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Supporting the visual recognition of areomorphic features by DTM analysis

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Enhancing of the landform features using a digital terrain model (DTM) for the areomorphologic interpretation (i.e. relating to the morphology of Mars) is the main aim of the paper. The detection process starts with producing or selecting reliable data sets. Novel spatial variables were produced by performing spatial analysis in geographical information systems (GIS). They may be associated to the following groups: analytical shading, relative relief, relative height-coding, edge enhancement, and annular features. The variables produced with spatial analysis were further combined by spatial modelling of the certain phenomena such as craters, volcanoes or peaks. Especially the modelling parameters of relative relief modelling are highly independent on the landform. Two further approaches were implemented: DTM generalisation that facilitate selection the various areomorphic features considering different detail of observation and developing multi-scale visualisations techniques used for improved cartographic visualisation of topography and for the further interpretation and phenomena detection. A possible by-product of the analysis is the outlining of areas of lower DTM quality. Selected areas on the Mars have been tested using DTMs produced from HRSC images of the Mars Express mission and MOLA data. For the calibration of the parameters the geomorphic features were analysed.