The ExoMars-Like Field Trials (ExoFiT): PanCam Emulator observations

S. Motaghian1,2, P. M. Grindrod1, E. J. Allender3, R. B. Stabbins4, C. R. Cousins3, M. R. Balme5, M. D. Gunn6, The PanCam and ExoFiT Teams.

1Department of Earth Sciences, Natural History Museum, London, UK
2Earth Science and Engineering Department, Imperial College London, UK
3University of St. Andrews, UK
4University College London, UK
5Open University, UK
6Aberystwyth University, UK

(s.motaghian@nhm.ac.uk)

The ExoMars-Like Field Trials (ExoFiT): PanCam Emulator observations

Acknowledgements: SM would like to thank STFC and NHM London for funding this project, the ExoFiT teams for making the trials a success.

References:

ExoSpec Processing Pipeline

Figure 1: ExoFIT I Sol 4 PanCam Panorama

Figure 2: ExoSpec Processing Pipeline

PanCam Emulator Multispectral observation Sol 4 ExoFIT Rover campaign, identified 0.5m high ‘Glengoyne’ Ridge as target of interest

Raw image lighting correction using on board calibration target in ExoSpec [1] R* correction applied [2] and overlaid with decorrelation stretch to emphasise the layering within Glengoyne ridge 532nm band depth spectral parameter map indicating presence Hematite [1]

ExoFIT and ExoMars

Designed to test response of ExoMars instrument suite in an analogous Mars location Insight into processing required to effectively interpret data within the missions tactical planning phase ExoFIT I: 10 Sol campaign in Southern Spain ExoFIT II: 10 Sol campaign in Atacama desert

Figure 4: ExoFIT II Rover

Figure 5

PanCam 12 Filter wheel and PTU Flight model, Credit: M. de la Nougerede, UCL/MSSL 2019

Figure 6

RGB PanCam image of target Flora, Sol 6 ExoFIT II overlaid with 770nm spectral parameter map, indicating presence of ferrous minerals in the lower layer of the surrounding unit. Credit: P. M. Grindrod

ExoFIT II Sol 3 PanCam Anaglyph

Instrument Capabilities

ExoFIT II Sol I V2. HRC Image of Rover inspection mirror (RIM) after occurrence of slippage. Allows inspection of wheel status and health of the rover undercarriage.

Figure 8: HRC image of Glengoyne

Variation in layers of glengoyne ridge targeted with high resolution camera (HRC)

The ridge appears to consist of two main layers; the darker upper layer more resistant to erosion and the lighter lower layer appearing to be more heavily altered with a softer lithology

Figure 9: Spectral variation of the layers of ridge, compared with Hematite in black [3]

Steep slope between 532 and 580nm may indicate presence of Hematite in ridge [4]

Negative slope from 950nm may indicate the presence of hydration feature at 1000nm [5]

Similarity in shape of pairs of ROI’s indicate shared constituent materials

Further spectral analysis with ISEM and RAMAN instrument needed to further constrain materials present