TITLE: Automatic detection of surface changes on Mars - a status report

ABSTRACT BODY:
Abstract (2,250 Maximum Characters): Orbiter missions have acquired approximately 500,000 high-resolution visible images of the Martian surface, covering an area approximately 6 times larger than the overall area of Mars. This data abundance allows the scientific community to examine the Martian surface thoroughly and potentially make exciting new discoveries. However, the increased data volume, as well as its complexity, generate problems at the data processing stages, which are mainly related to a number of unresolved issues that batch-mode planetary data processing presents. As a matter of fact, the scientific community is currently struggling to scale the common ("one-at-a-time" processing of incoming products by expert scientists) paradigm to tackle the large volumes of input data. Moreover, expert scientists are more or less forced to use complex software in order to extract input information for their research from raw data, even though they are not data scientists themselves.

Our work within the STFC and EU FP7 i-Mars projects aims at developing automated software that will process all of the acquired data, leaving domain expert planetary scientists to focus on their final analysis and interpretation. Moreover, after completing the development of a fully automated pipeline that processes automatically the co-registration of high-resolution NASA images to ESA/DLR HRSC baseline, our main goal has shifted to the automated detection of surface changes on Mars. In particular, we are developing a pipeline that uses as an input multi-instrument image pairs, which are processed by an automated pipeline, in order to identify changes that are correlated with Mars surface dynamic phenomena. The pipeline has currently been tested in anger on 8,000 co-registered images and by the time of DPS/EPSC we expect to have processed many tens of thousands of image pairs, producing a set of change detection results, a subset of which will be shown in the presentation.

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