Polygonal landforms at the South Pole and implications for exposed water ice. S. Piqueux[1], S. Byrne[1], M.I. Richardson[1], [1]Division of Geological and Planetary Sciences, California Institute of Technology, Mail-stop 150-21, 1200 East California Blvd., Pasadena, CA 91125, USA. **sylvain.piqueux@free.fr**, **shane@gps.caltech.edu**, **mir@gps.caltech.edu**

Introduction: Polygonal terrain (see Fig. 1) is a reliable indication of subsurface water ice [1,2]. Following the discovery of exposed water ice on the south polar layered deposits [3] we searched for and mapped occurrences of polygonal terrain. Occurrences of polygons were found in regions interpreted to have exposed water ice at the surface.

Mapping: We report on the extension of this mapping to cover the rest of the south polar region. We discuss the possibility of using the distribution of polygonal landforms as a prediction of where exposed water ice will be expected to be found in the upcoming southern summer. This years observations will be much more complete than last years.

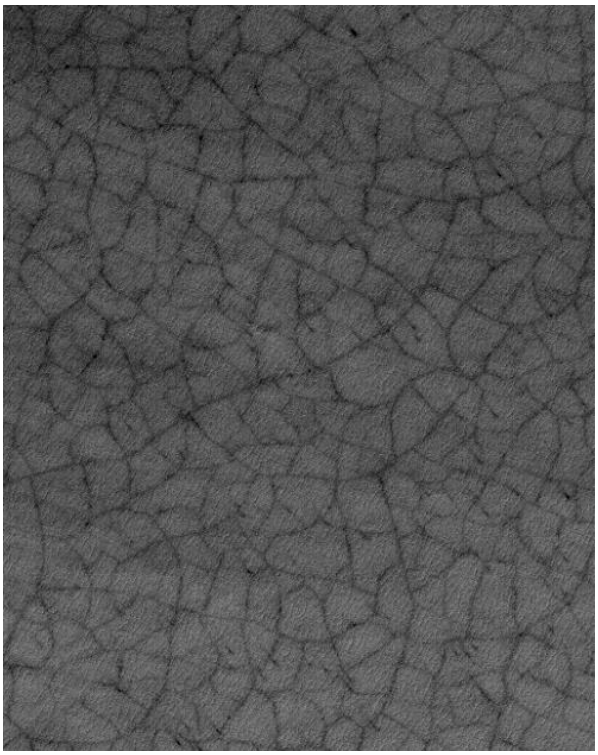

Figure 1. Subframe of M09/05958 showing typical polygons. Frame is 3km across.

Roughness: Polygonal areas are well correlated with smooth areas. We will report on correlations between roughness (measured by rms slope) and concentration of polygonal features.

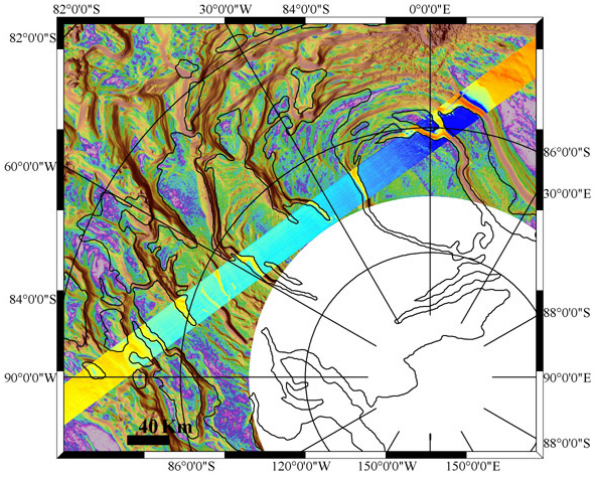

Figure 2. Background is roughness map (rms slope on 1km baselines) where purple is smooth and brown rough. Overlain is THEMIS IR frame I00910002 which was used to demonstrate exposed water ice at roughly 10° E.

The exposed water ice unit [3] spans a larger roughness range. The connections between exposed water ice, polygonal landforms and surface roughness will be discussed in more detail.

References: [1] Mellon, M.T. (1997) JGR, 102, 25617-25628. [2] Plug, L.J. and B.T. Werner (2002) Nature, 417, 929-933. [3] Titus, T.N., et al. (2003) *Science, 299*, 1048-1051.