamara D. Starr R. Fellows C. W.

Scientific Objectives of the Mars Surveyor 2001 Gamma-Ray Spectrometer

Bridges N. T. Herkenhoff K. E.

Large Grooves in the South Polar Layered Deposits: Insights from Spacecraft Data and Terrestrial Analogs

Byrne S. Ingersoll A. P.

Sublimation Model for Formation of Residual Cap Depressions

Cabrol N. A. Grin E. A.

High-Latitude Martian Impact Paleolakes: The Possible Contribution of Snowfall and Ancient Glaciers in the Lacustrine Activity Associated to the Argyre and Hellas

Craddock R. A. Greeley R.

Contribution of Volcanic Outgassing to Martian Polar Layered Deposits

Dohm J. M. Anderson R. C. Baker V. R. Ferris J. C. Hare T. M. Strom R. G. Rudd L. Rice J. W. Jr. Scott D. H.

Northwestern Tharsis Latent Outflow Activity Mars

Edgett K. S. Malin M. C.

The Martian North Polar Cap: Sedimentary Aspects

Einarsson P. Brandsdóttir B.

The Katla Subglacial Volcano: Earthquakes and Evidence for Crustal Magma Chambers

Fishbaugh K. E. Head J. W. III

Current Issues in Mars Polar Research: Using MOLA Data to Compare the Martian Polar Caps

Foster J. Chang A. Hall D. Tait A. Wergin W. Erbe E.

Continuing Measurements of CO₂ Crystals with a Hand-Held 35 GHz Radiometer

Fountain A. Kargel J. Lewis K. MacAyeal D. Pfeffer T. Zwally J.

Troughs in Ice Sheets and Other Icy Deposits on Mars: Analysis of Their Radiative Balance

Fountain A. Kargel J. Lewis K. MacAyeal D. Pfeffer T. Zwally J.

Troughs on Martian Ice Sheets: Analysis of Their Closure and Mass Balance

Gaidos E. J. Nimmo F.

Interactions of Intrusive Volcanism with Permafrost on Mars

Gunnlaugsson H. P.

Magnetic Properties of the Dust on Mars

Gunnlaugsson H. P. Weyer G. Helgason Ö.

Maghemite on Mars: Possible Clues from Titanomagemite in Icelandic Basalt

Head J. W.

Evidence for Geologically Recent Lateral Migration of Volatile-rich Polar Layered Deposits

Helgason J.

Classification of Martian Volcanoes on Basis of Volcano Ground Ice Interaction

Helgason J.

Geological Map of the Skaftafell Region, SE-Iceland: Glacial-Interglacial History 0–5 Ma

Helgason J.

Ground Ice in Iceland: Possible Analogs for Equatorial Mars

Helgason J.

On the Present Martian Water-Ice Reservoir in Equatorial Mars

Höskuldsson A. Carroll M. R. Sparks R. S. J.

Quaternary Ice Sheet Thickness, Jökulhlaups and Rapid Depressurization of Pillow Basalts

Hvidberg C. S.

An Ice Flow Model of the North Polar Martian Ice Cap

Ivanov A. B. Muhleman D. O.

Comparative Analysis of the Martian Ice Caps Topography. Results from the Mars Orbiter Laser Altimeter (MOLA) Investigation

Kereszturi A.

Comparison of Some Parts of the Southern “Etch-pitted” and Northern Fretted Terrains on Mars

Kieffer H. H. Titus T. Mullins K. Christensen P. R.

An Overview of TES Polar Observations to Date

Tuesday, August 22, 2000
MARS POLAR GLACIOLOGY
8:45 a.m. Auditorium

REVIEW OF DAY'S AGENDA

Durham W. B. * Kirby S. H. Stern L. A. [INVITED]

Comparative Rheologies of Solid H₂O, CO₂, and CO₂ Clathrate Hydrate

Zuber M. T. * Smith D. E. Neumann G. A. Lemoine F. G. [INVITED]

Structure and Dynamics of the Polar Regions of Mars from MGS Topography and Gravity

Greve R. * Klemann V. Wolf D. [INVITED]

Ice Flow, Isostasy and Gravity Anomaly of the Permanent North Polar H₂O Ice Cap of Mars

Pathare A. V. * Paige D. A.

*Orbital Variations of the Rheology and Sublimation of the Martian Polar Layered Deposits:
Glaciological Implications*

GENERAL DISCUSSION

10:45–11:00 a.m. BREAK

Tuesday, August 22, 2000
MARS POLAR HYDROLOGY
11:00 a.m. Auditorium

Fishbaugh K. E. * Head J. W. III

North Polar Region of Mars: Evidence for Residual Cap Retreat and Basal Melting

Eckberg J. T. *

An Assessment of the North Polar Magnetic Anomaly: Implications for Basal Melting and Polar Wander

Kolb E. J. * Tanaka K. L.

Possible Melt-Water Lakes Beneath Planum Australe, Mars: Predictions Based on Present and Past Polar Deposits

GENERAL DISCUSSION

12:30–2:00 p.m. LUNCH

Tuesday, August 22, 2000
ICELANDIC ANALOGS
2:00 p.m. Auditorium

Jakobsson S. P. * [INVITED]
Subglacial and Submarine Volcanism in Iceland

Gudmundsson M. T. * [INVITED]
The Eruption at Gjalp, Vatnajökull in 1996 — Lessons on Subglacial Eruptions

Björnsson H. * [INVITED]
Jökulhlaups in Iceland: Characteristics and Impact

Tómasson H.* [INVITED]
Catastrophic Floods in Iceland

4:00–4:15 p.m. BREAK

ICELANDIC ANALOG PANEL DISCUSSION

MARS POLAR GEOLOGY, GLACIOLOGY, AND HYDROLOGY PANEL DISCUSSION

Tuesday, August 22, 2000
POSTER SESSION II
8:00–10:00 p.m. Oddi Building

- Langley K. A. Gudmundsson M. T. Björnsson H.
Characteristics of Hyaloclastite Ridges Under Western Vatnajökull
- Lanz J. K. Hebenstreit R. Jaumann R.
Martian Channels and Their Geomorphologic Development as Revealed by MOLA
- Larsen J.
A Temperature, Scarp and Ice Flow Model of the Northern Remnant Ice Cap on Mars
- Lee P.
Cold-based Glaciations on Mars: Landscapes of Glacial Selective Linear Erosion on Devon Island, Nunavut, Arctic Canada, as a Possible Analog
- Lepper K. Kuhns C. K. McKeever S. W. S. Sears D. W. G.
Luminescence Dating of Martian Polar Deposits: Concepts and Preliminary Measurements Using Martian Soil Analogs
- Lorenz R. D.
Compact Acoustic Instrumentation for Studying In-Situ the Martian Polar CO₂ Cycle
- Mangold N.
Crater Density of Lobate Debris Aprons and Fretted Channels: Paleoclimatic Implications
- Mangold N.
Giant Paleo-Eskers of Mauritania: Analogs for Martian Esker-like Landforms
- Mangold N. Baratoux D. Frey V.
Slope Analysis of Scarps in Deuteronilus Mensae from MOLA Data and Viking D.E.M.: Evidence for Landslides Controlled by Ground Ice
- Mangold N. Costard F. Peulvast J.-P.
Thermokarstic Degradation of Lobate Debris Aprons and Fretted Channels
- Mangold N. Costard F. Peulvast J.-P.
Thermokarstic Degradation of the Martian Surface
- Murray B. C. Byrne S. Danielson G. E. Herkenhoff K. E. Soderblom L. A. Zuber M. T.
Polar Layered Deposits: Preliminary Stratigraphic Assessment from MGS Observations
- Musselwhite D. S. Boynton W. V. Ming D. W. Quadlander G. Kerry K. E. Bode R. C. Bailey S. H. Ward M. G. Pathare A. V. Lorenz R. D. Kring D. A. Lauer H. V. Jr. Morris R. V.
Differential Scanning Calorimetry and Evolved Gas Analysis at Mars Ambient Conditions Using the Thermal Evolved Gas Analyser (TEGA)
- Nussbaumer J. Jaumann R. Hauber E.
Evidence for a Surging Ice-Sheet in Elysium Planitia, Mars
- Ozorovich Y. R. Linkin V. M. Smythe W. D. Zoubkov B. Babkin F.
Possibilities of Using MARSES Instrument for Long-Term Monitoring and Subsurface Studies in Arctic and Arid Lands

Rice J. W. Jr. Russell A. J. Tweed F. S. Knudsen Ó. Roberts M. J. Marren P. M. Waller R. I.
Rushmer E. L. Fay H. Harris T. D.

Field Investigations of Icelandic Jökulhlaups as an Analog to Floods on Mars

Richardson M. I. Toigo A. D.

Mesoscale Simulations of Martian Polar Circulation: II, North Polar Water Transport

Schmitt B.

The Formation and Detectability of CO₂ Clathrate Hydrate on Mars

Sigurðsson O. Jónsson P. Snorrason Á. Víkingsson S. Kaldal I. Pálsson S.

The Jökulhlaup on Skeiðarársandur in November 1996: Event, Discharge and Sediment

Siili T. Bass D. S. Savijärvi H.

Thermal Contrast and Slope Winds in Mars' Northern Polar Cap Edge Region: 2-D Simulations

Stumptner W. Lammer H. Kömle N.

Estimation of Radiation Protection by a Dense Atmosphere and Magnetic Field on Ancient Mars

Tamppari L. K. Bass D. S.

Martian North Polar Water-Ice Clouds During the Viking Era

Tanaka K. L. Schultz P. H. Herkenhoff K. E.

Stratigraphy and Topography of McMurdo Crater Area, Planum Australe Mars: Implications for Resurfacing History and Porous Character of the South Polar Layered Deposits

Thorsteinsson Th.

Estimating the Evolution of Crystal Size in the North Polar Ice Cap on Mars

Toigo A. D. Richardson M. I.

Mesoscale Simulations of Martian Polar Circulation: I, Polar Cap Edge Circulations and Dust Lifting

Tyler D. Barnes J. R.

Initial 3-D Mesoscale Simulations of the North Pole Martian Summer Atmospheric Circulation

Wilson R. J. Richardson M. I. Rodin A. V.

The Polar Regions and the Martian Climate: Studies with a Global Climate Model

Yokohata T. Kuramoto K. Odaka M. Watanabe S.

Polar Cap Formation and Evolution of Martian Atmosphere

Zimbelman J. R. Bourke M. C.

A Search for Unconfined Fluvial Outflow Deposits on Mars

Zwally H. J. Fountain A. Kargel J. Kouvaris L. Lewis K. MacAyeal D. Pfeffer T. Saba J. L.

Morphology of Mars North Polar Ice Cap

Wednesday, August 23, 2000
MID-CONFERENCE FIELD TRIP

Thursday, August 24, 2000
SEASONAL EVOLUTION OF MARTIAN ATMOSPHERE AND POLAR CAPS
8:45 a.m. Auditorium

REVIEW OF THE DAY'S AGENDA

Barnes J. R. * [INVITED]

The Current Atmospheric Circulation and Climate of Mars: The Polar Regions

Hansen G. B. *

Composition and Energy Balance of the Mars Seasonal Polar Caps from MGS

James P. B. * Cantor B. A. Malin M. C. Davis S.

The 1999 Seasonal Recession of Mars' South Polar Cap: MOC Observations

Ingersoll A. P. * Murray B. C. Byrne S. De Jong E. Danielson G. E. Herkenhoff K. E. Kieffer H. H. Soderblom L. A.

Spring and Summer Changes at the South Pole as Seen by the Mars Orbiter Camera

Kieffer H. H. * [INVITED]

Annual Punctuated CO₂ Slab-Ice and Jets on Mars

Ivanov A. B. * Muhleman D. O.

Observations of the Polar Night Clouds on Mars with the Mars Orbiter Laser Altimeter (MOLA)

10:45–11:00 a.m. BREAK

Richardson M. I. * Wilson R. J.

Control of the Martian Water Cycle by the Northern Polar Ice Cap

Bass D. S. * Tamppari L. K.

The Contribution of Water Ice Clouds to the Water Cycle in the North Polar Region of Mars: Preliminary Analysis

Cantor B. A. * James P. B. Caplinger M. Malin M. C. Edgett K. S.

Martian Dust Storms: 1999 MOC Observations

Thursday, August 24, 2000
EVOLUTION OF THE MARTIAN CLIMATE AND POLAR STRATIGRAPHY
11:45 a.m. Auditorium

Haberle R.* [INVITED]

Quasiperiodic Climate Change on Mars

Rubincam D. P. *

Mars Secular Obliquity Decrease and the Layered Terrain

12:30–2:00 p.m. LUNCH

Lorenz R. D. *

Entropy Production and the Martian Climate

Musselwhite D. S. * Swindle T. D. Lunine J. I.

Is Polar Clathrate Storage Fractionation of the Martian Atmosphere the Cause of the Nakhlite Kr to Xe Ratio?

Hartmann W. K. *

Polar Terrain and Youthful Geological Processes on Mars

Keller H. U. * Skorov Yu. V. Markiewicz W. J. Basilevsky A. T.

Stability of Water Ice Beneath Porous Dust Layers of the Martian South Polar Terrain

Mahaney W. C. * Malloch D. Hancock R. G. V. Campbell I. B. Sheppard D.

Microbiology and Geochemistry of Antarctic Paleosols

Wynn-Williams D. D. * Edwards H. G. M. Newton E. M.

The Detection of Cold Desert Biomarkers, Ancient and Modern: Antarctica and Mars?

4:00–4:15 p.m. BREAK

MARS POLAR SCIENCE: SUMMARY PANEL DISCUSSION

6:00–7:30 p.m. RECEPTION AT CITY HALL

8:00–10:00 p.m. CONFERENCE DINNER ON HARBOUR ISLAND

Friday, August 25, 2000
PLANNED FUTURE MISSIONS
8:45 a.m. Auditorium

REVIEW OF DAY'S AGENDA

Mitrofanov I. G. * Sanko N. F. Kozyrev A. S.

High Energy Neutron Detector for Mars Surveyor Orbiter 2001: Looking for Water Ice

Plaut J.* [INVITED]

Mars Express Radar Sounder

GENERAL DISCUSSION

Friday, August 25, 2000
EXPLORATION TECHNOLOGIES AND PLATFORMS
10:15 a.m. Auditorium

Doran P.* [INVITED]

Potential Techniques for Dating the Martian Polar Layered Deposits

10:45–11:00 a.m. BREAK

Butler B. J. * Slade M. A. Muhleman D. O.

Radar Reflectivity of the Martian Polar Regions

Fujita S. *

Radar Sounding of Layering in Polar Ice Sheets: Possibilities and Limitations Considering the Dielectric Properties of Ice Crystals

Surdyk S. *

Detection of Surface Temperature Changes from Passive Microwave Data over Antarctic Ice Sheet: A Possible Application on Mars

Kömler N. I. * Kargl G.

The Application of Penetrators to Characterize Physical Properties of Extraterrestrial Ice Surfaces

Wilcox B. H. * Morgan A. R.

A Subsurface Explorer for Deep Underground Exploration on Mars

12:30–2:00 p.m. LUNCH

Friday, August 25, 2000
POTENTIAL FUTURE MISSIONS
2:00 p.m. Auditorium

Paige D. A. * [INVITED]

After the Mars Polar Lander: Where to Next?

Stoker C. * Lemke L. [INVITED]

The Strategy for Polar Exploration: Planes, Trains, and Automobiles

Carsey F. D. * Nock K. Bearman G. Kossakovski D. Wilcox B.

Examination of a Deep Subsurface Mars Polar Cap Mission to Address Climate History

Brophy J. R. Carsey F. D. Rodgers D. H. * Soderblom L. A. Wilcox B. H.

A Novel Approach to Exploring the Mars Polar Caps

McCleese D. J. * [INVITED]

Return to the Poles of Mars

GENERAL DISCUSSION

4:00–4:15 p.m. BREAK

**NEW PERSPECTIVES ON MARS POLAR SCIENCE AND
EXPLORATION: A PANEL DISCUSSION**

SUMMARY DISCUSSION:

Key Questions, Needed Observations, and Recommended Missions

Conference Special Issue and Third International Conference in 2002

CONFERENCE ADJOURNS

PRINT-ONLY PRESENTATIONS

Edgett K. S. Supulver K. D. Malin M. C.

Spring Defrosting of Martian Polar Regions: Mars Global Surveyor MOC and TES Monitoring of the Richardson Crater Dune Field, 1999-2000

Gunnlaugsson H. P.

Optical Properties of the Magnetic Dust on Mars

Hall B. L.

Extensive Lakes in the Dry Valleys (Antarctica) During the Last Glacial Maximum: Implications for Past Lakes on Mars

Higuchi K.

Accumulation Process at Mars North Ice Cap

Krinsley D. Rusk B. G.

Bacterial Presence in Layered Rock Varnish-Possible Mars Analog?

Malin M. C. Edgett K. S.

The Mars Surveyor 1998 Landing Zone: Searching for Mars Polar Lander in High Resolution MOC Images

Yoshikawa K.

Contraction Cracking and Ice Wedge Polygons in Mars