

Investigation around 3.3 μm in CRISM IR data in the area of Utopia Planitia. P. Manzari¹, C. Marzo², E. Ammannito¹; Agenzia Spaziale Italiana, Roma, Italy (1) Agenzia Spaziale Italiana, Matera, Italy, (2)

Introduction: In this work we used CRISM IR data in search for localized hydrocarbon features on Mars. Specifically, in this abstract we show the preliminary results of the investigation on an area located in Utopia Planitia, south of the Vivero crater.

In Utopia Planitia both OMEGA and CRISM detected olivine [1, 2]. The olivine occurrences on Mars surface are of critical importance because the abiogenic methane can form from the serpentinization of olivine and reaction of H_2 with carbon dioxide (for example [3] and references therein).



Figure 1. Green frame on the investigated region, under the Vivero Crater, Utopia Planitia, superimposed on THEMIS IR daytime mosaic.

Sample and Methods: In this abstract we show the CRISM IR image frt0000c5af (fig.2). This image was collected in coordination with OMEGA observations that revealed the presence of olivine in Utopia Planitia.

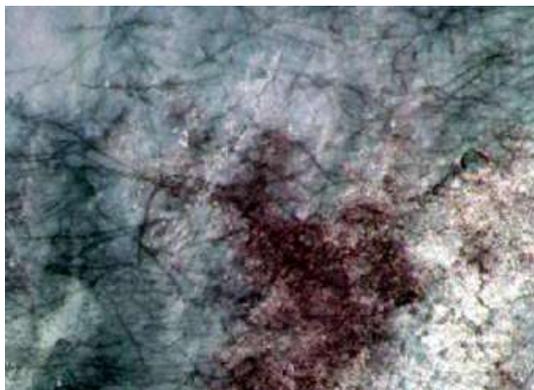


Figure 2. RGB image of CRISM IR observation frt0000c5af.

The image is located over an outflow channel. The HIRISE image psp_009901_2280, in the region corresponding to CRISM image, shows dark areas dominated by boulders strewn terrains (fig.3 crop, a), dark strikes formed by the passage of dust devil tracks, also visible

in CRISM image (fig.2), and polygonal structures (fig.3, crop b).

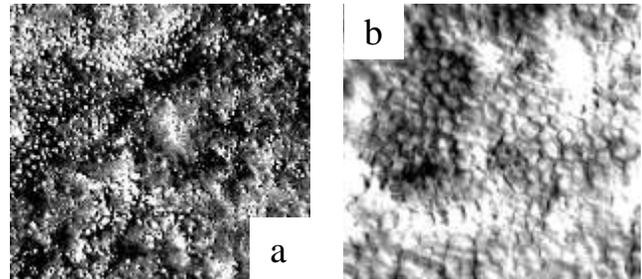


Figure 3. Crops from HIRISE image psp_009901_2280, showing boulders (a); polygonal structures (b); 0.5 cm/pixel

The processed CRISM IR image (fig.2) consists of I/F values between 0.15 and 0.20 characterized by olivine spectra and possible pyroxenes in the dark regions (fig.4). Therefore, these selected area of Utopia Planitia resulted a good site to search for potential hydrocarbon features.

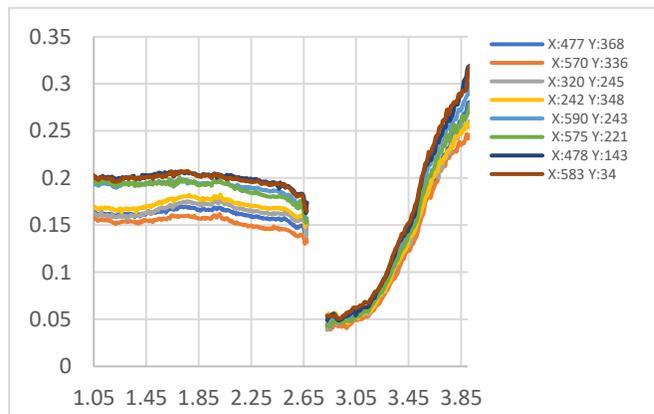


Figure 4. Spectra of different pixels in frt0000c5af.

The procedure to search for hydrocarbons was previously described in [4] in which spectral absorptions in the range 3.2-3.4 μm were selected through 640 x 510 pixel spectra. We adopted the criteria described in [4], to exclude as many artefacts and noise as possible from the spectra before we started looking for the hydrocarbon absorption feature. In this case, we focused the research in potential features at 3.31 μm , that is the strongest absorption band of methane around 3.3 μm .

Results and forthcoming work: We found a small cluster of pixels showing absorptions in the 3.31 μm .

The characteristics of this cluster survived all the criteria adopted to avoid the misinterpretation of the spectra. Moreover, we are working on the comparison of these results with data acquired by other instruments, in the same day and possibly the same hour.

References:

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