INTEGRATED GEOLOGIC MAP OF THE EQUATORIAL REGION OF MARS.

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Background. Recent spectroscopic and radiometric remote sensing data for Mars from the TERMOSKAN imaging radiometer and the ISM imaging spectrometer on the *Phobos 2* spacecraft provide information on the composition and physical properties of the Martian surface. Understanding the geologic context of these data and accurately interpreting them requires use of detailed geologic maps. However, most existing geologic maps of Mars depict materials which form kilometers- to tens-of-kilometers-scale geomorphic features; these may be different than materials forming the surface layer sensed by spectroscopy and radiometry, at a depth of centimeters or less. To aid in interpretation of such remotely sensed data we have prepared maps of the uppermost layer of crustal stratigraphy in the Martian equatorial region (30°N-35°S), that which forms hundreds-of-meters- to kilometers-scale surface features, which is exposed through gaps in surface dust cover.

Construction of the Detailed Map. This integrated map derives from the maps of Scott and Tanaka [1] (western hemisphere) and Greeley and Guest [2] (eastern hemisphere). We have increased the detail of mapping of five types of deposits of particular geologic interest: (a) volcanic constructs, (b) highland massifs, (c) intra-canyon and intra-crater valley-fill deposits, (d) craters of different morphologic types, and (e) thick, unconformable mantling deposits such as those west of Tharsis, in Arabia, and in Isidis. This was accomplished in large part by integrating previously published maps prepared for regional or topical studies (e.g., maps by Masursky *et al.* [3], Lucchitta [4], Zimbelman [5], Nedell *et al.* [6], Schultz and Lutz [7], Grizzaffi and Schultz [8], and Greeley and Crown [9]). New mapping was performed for highland massifs, unconformable deposits in Arabia and surrounding Olympus Mons, materials of Syria Planum, and materials of Pavonis Mons, Apollonaris Patera, Hadriaca Patera, Syrtis Major Planum, and Elysium Planitia. Craters of different morphology and degradation states were mapped using the conventions of Wilhelms [10] and Schultz and Lutz [7]. We have also made some modifications to details incorporated from the the previously published maps, based on detailed examination of *Viking* imagery. Compared to the maps of Scott and Tanaka [1] and Greeley and Guest [2], more than 50 new units were added and 16 were subdivided or replaced. The primary differences between this map and Scott and Tanaka's and Guest and Greeley's are greater coverage by mantling deposits, and greater subdivision of volcanic, unconformable mantling, highland massif, and crater units.

Construction of the Thematic Map. In order to provide a synoptic representation of the surficial geology of the equatorial region, we also prepared thematic maps in which units in the detailed map are grouped into 25 thematic units having similar surface morphology amd relative age, and whose origins are interpreted to be closely related. These maps are illustrated on the facing page, and the thematic units are described in Table 1.

References: [1] Scott, D. and K. Tanaka, *U.S.G.S. Misc. Inve. Ser.*, Map I-1802-A, 1986. [2] Greeley, R. and J. Guest, *U.S.G.S. Misc. Inv. Ser.*, Map I-1802-B, 1987. [3] Masursky, H. et al., *U.S.G.S. Misc. Inv. Ser.*, Map I-896, 1978. [4] Lucchitta, B., *J. Geophys. Res., 84,* 8097-8115, 1979. [5] Zimbelman, J., Ph.D. Thesis, 1984. [6] Nedell, S. et al., *Icarus, 70,* 409-441, 1987. [7] Schultz, P. and A. Lutz, *Icarus, 73,* 91-141, 1988. [8] Grizzaffi, P. and P. Schultz, *Icarus, 77,* 358-381, 1989. [9] Greeley, R. and D. Crown, *J. Geophys. Res., 95,* 7133-7149, 1990. [10] Wilhelms, D., *U.S.G.S. Misc. Inv. Ser.*, Map I-995, 1976.

TABLE 1. Description of Thematic Map Units

Pu	Undivided young smooth plains. Occurs in northern plains and in interior of Isidis.
Pk	Young smooth and fractured plains possessing abundant low conical hills.
Pv	Plains with distinctly volcanic morphologic features such as flow fronts and lobate flows.
Pr	Plains with mare-type wrinkle ridges, generally lacking clearly volcanic features.
Pf	Plains with abundant graben-like troughs, and generally lacking clearly volcanic features.
P_3	Flat, relatively featureless plains in southern highlands; locally embays units P_1 and P_2.
P_2	Highland plains characterized by subdued and partly buried crater rims; fills some crater floors; flow fronts rare.
P_1	Highly cratered, uneven surfaces of moderate to locally high relief; fractures and channels common.
V_3	Shields, paterae, and tholi with central depressions, flow features, and commonly flank flows.
V_2	Broad low shields with central depressions and flow features emanating from them.
V_1	Highland paterae; flanks commonly radially lineated and/or terraced; smoother basal aprons; smooth caldera fill.
V	Isolated mountains of uncertain age, commonly with summit depressions and radially lineated flanks.
Um	Unconformable smooth, grooved, pitted or hilly deposits; rough areas probably eroded.
Ul	Unconformable layered material of Valles Marineris; thinly bedded, eroded dark and light layers.
Uf	Unconformable mooth, rough, and rolling chasma-flooor materials of Valles Marineris.
Un	Unconformable subpolar rolling plains deposits, with linear ridges, knobs, and polygonal patterns of grooves.
Us	Unconformable smooth deposits on crater floors. Largest deposits where channels empty into craters.
Ub	Unconformable basin-fill materials with knobs and linear to sinuous or reticulate ridges.
Ue	Unconformble etched materials characterized by irregular mesas and pits of intermediate albedo.
Ls	Lobate, hummocky deposits originating from steep slopes.
La	Aureole deposits of Olympus Mons. Broad, semicircular, flat lobes, corrugated and cut by numerous faults.
Chf	Smooth to rough floor materials of chasmata; rough to streamlined materials of floors of outflows channels.
Cht	Chaotic materials; generally a mosaic of highland blocks and depressions.
Bb	Basin-rim materials. Rugged, with interspersed high-standing mountains; intermontane patches have less relief.
Bm	Basin-ring massifs (*shown in black on maps*).
Bs	Basement materials exposed on high-refief surfaces including escarpments and mountains.
C	Craters in varying states of degradation.