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Abstract

From Mars Global Surveyor to Mars Reconnaissance Orbiter: A Decade of Visible and Infrared Observations of Mars Polar Processes

Timothy N. Titus (1), K. Herkenhoff (2), K. D. Seelos (2), F. P. Seelos (2), S. L. Murchie (2), W. M. Calvin (3), P. B. James (4), L. H. Roach, J. F. Mustard (5), H. H. Kieffer (6), Y. Langevin (7), T. H. Prettyman (8), (9) Candace Hansen, (10) P. R. Christensen, and (11) Alfred McEwen

(1) USGS, Flagstaff, AZ 86001
(2) JHU Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723
(3) Dept. of Geological Sciences
University of Nevada
Reno, NV 89557
(4) Space Science Institute
Boulder, CO
(5) Dept. of Geological Sciences
Brown University
Providence, RI 02912
(6) Celestial Reasonings
Genoa, NV 89411
(7) Institut d'Astrophysique Spatiale
Orsay, 91405, France
(8) Los Alamos National Laboratory
Los Alamos, New Mexico 87545
(9) NASA Jet Propulsion Laboratory
Pasadena, California, U.S.
(10) Arizona State University
Tempe, AZ
(11) University of Arizona
Tucson, AZ

The polar caps are the most active regions on Mars. The annual cycling of atmospheric CO_2 into the seasonal CO_2 ice caps is a driving force of the martian climate. The polar layered deposits, with hundreds of layers whose thicknesses are now being resolved with Mars Reconnaissance Orbiter, probably contain a record of recent climate changes. The polar regions contain the majority of known H_2O ice deposits, distributed between the

residual caps and near-surface ice in the regolith. We synthesize results from the past decade of observations, and consider the implications for martian polar processes. Many of the processes that occur in the polar regions of Mars do not have direct analogs on Earth, but do have analogs in other parts of the solar system. If we are to understand the history of Mars, and by association, the evolution of Earth within our own solar system, we must understand the martian polar regions.