gungen der beiden Einheiten nördlich und südlich der SEMP möglich. Weiters wäre es möglich, dass phreatische vorflutgebundenen Höhlen existierten, aber mit Sediment verfüllt wurden. Aufschlüsse verfüllter Höhlen scheinen südlich der SEMP häufiger zu sein. Dies würde ehemals unterschiedliche sedimentäre bzw. hydrologische Bedingungen beiderseits der Störung bedeuten.

Determination and shape analysis of selected Terrestrial and Martian geomorphic features derived from high resolution DTMs

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The purpose of the study is the investigation of automated methods for the determination and shape analysis of morphological features. The methods' focus is the detection of peaks and pits (sinks) and the recognition of selected types of shapes. Additionally, some non-typical cartographic visualisation techniques aiming at the enhancement of morphological details were developed. The proposed methods allow for enhanced quality control and subsequent DTM quality improvement. Hence, the interpretation of terrain features for various applications may be supported.

The first part of the study focuses on detecting areas of peaks and pits (regional extremes) and describing their shapes. The determination of significant regional extremes, comprising more than one local property, is a more challenging task. To solve this task, we propose automated algorithms to deal with the topographic and morphological criteria properly. The points and potential surfaces of the regional extremes are calculated and shapes are identified. Advantages of the automated approach are that the parameters are standardised and the results are more comparative, more objective, and therefore of higher quality. The proposed techniques are compared with the techniques for the peaks detection with local histograms.

The second part introduces some enhanced visualisation techniques that are based on extracting selected morphologic characteristics of a landform. We propose visualization techniques that can be grouped as follows: relative relief modelling, enhanced height-coding including local approaches, techniques for the enhancement of edges or other morphological features enhancement. Furthermore, we propose DTM generalisation and multiscale presentation for visualization purposes. A combination of the proposed methods in various scales may improve reading and interpretation of landform features. Possible by-products are: objective DTM analysis, DTM quality improvement; support in DTM interpretation; possibility of application in education; and increase of the public awareness on environment.

Selected areas on the Mars have been investigated using DTMs determined from HRSC images and MOLA data in the areas of Candor Chasma and Nanedi Valles. For the calibration of the parameters the following areas on the Earth were analysed in previous stages: San Francisco volcanic fields in Arizona, Vorarlberg, Austria and Kamnik Alps in Slovenia. As the morphological features on Mars are often different compared to the Earth, the acquired knowledge from Mars will help to better understand the Earth's characteristics, and can be therefore used for better modelling the DTMs on Earth.

An attempt of analysis of the potentially hazardous detrital cones (fans and talus cones) with DTM in Alpine areas

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In alpine settings where the topographic evolution is mostly driven by post-glacial geomorphology, the analysis of digital terrain data has attracted much interest. Unstable valley slopes are often covered by detrital cones (fans). In these areas the scree slopes are often unvegetated, however in some settings of young forests or shrubs may cover them. Less active and often settled fans that are analysed in this study are characterised with less risk potential.

Identification of the fans has been carried out by introducing appropriate spatial variables derived from a high quality DTM (e.g. slope, relative relief, aspect, curvature, etc.). The combinations of different variables by modelling in GIS environment enable outline the potential areas of fans. The output may be twofold: On one hand the detection of the potential talus cone areas that are important for geomorphic assessment. The second aspect is the visualisation of the terrain surface with enhanced terrain structures in order to provide easy-to-read maps of the fans including explanatory text that increases public awareness on the possible natural hazards.

The preliminary results of calculations are promising. Map algebra operations of sectorial parameters yielded the best results. The vast majority of the talus area has been categorized by the method to the correct category. The misclassifications are relatively rare, and they appear rather as single points, than in extensive patches. It seems that later they can be removed applying a simple filter. Although we present here the results of relative small test areas, the method works also in larger extents as well. On the other hand the processing of larger area needs more preparation time of the operator, since misclassifications may occur. Especially if various lithological classes are present in the area to be processed, the results cannot remain always stable, because the modelling may turn to be selective in the area of one lithology, and in the area of another rock type the classification selects too many or too few points. This behaviour should be eliminated in operational environment.

The Tonalitic lamellae along the Giudicarie Fault System

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The NNE-SSW striking Guidicarie Fault System (GFS, composed

of the Giudicarie Fault and the Meran-Mauls Fault) terminates the E-W striking dextral strike-slip Tonale Fault Zone to the east. South of this concourse, the Giudicarie Fault delimits the Adamello pluton to the east while to the north small Tertiary intrusive bodies, the tonalitic lamellae, are aligned along the Giudicarie Fault and its northeastern prolongation, the Meran-Mauls Fault.
Two end member models are generally discussed concerning the Cenozoic evolution of the GFS as part of the Periadriatic Fault System (PFS): an originally straight PFS, dissected and sinistrally offset by a GFS active in the Miocene (e.g. Laubscher 1971, Frisch et al. 1998, Stipp et al. 2004) or Neogene compressional inversions of an inherited Early Permian to Lower Liassic NE-SW trending horst and graben structure (e.g. Viola et al., 2001, Castellarin et al. 2006).
The Tonalitic lamellae consist of many small bodies of different size and shape. The contact to the surrounding Austroalpine and South-Alpine units is always overprinted by brittle faults, in some locations thin ultracataclastic and discrete mylonitic zones could be observed. Quartz grains in the Tonalites of the northern rim of the Adamello intrusion and along the GFS show grain boundary migration as dominant recrystallisation mechanism. However, deformation under high temperatures seems not to have been very intense. Usually, neither a foliation nor an alignment of hornblende could be observed. Locally, overprinting by bulging recrystallization can be observed. It is related to the discrete mylonitic zones formed at greenschist facies metamorphic conditions. Brittle faulting is widespread and appears to be partly related to the size of the tonalitic bodies with smaller bodies being more affected. A tectonically bordered paragneiss lens near Rumo was the only outcrop along the GFS where contact metamorphism close to the (inferred) Oligocene Intrusions could be observed.
Preliminary results indicate that both the northern rim of the Adamello pluton and the mylonites along the GFS show foliations parallel to the adjacent segments of the PL. We interpret these mylonites as boudinaged elements of the Tonale mylonites which formed during dextral strike slip movements along the PFS in the Oligocene. The mylonitic foliation at the northeastern corner of the Adamello pluton bends from an E-W into a NE-SW trending orientation close to the intersection with the GFS. The nearly horizontal stretching lineation along the GFS shows a dextral sense of shear and is overprinted by a clearly younger steep dipping lineation, revealing top ESE to SE thrusting.

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Miozäne und aktive Deformation am Lavanttal-Störungssystem

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Das Lavanttal-Störungssystem ist eines der bedeutendensten Störungssysteme der Ostalpen mit etwa 12 km dextralem und einigen km vertikaler Versatz, das während der miozänen lateralen Extrusion entstand. Im Miozän hat sich das Lavanttalbecken an einem releasing bend zwischen zwei rechtstretenden Störungssegmenten gebildet.
Kinematische Daten mikrotektonischer Strukturen von Aufschlüssen entlang des Störungssystems weisen auf eine komplexe miozäne Störungsgeschichte mit älterem dextralen strike-slip Versatz an der Störung und einer jüngeren Phase der Störungsinversion mit sinistralem Schersinn.
Gegenwärtig begrenzt das Lavanttalstörungssystem das morphologische Becken des Lavanttals gegen die Gebirgsmassive der Saualm und der Koralm. Beim Vergleich beider Bergketten lassen sich unterschiedliche morphologische und geomorphologische Indizes bestimmen, die mit der aktiven Seitenverschiebungen und Abschiebungen an der Front der Koralm in Zusammenhang stehen. Niedrige Mountain Front Sinuosity, Dreiecksfacetten und die Morphologie von Schuttkegeln entlang der Störung am Fuß des Koralmmassivs weisen auf aktive Störungen hin.
Auch die Talformen von Tributärgerinnen aus der Sau- und Koralm zur Lavant liefern deutliche Beweise für die relative Hebung der Koralm an einem Releasing Fault Bend der aktiven dextralen Störung. Die morphologischen Indikatoren dafür umfassen Indices wie Talboden-Breite-zu-Höhe, V-Rate und Flußgradienten.
Die geomorphologischen Belege aktiver Störungen im Lavanttal werden von der Verteilung der regionalen Seismizität und von makroseismischen Daten, die zur Störung parallele Isoseisten zeigen, bestätigt.

Quartäre und Neogene Sedimente im nördlichen Wiener Becken und angrenzenden Bereichen - Bauaufschlüsse entlang der A5-Nordautobahn und der S1-Wiener Außenring Schnellstraße

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Die Abschnitte Eibesbrunn - Schrick der A5 Nordautobahn und der Abschnitt Knoten Eibesbrunn – Knoten Korneuburg der S1 Wiener Außenring-Schnellstraße wurden im Rahmen des Projektes „Geo-Dokumentation Großbauvorhaben - Niederösterreich“ geologisch dokumentiert und beprobt. Die Bauaufschlüsse liegen zum Großteil im nördlichen Wiener Becken (A5 und S1). Im Tunnel Tradenberg (S1) wird die Flyschzone durchörtert, W davon durchquert die Trasse das Korneuburger Becken und mündet schließlich im Bereich des Talbodens der Donau in die A22. Der Baubeginn entlang beider Trassenabschnitte erfolgte im Frühjahr 2007, die Verkehrsfreigabe für diese Abschnitte ist für Anfang 2010 geplant.
Entlang der Baustellenabschnitte im Wiener Becken (A5, östlicher Teil der S1) zeigte sich bereits innerhalb kleiner Bereiche eine Vielfalt an geologischen Ablagerungen. Das Quartär ist vor allem durch Löss vertreten, wobei dieser in sehr unterschiedlicher Ausprägung und Mächtigkeit auftritt. Neben der typischen massigen Ausprägung mit Pseudomycelien und stellenweisem Vorhandensein von Lössschnecken konnten auch Aufschlüsse mit geschichtetem Löss dokumentiert werden. Oft ist der Löss als Lösslehm ausgeprägt, welcher häufig durch Paläoböden unterbrochen ist. Bis zu 3 im Lösslehm aufeinanderfolgende Paläobodenhorizonte konnten beobachtet werden, die sich vor allem in ihrer Farbe unterscheiden. Im Bereich von Schrick war über einer Sand-Kies-Abfolge eine geringmächtige, von Löss bedeckte rote tonige Schicht aufgeschlossen. Dabei dürfte es sich um oberpliozäne bis altpleistozäne fluviatile Ablagerungen mit Bodenbildung handeln.