GREAT MARTIAN DUST STORM PRECURSOR?. J. E. Tillman, *Department of Atmospheric Sciences, University of Washington, Seattle, WA, USA (mars@atmos.washington.edu).*

Reviews of rejected proposals for analyses of Viking lander meteorology data sometimes have stated that nothing significant remains to be learned: it is proposed that lander temperature differences between the first and second year prior to the dust storm season, may be related to or even be used as a predictor of whether or not great dust storms form later in the year. The Viking lander mission demonstrated conclusively that some years have great dust storms while others do not, contrary to conventional wisdom prior to the Viking results which suggested that they occurred every year. The first year had two, beginning at about L_s 210 (1977 A) and 310 (1977 B), the second and third had none, while the fourth year had one that was initiated about L_s 200 (1982).

Atmospheric temperature data were processed and averaged into 25 segments/sol, i.e., roughly hourly averages for almost all of the Lander 2 but far less than half of the Lander 1 mission. (The Lander 1 data were only partially processed due to problems with the wind determination.) From these, the minimum, sol average and maximum temperatures were determined for each sol. Lander 2 temperatures between roughly L_s 117 and 177, prior to the beginning of the great dust storm season, show that the minimum and daily average temperatures were essentially identical for the first year, with, and the second year, without, great dust storms, while the maximum temperature for the first year was consistently lower on a sol by sol basis by 3 to 9 degrees Celsius. This implies that the first year was dustier than the second and poses the question "Do these temperature differences truly indicate optical depth changes, and thereby atmospheric heating changes, and if so are these responsible for the presence or absence of great dust storms later in a given year?" Alternatively, are they artifacts or not significantly material to the circulation later in the year. The Lander 2 evidence for this possible dust storm precursor condition will be presented.

Unprocessed Lander 1 data exist that can support or refute this hypothesis for most of this same season during years 1 and 2, a small portion of year 3, and for the first part of year 4 prior to its great dust storm. Lander 1 data have been processed for this season only in year 1, due to problems with the wind sensors that do not directly affect the temperature observations. (These wind sensor partial failures occurred in the first year, the first at L_s 117 and the second at L_s 303.) These unprocessed Lander 1 temperature data should be processed and analyzed to support, refute or modify this hypothesis and be compared with other data related to optical depth such as the second harmonic of the daily pressure variation which is a very good optical depth proxy. If these additional data are consistent with this hypothesis, then they must be modeled to see if such temperature observations are great dust storm precursors and thereby can be used to forecast great dust storms later in the same year. This potential illustrates why it is essential to reinstate climate observations as soon as possible, beginning at the Viking sites, and to make them permanent.

The Viking data are the only climate data for the surface of Mars and will remain so for the foreseeable future. It is now possible to far better process and analyze the Lander 1 wind data due to the dramatic improvement of computer resources since these efforts were terminated. Processing is still possible since all of the software, documentation and data have been maintained, without support, during the past decade and illustrations of the additions to this surface meteorology climate record will be presented. It is essential that an international program be immediately initiated to understand, replicate, further process, and improve the Viking Lander meteorology climate record, the only one for Mars, before this opportunity is permanently lost.