GIS-based realization of international standards for digital geological mapping - developments in planetary mapping

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The Helmholtz Alliance and the European Planetary Network are research communities with different main topics. One of the main research topics which are shared by these communities is the question about the geomorphological evolutions of planetary surfaces as well as the geological context of life. 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 the comparative work and generalisation during mapping processes results in new information. These insights are crucial for subsequent investigations. Therefore, the aim 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 database model arranging all data and processes in a uniform mapping schema. With the help of such a schema, the mapper will be able to utilise a predefined (but customisable) GIS environment with individual tool items as well as a standardised symbolisation 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.

One of the first tasks towards this data model is the definition of a consistent basis of symbolisation standards developed for planetary mapping. The mapper/geologist will be able to access the pre-built signatures and utilise these in scale dependence within the mapping project. The symbolisation will be related to the data model in the next step.

As second task, we designed a concept for description of the digital mapping result. Therefore, we are creating a metadata template based on existing standards for individual needs in planetary sciences. This template is subdivided in (meta) data about the general map content (e.g. on which data the mapping result based on) and in metadata for each individual mapping element/layer comprising information like minimum mapping scale, interpretation hints, etc.

The assignment of such a metadata description in combination with the usage of a predefined mapping schema 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.