DEVELOPMENTS IN PLANETARY MAPPING: GIS-BASED IMPLEMENTATION OF INTERNATIONAL STANDARDS FOR DIGITAL GEOLOGICAL AND GEOMORPHOLOGICAL MAPPING. A. Nass1,2, S. van Gasselt1, R. Jaumann2,3 and H. Asche1, 1University of Potsdam, Faculty of Mathematics and Natural Sciences, Institute for Geography, Division Geoinformatics, Karl-Liebknecht-Straße 24-25, 14476 Potsdam, Germany, 2German Aerospace Center (DLR), Institute for Planetary Research, Department of Planetary Geology, Rutherfordstr. 2, 12489 Berlin, Germany, 3Free University of Berlin, Department of Earth Sciences, Institute of Geological Sciences, Division of Planetary Sciences and Remote Sensing, Berlin, Germany. (andrea.nass@dlr.de)

The geological and geomorphological evolution of planetary surfaces as well as the geological context of life are main research topics within the Helmholtz Alliance [1] and the European Planetary Network [2]. This research contains questions like “Is there volcanic activity on a planet?” or “Where are possible landing sites?”. In order to help answering such questions, analyses of surface features and morphometric measurements need to be performed. This ultimately leads to the generation of thematic maps (e.g. geological and geomorphologic maps) as a basis for the further studies.

By using modern GIS techniques comparative work and generalisation work during mapping processes have resulted in new information which is crucial for subsequent investigations. The aim therefore is to make these results available to the research community as a secondary data basis. In order to obtain a common and interoperable data collection, results of different mapping projects have to follow a standardised data-infrastructure, metadata definition and map layout.

Therefore we are currently focussing on the generation of a data model arranging all data and processes in a uniform mapping schema which is additionally supported by sets of specific tools supporting mapping processes. With the help of such a model, the mapper will be able to utilise a predefined (but customisable) GIS environment with individual tool items as well as a standardised symbolisation [3] and a metadata environment. This environment is based on a data model which is currently on a conceptual level, and provides the layout of the data infrastructure including relations and topologies [4].

One of the first tasks towards such a data model is the definition of a consistent basis of symbolisation standards developed for planetary geoscientific mapping [3]. The mapper/geologist will be able to access the pre-built signatures (figure 1) and utilise these in scale dependence within the mapping project. Such a symbolisation basis supports the simplification of the mapping procedure because the mapper can use an environment without having to deal with technical issues. It further provides the comparability of different mapping results.

In this context, we also work on the improvement of the traceability of derived data products on a network level. This is employed by adding detailed data descriptions and metadata information. Such information is essential for the understanding of individual geological/geomorphological interpretations. Therefore we generated a metadata template based on existing metadata standards for individual needs in planetary sciences. This contains information about the overall mapping result such as map projection and body reference or overall extent etc. on the one hand and on the other hand it incorporates metadata information for each individual mapping element/layer comprising information such as minimum mapping scale, interpretation hints, keys, etc.

The assignment of such a metadata description in combination with the usage of a predefined mapping schema and the embedding in the data model facilitates the efficient and traceable storage of data information on a network server and enables a subsequent representation, e.g., as a mapserver data structure.


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Figure 1: Symbolization for GIS-based mapping.