

## PRELIMINARY PROGRAM

### Conference on the Geophysical Detection of Subsurface Water on Mars August 6–10, 2001

*\* Denotes Speaker*

*To view a particular abstract, simply use the hand tool of your Acrobat Reader to  
click on the title of that presentation.*

**Monday, August 6, 2001**  
**TERRESTRIAL BACKGROUND**  
**8:30 a.m. Lecture Hall**

**Chair: S. Clifford**

*WELCOME, INTRODUCTIONS, AND REVIEW OF CONFERENCE AGENDA*

Black P. B. \* [INVITED]

*Basic Concepts in Terrestrial Ground Freezing*

Hallet B. \* [INVITED]

*Characteristics of the Continuous Permafrost Regions of Earth*

Max M. D. \* [INVITED]

*Terrestrial Methane Hydrate*

GENERAL DISCUSSION

10:30–10:45 a.m. BREAK

**Monday, August 6, 2001**  
**MARTIAN BACKGROUND**  
**10:45 a.m. Lecture Hall**

**Chair: J. George**

Clifford S. M.\* [INVITED]

*The Expected Nature, Distribution and State of Subsurface Volatiles on Mars*

Greeley R.\* [INVITED]

*Mars Subsurface Science Issues: A MEPAG Perspective*

GENERAL DISCUSSION

12:15–1:30 p.m. LUNCH

**Monday, August 6, 2001**  
**GEOMORPHIC EVIDENCE OF SUBSURFACE VOLATILES ON MARS**  
**1:30 p.m. Lecture Hall**

**Chair: C. Stoker**

Barlow N. G. \*

*Impact Craters as Indicators of Subsurface Volatile Reservoirs*

Russell P. S. \* Head J. W. III

*The Elysium/Utopia Flows: Evidence for Release of Confined Groundwater in the Context of a Global Cryosphere-Hydrosphere System*

Head J. W. \* Kreslavsky M. A.

*Medusae Fossae Formation as Volatile-rich Sediments Deposited During High Obliquity:  
An Hypothesis and Tests*

**PANEL DISCUSSION**  
**THE NATURE OF THE CRYOSPHERES OF THE EARTH AND MARS**

Moderators: C. Stoker, S. Clifford, J. George

Panelists: M. Carr, B. Hallet, N. Hoffman

3:30–3:45 p.m. BREAK

**Monday, August 6, 2001**  
**MARS EXPLORATION: PLANS AND POSSIBILITIES**  
**3:45 p.m. Lecture Hall**

**Chair: S. Clifford**

Beaty D. \* [INVITED]

*Mars Subsurface Exploration: A Review of Recent Studies*

**MODERATED DISCUSSION**

Moderators: D. Beaty, M. Carr, D. McCleese, S. Arcone

**Monday, August 6, 2001**  
**CONFERENCE RECEPTION AND POSTER SESSION**  
**7:00 p.m. Great Room**

Coleman N. M.

*Geophysical Methods to Detect Ground Ice Produced by Recent Fluid Flows on Mars*

Ozorovich Y. R. Linkin V. M. Fink J. Smythe W. D. Zoubkov B. V. Babkin F. V.

*Possibilities of Using MARSES Instrument for Long-Term Monitoring and Subsurface Studies in Arctic and Arid Lands*

Counil J. L. Ferri F. Lognonne Ph. Marsal O. Rocard F. Bonneville R.

*The Netlander Mission: A Geophysical Network Aimed at Investigating Mars Atmosphere, Sub-Surface and Deep Interior*

Mangold N.

*Lobate Debris Aprons as Potential Targets for Ground Ice Detection Analogs to Terrestrial Rock Glaciers*

Jean J.-S. Yang C.-H.

*Future Explorations on Chemical Compositions of Seepage Water and Ground Ice on Mars Detected by Gamma-Ray Spectrometer, GC-MS, and Ion Chromatograph*

Hamelin M. Trautner R.

*Localization of Mars Sub-Surface Ice/Water by Means of a Mobile Ground Penetrating Radar in Combination with a Mutual Impedance Probe*

Reineix A. Martinat B. Berthelier J. J. Ney R.

*FDTD Method for the Theoretical Analysis of the NETLANDER GPR*

Costard F. Forget F. Mangold N. Mercier D. Peulvast J. P.

*Debris Flows on Mars: Comparison with Terrestrial Analogs*

Pletser V. Lognonne P. Diament M. Ballu V. Dehant V. Lee P. Zubrin R.

*Subsurface Water Detection on Mars by Active Seismology: Simulation at the Mars Society Arctic Research Station*

Costard F. Berthelier J. J. Grandjean G. Heggy E. Mangold N. NEY R. Paillou Ph.

*Proposed Model of the Martian Subsurface for the GPR Experiment on Netlander*

Pellenbarg R. E. Max M. D. Clifford S. M.

*Methane and Carbon Dioxide Hydrates on Mars: Are There Sufficient Natural Resources on Mars to Sustain Human Habitation?*

Kereszturi A.

*Theoretical Assumptions on Subsurface Ice Melting on Mars*

Cummer S. A. Farrell W. M.

*Modeling the Complete Planetary Subsurface Radio Remote Sensing Problem*

Knauth L. P. Burt D. M. Tyburczy J. A.

*Highly Conductive Eutectic Brines Rather than Water Expected in the Martian Subsurface*

Plaut J. J. Jordan R. Safaeinili A. Picardi G. Seu R. Orosei R.

*Subsurface Sounding of Mars: The Effects of Surface Roughness*

Aprea C. M. Alde D. M. Rutledge J. T.

*Regional Imaging of the Subsurface of Mars Using Teleseismic Events*

Banerdt W. B. Pike W. T.

*A Miniaturized Seismometer for Subsurface Probing on Mars*

**Tuesday, August 7, 2001**  
**TECHNIQUES IN TERRESTRIAL GEOPHYSICAL EXPLORATION**  
**8:30 a.m. Lecture Hall**

**Chair: J. George**

*REVIEW OF DAY'S AGENDA*

Olhoeft G. R. \* [INVITED]

*Subsurface Geophysical Detection Methods to Uniquely Locate Water*

Grimm R.\* Blohm M. [INVITED]

*Practical Geophysical Exploration for Groundwater*

Mosher C. \* [INVITED]

*Advanced Geophysical Techniques in the Search for Oil and Gas*

10:30–10:45 a.m. BREAK

**Tuesday, August 7, 2001**  
**TECHNIQUES APPLIED TO THE TERRESTRIAL PERMAFROST**  
**10:45 a.m. Lecture Hall**

**Chair: C. Stoker**

Arcone S. \* [INVITED]

*Permafrost Investigations with Ground-Penetrating Radar in Northern and Interior Alaska, and in the Antarctic Dry Valleys*

Hoekstra P. \* [INVITED]

*Electromagnetic Probing of Permafrost*

12:15–1:30 p.m. LUNCH

**Tuesday, August 7, 2001**  
**TERRESTRIAL INVESTIGATIONS OF SOIL, PERMAFROST, AND ICE SHEETS**  
**1:30 p.m. Lecture Hall**

**Chair: S. Clifford**

Daniels J. \* Blumberg D. G. Freiliker V. Vulfson L. D. Kotlyar A. L. Neta T. Ben-Asher J.  
Sprintsin M. Ronen G. Linstky M.

*Radar Penetration in Soils: The Potential for Sub-Surface Observation of Both Earth and Mars*

Calvert H. T. \* Dallimore S. R. Hunter J. A.

*Application of Geophysical Techniques for Mapping Ice-bearing Sediments, Mackenzie Delta,  
Western Arctic, Canada*

Peters M. E. \* Blankenship D. D. Morse D. L.

*Imaging Subglacial Water Systems with Coherent Airborne Radar Sounding Techniques*

Doebbler J. A. \* Blankenship D. D. Morse D. L. Peters M. E.

*A Model for the Dielectric Absorption of the Central West Antarctic Ice Sheet at Radar Sounding Frequencies*

GENERAL DISCUSSION

3:30–3:45 p.m. BREAK

**Tuesday, August 7, 2001**  
**PLANNED ORBITAL GEOPHYSICAL INVESTIGATIONS I**  
**3:45 p.m. Lecture Hall**

**Chair: S. Clifford**

Jordan R. \* Biccari D. Bombaci O. Gurnett D. Johnson W. T. K. Kirchner D. Picardi G. Plaut J.  
Safaeinili A. Seu R. Zampolini E.

*The System and Implementation Aspects of the Mars Advanced Radar for Subsurface and Ionospheric  
Sounding (MARSIS)*

Safaeinili A. \* Biccari D. Bombaci O. Gurnett D. Johnson W. T. K. Jordan R. L. Orosei R. Picardi G.  
Plaut J. Seu R. Zampolini E. Zelli C.

*Radar Sounding of Mars: A Focus on MARSIS*

Biccari D. \* Picardi G. Seu R. Corradini A. Orosei R.

*The Mars High Resolution Advanced Radar for 2005 Space Mission*

**MODERATED DISCUSSION**

Moderators: D. Beaty, M. Carr, D. McCleese, S. Arcone

6:30–9:00 p.m. CONFERENCE DINNER: VILLA CAPRI, CLEAR LAKE

**MODERATED DISCUSSION (Continued)**

Moderators: D. Beaty, M. Carr, D. McCleese, S. Arcone

Wednesday, August 8, 2001

**AMBIGUITIES AND COMPLICATIONS IN THE INTERPRETATION OF GEOPHYSICAL DATA**  
**8:30 a.m. Lecture Hall**

**Chair: C. Stoker**

*REVIEW OF DAY'S AGENDA*

Leuschen C. J. \* Gogineni S. P. Clifford S. M. Raney R. K. [INVITED]  
*Design of a Ground-Penetrating Radar for Mars: Simulations and Experiments*

Orosei R. \* Bianchi R. Coradini A. Espinasse S. Federico C. Ferriccioni A.  
*Characterization of the Martian Surface Scattering at Decametric Wavelengths*

Heggy E. \* Paillou Ph. Ruffié G. Malézieux J.-M. Costard F. Grandjean G.  
*On Sounding Radar Performances for Martian Subsurface Water Detection*

Pettinelli E. \* Della Monica G. Bella F. Losito G. Di Maio R. Vannaroni G. Storini M. Orsini S. Cerulli-Irelli R.  
*High and Low Frequency Electrical Measurements of Martian Soil Simulants*

Shchuko O. B. Kartashov D. V. \* Orosei R. Picardi G.  
*Martian Underground Water Detection: Thermal Model and Simulations of Radar Pulse Propagation*

GENERAL DISCUSSION

10:30–10:45 a.m. BREAK

**Wednesday, August 8, 2001**  
**MARS GEOPHYSICAL EXPLORATION STRATEGY**  
**10:45 a.m. Lecture Hall**

**Chair: S. Clifford**

Clifford S. M. \* George J. A. Stoker C. R. Briggs G. Beaty D. W.  
*A Proposal for an Integrated Geophysical Strategy to "Follow the Water" on Mars*

**DEEP-SOUNDING ORBITAL RADAR, GLOBAL RECONNAISSANCE CONCEPTS**

Gogineni P. \* [INVITED]  
*Orbital Radar Sounding of Mars: Technical Challenges and Solutions*

GENERAL DISCUSSION

12:15–1:30 p.m. LUNCH

**Wednesday, August 8, 2001**  
**SAR ORBITAL SOUNDERS**  
**1:30 p.m. Lecture Hall**

**Chair: J. George**

Campbell B. A. \* Campbell D. B. Grant J. A. Hensley S. Maxwell T. A. Plaut J. J. Rosen P.  
Shepard M. K. Simpson R.

*Orbital Imaging Radar and the Search for Water on Mars*

Paillou Ph. \* Thompson T. W. Plaut J. J. Rosen P. A. Hensley S. Elachi Ch. Massonnet D. Achache J.

*MEEM: An Orbital Synthetic Aperture Radar for Mars Exploration*

Kofman W. \* Herique A. Costard F.

*The P-band Radar to Study Polar Caps, the Shallow Sub-Surface and Paleo-Channels on Mars*

GENERAL DISCUSSION

**PANEL DISCUSSION**  
**MARS ORBITAL SOUNDING: A VIABLE METHOD**  
**OF GLOBAL RECONNAISSANCE FOR SUBSURFACE WATER?**

Moderators: D. Beaty, M. Carr, D. McCleese

Panelists: G. Olhoeft, S. Arcone, P. Gogineni, C. Leuschen, K. Raney, C. Mosher

3:30–3:45 p.m. BREAK

**Wednesday, August 8, 2001**  
**PANEL DISCUSSION**  
**MARS ORBITAL SOUNDING: A VIABLE METHOD**  
**OF GLOBAL RECONNAISSANCE FOR SUBSURFACE WATER? (Continued)**  
**3:45 p.m. Lecture Hall**

Moderators: D. Beaty, M. Carr, D. McCleese

Panelists: G. Olhoeft, S. Arcone, P. Gogineni, C. Leuschen, K. Raney, C. Mosher

**PLANNED ORBITAL GEOPHYSICAL INVESTIGATIONS II**

**Chair: J. George**

Squyres S.\* [INVITED]

*The Gamma-Ray/Neutron Spectrometer Onboard the 2001 Mars Orbiter*

6:30–9:00 p.m. CONFERENCE DINNER: CADILLAC BAR AND GRILL, KEMAH BOARDWALK  
Featured Speaker: A. Frolov  
*On the Nature and Geophysical Investigation of the Continuous Permafrost of Siberia*

**Thursday, August 9, 2001**  
**NETLANDERS**  
**8:30 a.m. Lecture Hall**

**Chair: S. Clifford**

*REVIEW OF DAY'S AGENDA*

Costard F. Lognonne Ph. \* Banerdt B.

*Martian Volatile-Rich Reservoirs: A Review of the Netlander Payload Contribution*

Berthelier J. J. \* Ney R. NETLANDER/GPR Team

*The GPR Experiment on Netlander: Objectives, Description of the Instrument and Simulated Performances*

Ciarletti V. \* Berthelier J. J. Ney R. Reinex A. Martinat B.

*The GPR Experiment on NETLANDER: Preliminary Results on the Determination of the Propagation Vector of Reflected Waves*

Lognonné Ph. \* Banerdt B. Giardini D. Costard F. NL-SEIS Team

*An Idea for an Active Seismic Experiment on Mars in 2008*

10:30–10:45 a.m. BREAK

**Thursday, August 9, 2001**  
**ALTERNATIVE PLATFORMS**  
**10:45 a.m. Lecture Hall**

**Chair: J. George**

Stoker C. \*

*Rovers, Airplanes, & Balloons: Capabilities & Limitations*

Brownlow L. W. Dorn G. A. Mosher T. J. \*

*A Proposal for Detailed Mapping of Martian Aquifers Using Penetrators*

Grant J. A. \* Campbell B. A. Schutz A. E.

*A Rover Deployed Ground Penetrating Radar on Mars*

GENERAL DISCUSSION

12:15–1:30 p.m. LUNCH

**Thursday, August 9, 2001**  
**ALTERNATIVE INVESTIGATIONS**  
**1:30 p.m. Lecture Hall**

**Chair: C. Stoker**

Grimm R. E. \* [INVITED]

*Low-Frequency Electromagnetic Exploration for Groundwater on Mars*

Connerney J. E. P. \* Acuna M. H.

*Detection of Sub-Surface Water on Mars by Controlled and Natural Source Electromagnetic Induction*

Trautner R. Grard R. \* Hamelin M.

*Localisation and Characterisation of Subsurface Ice and Water Deposits by Means of Mutual Impedance (MI) Instruments*

Smith P. H. \*

*Mars Oasis Detector*

Kiefer W. S. \*

*Water or Ice: Heat Flux Measurements as a Contribution to the Search for Water on Mars*

3:30–3:45 p.m. BREAK

**Thursday, August 9, 2001**  
**PANEL DISCUSSION**  
**SURFACE AND AIRBORNE GEOPHYSICAL**  
**INVESTIGATIONS IN THE SEARCH FOR SUBSURFACE WATER ON MARS**  
**3:45 p.m. Lecture Hall**

Moderators: D. Beaty, M. Carr, D. McCleese, S. Arcone  
Panelists: C. Stoker, R. Grimm, P. Hoekstra, R. Grard, N. Coleman

6:30–9:00 p.m. CONFERENCE DINNER: LANDRY'S SEAFOOD, KEMAH BOARDWALK

**PANEL DISCUSSION**  
**COLLATERAL SCIENCE OPPORTUNITIES OFFERED BY THE GEOPHYSICAL EXPLORATION**  
**FOR SUBSURFACE WATER ON MARS**

Moderators: D. Beaty, M. Carr, D. McCleese, S. Arcone  
Panelists: B. Banerdt, Ph. Lognonné, C. Mosher, G. Olhoeft

**Friday, August 10, 2001**  
**ACCESSING VOLATILE TARGETS: DRILLING ON MARS**  
**8:30 a.m. Lecture Hall**

**Chair: J. George**

Briggs G.\* [INVITED]

*The Scientific Goals and Technical Challenges of Drilling on Mars*

Coradini A. \* Angrilli F. De Sanctis M. C. Espinasse S. Flamini E. Orosei R. Re E.

*An Integrated Technological Proposal for Drilling and In-Situ Science for the 2007 Mars Lander Mission*

Mandell H. \* [INVITED]

*A Proposal for Going Deep and Early*

GENERAL DISCUSSION

10:30–10:45 p.m. BREAK

**Friday, August 10, 2001**  
**SUMMARY PANEL DISCUSSION**  
**DEFINING THE BEST STRATEGY TO “FOLLOW THE WATER” ON MARS**  
**10:45 a.m. Lecture Hall**

Moderators: S. Clifford, C. Stoker, J. George

Panelists: D. Beaty, M. Carr, D. McCleese, S. Arcone, J. Garvin, C. Mosher

CLOSING REMARKS

12:30 p.m. CONFERENCE ADJOURNS

**PRINT-ONLY PRESENTATIONS**

Hoffman N.

*Quantities and Sources of Liquid Carbon Dioxide in the Subsurface of Modern and Ancient Mars*

Hoffman N.

*Modern Geothermal Gradients on Mars and Implications for Subsurface Liquids*

Garry J. R. C.

*The Measured Permittivity of CO<sub>2</sub> Ice Grown Under Martian Polar Conditions*