

## **2001 SITE IN NORTH TERRA MERIDIANI: THE TES CONCENTRATION AREA.** M. G. Chapman, U.S. Geological Survey, 2255 N. Gemini Dr., Flagstaff, AZ 86001.

**Introduction:** The area detected by TES to have a concentration of hematite, within north Terra Meridiani, is formally proposed as a candidate landing site for the Mars Surveyor 2001 Mission. It is also the only place on Mars where TES has noted a very different surface; therefore, although this area may not contain a diversity of rock types--it is likely to be a unique-appearing site, both visually and chemically dissimilar to Viking and Pathfinder Sites. The candidate site is on the ancient Martian highlands (within required latitude band of 3 N. to 12 S.), shows evidence of nearby ancient channels, and may have experienced some type of hydrothermal alteration during the Hesperian or Amazonian Systems (see below).

The whole of north Terra Meridiani (centered at lat. 0°, long. 0°) contains an unusual and enigmatic terrain unit. On the equatorial geologic maps of Mars, this highland area was mapped as being surfaced by two units of Noachian age: a subdued crater unit and an etched unit [1,2]. The subdued crater unit is a plains unit marked by subdued and buried old crater rims and was interpreted to be thin, interbedded lava flows and eolian deposits that partly bury underlying rocks [1,2]. The etched unit was described as being deeply furrowed by grooves that produce an etched or sculptured surface and was interpreted to be ancient cratered material degraded by wind erosion, decay of ground ice, and minor fluvial erosion [1,2]. However, closer inspection of the 360,000 km<sup>2</sup> area has revealed new details: specifically, the area is surfaced by a younger deposit, which (1) overlies Noachian materials and (2) consists of both intermediate and bright albedo materials, having very different rock attributes [3].

**Site Characteristics:** The landing ellipse could be safely located at about lat 1.5 S., long 5.5, as high-resolution Viking Orbiter (16 m/p, rev. 746A) and MOC (07704) images show this locale to be very smooth and hazard free (all surface slopes are much less than 10 degs), without any known

impediments to mobility. The site also satisfies other engineering requirements of the 2001 Mission, such as rock abundance (between 5-10 %), elevation (approximately 500 m above datum), and thermal inertia (fine component thermal inertia between 6-8 % and bulk thermal inertia between 7-9 %).

**Geology:** The north Terra Meridiani area is bound by a swath of dark and bright albedo patterns and by impact craters whose floors are filled to variable degrees by dark and bright albedo materials. In the central part of this area (about 90,000 km<sup>2</sup>), few impact craters < 5 km in diameter are superposed on what appears to be a relatively smooth, intermediate albedo surface that buries craters of the surrounding Noachian terrains, indicating a much younger age for the overlying material. Observed within the area are at least 18 nearly buried Noachian impact craters 30 km in diameter. Using crater rim height/diameter relations [4,5] and an average crater diameter of 35 km, the intermediate albedo material burying the underlying Noachian rocks is about 0.9 km thick. Between lat. 1 to 3° S., and long. 1 to 5°, high-resolution images (25-30 m/p) from Viking Orbiter (VO) revs 746A and 408B show the intermediate albedo material to be very smooth and dotted with small, rimless craters that lack ejecta, are floored by dark material, and trail dark material downwind (SW) of their rims. This physical appearance indicates that the intermediate albedo surface, central to north Terra Meridiani, is likely some type of friable material, eroded by the wind. Portions of this area were measured by TES to have a concentration of hematite, possibly indicating hydrothermal alteration [6]; the measurements also indicate that the deposits in question are still exposed. This intermediate albedo material surfaces the suggested locale for the candidate 2001 landing site. Noachian terrains, to the south, contain ancient channels that terminate at the contact with the intermediate albedo unit; indicating that ancient water may have flowed or pooled beneath the unit.