EPSC Abstracts,
Vol. 4, EPSC2009-813, 2009
European Planetary Science Congress,

Wide Angle Camera testing during the 2009 AMASE expedition for the ExoMars PanCam instrument

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Abstract

The joint NASA – ESA Arctic Mars Analogue Svalbard Expedition (AMASE) provides the opportunity to carry out mission simulations and test in-situ planetary instrumentation within geological and environmental Martian analogue surroundings [1]. The Wide Angle Cameras (WACs) form an integral component of the ExoMars PanCam instrument [2], which also incorporates a High Resolution Camera. The WACs provide essential panoramic, RGB colour and multispectral imaging of the surrounding terrain and nearby geological outcrops. This data is utilised to identify outcrops that warrant further investigation and to provide an initial lithological identification. These outcrops are considered the primary markers for identifying the sheltered subsurface environments where the ExoMars drill might sample remnant organic materials, thereby achieving the exobiological goals of the ExoMars mission.

Geological information that can be gathered from greyscale WAC images (1 Mpixel with 34º square FOV) includes outcrop context, structure, morphology, and brightness. Such knowledge can be used to identify basic rock classification (igneous/sedimentary/metamorphic), weathering state, and basic composition (e.g. felsic or mafic). Additionally, for the first time on this expedition the WACs will be equipped with wideband RGB filters and 12 narrow band (30–40 nm) geological filters, to provide colour and multispectral data respectively. This additional data will provide mineralogical and compositional information, which combined with morphology, structure and context, will ideally lead to the confident identification of outcrop lithology.

There are a number of variables that can affect the quality and appearance of greyscale and multispectral images, which in turn can affect interpretation. In particular, the multispectral resolution will be explored as a function of distance, outcrop heterogeneity, and weathering state. The goals for WAC during AMASE 2009 are therefore to:

- Determine effective resolution as a function of range for rock morphology and distribution studies
- Effect of range on identification of rock types from rock colour (WAC and HRC)
- Efficiency of rock identification with additional HRC images integrated into the WAC panoramas
- Investigate usefulness of DTMs for planning next days' observations
- Evaluate the usefulness of the WAC 12 point geology spectra for identifying hydrated minerals of interest for the mission's exobiology objectives.
- Acquire images of soil features (e.g. permafrost-related features such as sorted ground, solifluction, etc.) on medium scale (1m – 20m) distance using multispectral WAC and RGB or single-wavelength HRC

We will present initial data and results from WAC imaging of Martian analogue sites in Svalbard (sites to be determined).

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References

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