SEARCHING FOR LOCALIZED WATER VAPOR SOURCES ON MARS UTILIZING VIKING MAWD DATA. R. G. Nuno[1], D. A. Paige[1], R. W. Zurek[2], [1]University of California – Los Angeles, Department of Earth and Space Sciences, Los Angeles, CA 90095, [2]Caltech-JPL, Pasadena, CA 91109

Introduction: RSL (Recurring Slope Lineae) have been imaged by HiRISE on MRO [1], suggesting hydrological activity may be presently occurring on Mars. If there are surface water sources we might expect to observe plumes of atmospheric water vapor from orbit. The Mars Atmospheric Water Detector (MAWD) instrument on board Viking Orbiter 1 and 2, acquired a unique column water vapor dataset which samples a wide range of local times, seasons, latitudes, and longitudes [2]. We searched the raster averaged MAWD dataset for localized spikes of column water vapor content at mid-latitude regions, and found 87 points of interest (Figure 1) showing localized regions with significantly elevated column water. We correlated these measurements with topography, albedo, as well as brightness temperature measurements taken by the Infrared Thermal Mapper (IRTM) instrument on board Viking Orbiter 1 and 2 [3].

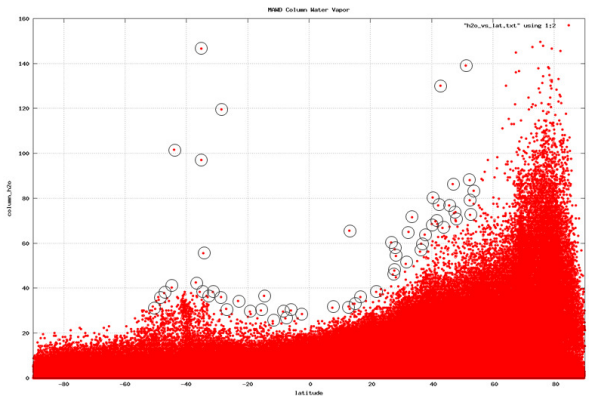

Figure 1. Viking Orbiter 1 and 2 raster averaged column H_2O abundance as a function of latitude. Horizontal axis is latitude ranging from -90 to 90 degrees, and vertical axis is column H_2O abundance which ranges from 0 to160 precipitable microns. Circled points show localized spikes of column H_2O abundances. The elevated values at -40 degrees latitude correspond to the Hellas region, and the elevated values at the highest latitudes correspond to the north polar cap.

Results: The regions showing localized regions with significantly elevated column water have values between 13 and 71.5 precipitable microns at latitudes between 47.79 and -52.24 degrees. These observations occurred primarily between 6-8 and 15-18 hours Mars local time, and predominately during Martian northern summer season. These regions were observed predominantly in locations with low albedo (Figure 2). Some of these regions were in locations that achieve temperatures as high as 280 K (Figure 3).

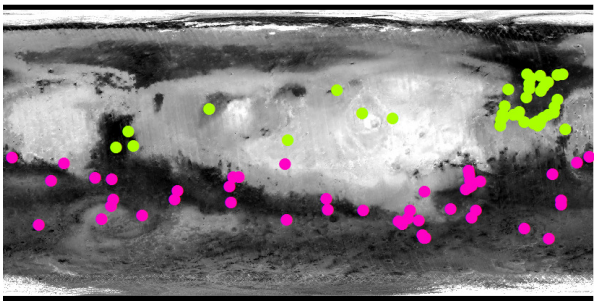

Figure 2. Points of interest, differentiated by green and pink makers for north and south hemispheres respectively, over Mars albedo map. Points with elevated H2O column abundances are seen predominately in dark regions.

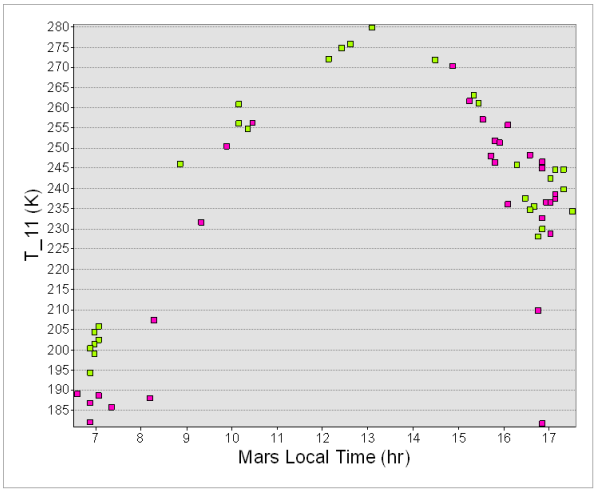

Figure 3. Plot of IRTM brightness temperature and Mars local time of the points of interest, differentiated by green and pink makers for north and south hemispheres respectively. High temperatures reach 280 K.

Discussion: We are currently validating these results by determining the statistical significance of the elevated column water values in the data, and correlating our results with other datasets.

References: [1] Ojha et al., (2012) *43rd Lunar and Planetary Science Conference, No 1659, ID 2591.* [2] Farmer et al, (1977) *JGR, Vol 82, No 28.* [3] Snyder, C.W. (1977) *JGR, Vol 82, No 28.*