STRATIGRAPHIC DETAILS OF UPPERMOST UNITS WITHIN SOUTH POLAR LAYERED DEPOSITS ON MARS. M.F. Gerstell[1], S. Byrne[2], B. Murray[1], M. Nomanbhoy[1], M. Koutnik[3], A. Pathare[1] [1]Caltech (1200 E. California Blvd., Pasadena, CA 91125, mfg@gps.caltech.edu), [2] MIT, [3] University of Washington.

Introduction: Byrne and Ivanov [1,2] identified a prominent bench-like layer within the South Polar Layered Deposits (SPLD), outcropping on at least 10 different scarps bounding the south residual cap of Mars (which are labeled in Fig. 1). They tentatively identified a second bench some distance below the main bench, outcropping on most of these 10 scarps. They hypothesize that these units represent the same stack of SPLD layers repeated along many scarps.

Discussion: In the present study, we examine details of fine-scale layers immediately above and below the main bench in 275 Mars Observer Camera (MOC) Narrow Angle images that cross one or more of the 10 scarps. On at least 8 of the 10 scarps, we find evidence for about 20 fine-scale layers immediately above the main bench and about half that number between the two benches. Figs. 2, 3, and 4 all illustrate this similar stratigraphy. Exposures of the individual layers range from a few meters to over 100 m in the direction of the topographic gradient, with those at the bottom of each stack often evolving into extended lobate forms that are strongly suggestive of flow. The erosion resulting from the possible flow of these layers may have contributed to the pitted appearance of the two benches identified by Byrne and Ivanov.

Results: Preliminary measurements indicate the thicknesses of individual layers are approximately a few meters each. Along-scarp correlation of particular layers is convincing for a few of the scarps; correlation of layers among different scarps is at best tentative. However, the consistency in the number of fine layers suggests that they are indeed the same stack of layers. We examine the extent of the similarities and differences amongst these exposures, as well as their implications for the evolution of the South Polar Layered Deposits.

References: [1] S. Byrne and A. Ivanov (2004), abstract this meeting. [2] S. Byrne and A. Ivanov (2004), in preparation.

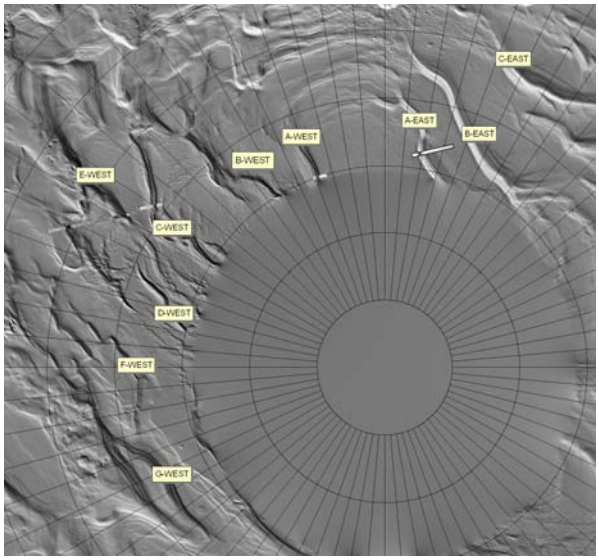

Figure 1. SPLD MOLA shaded relief map, illumination from upper right. The meridian spacing is 5 degrees. There is no MOLA data for the region 87-90 S. Individual scarps in this study are identified as either east or west of 0/180 meridian using letters from A to C East and A to G West.

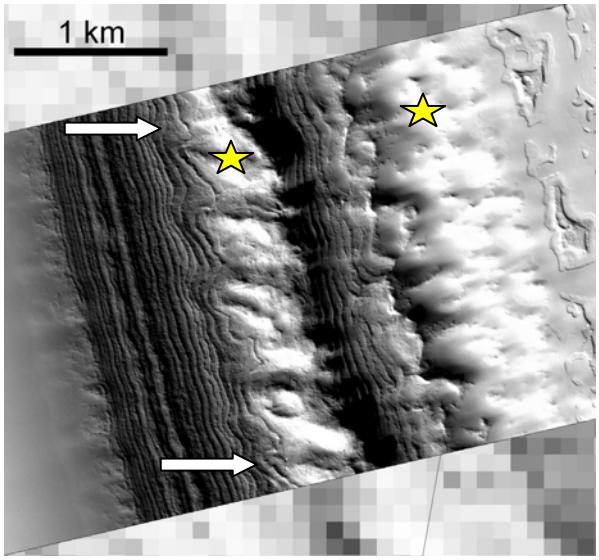

Figure 2. A portion of MOC NA frame m0805817 overlain on the MOLA shaded relief map. This scene is located in scarp A East. Downslope is to the right. Arrows point to lower boundary of ~20-layer stack above the main bench. Note the distorted layers at this boundary. Yellow stars mark location of the two benches.

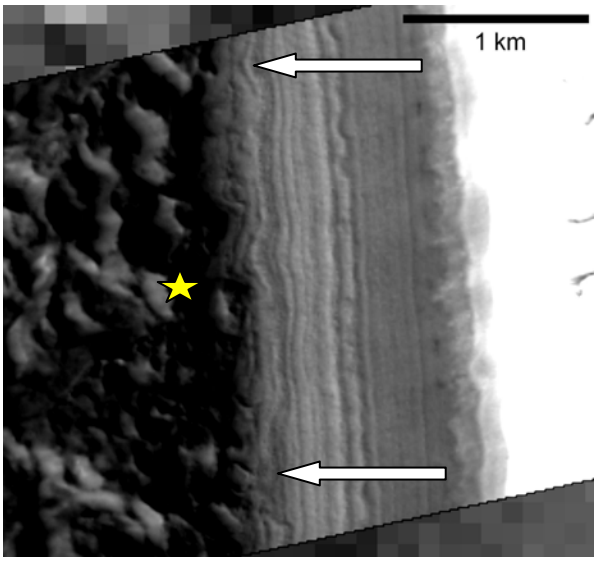

Figure 3. A portion of MOC NA frame m1301312 overlain on the MOLA shaded relief map. This scene is located in scarp A West. Downslope is to the left. Arrows point to top of upper bench as in Figure 2. Star indicates the main bench.

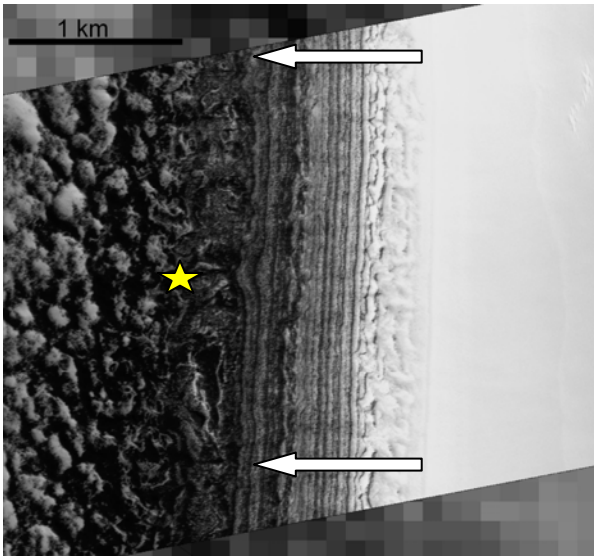

Figure 4. A portion of MOC NA frame m1101991 overlain on the MOLA shaded relief map. This scene is located in scarp C West. Downslope is to the left. Arrows point to top of upper bench as in Figure 2. Star indicates the main bench.