

The ArcGIS version of the geomorphological mapping legend of the University of Lausanne

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History and principles of the legend

The geomorphological mapping legend of the University of Lausanne has been used for more than 20 years for detailed mapping especially in high and middle mountain regions. It is a morphogenetic mapping system built on the following principles:

- The colours represent process categories;
- The symbols have a genetic significance and are drawn in the colour of the related process;
- The morphodynamic differentiation of erosion and accumulation areas is achieved by white and colour surfaces respectively;
- The morphography, the slope gradient and the lithology are not represented.

The legend was developed first for mapping by hand with colour pencils in the field. In the 1990s, several attempts were made for developing computer-assisted maps, especially by using Adobe Illustrator software.

The improvement of the graphical performance of GIS in the last years permitted the adaptation of the legend for GIS to be considered. Through various geomorphological mapping projects, a new version could be developed in ArcGIS 10.0.

The ArcGIS version

The legend consists in a geodatabase composed by three Feature Datasets containing respectively the Feature Classes “points”, “lines” and “surfaces”. Specific symbols were developed using the Representation tool in ArcGIS 10.0. For some landforms (e.g. alluvial fans, rock glaciers, deltas), it was necessary to combine two or three point, line or surface symbols.

The legend is available at http://unil.ch/igd/legende_UNIL and is called : *Geomorphological_legend_UniL.gdb*

To use the legend :

1. Rename the legend (e.g. *Geomorphological map Val d'Hérens.gdb*)
2. Load the 3 Feature Classes “points”, “lines” and “surfaces” in the ArcGIS project (Add data).
3. Choose the language (English or French) in the properties of the Feature Classes (Symbology - Representations).
4. Start the edition of the legend by selecting the wished symbol that appears on the edition window (*Create Features* in the toolbar *Editor*). When drawing, the right symbology appears directly.

Logic of the symbology :

Most of the geomorphic landforms are represented with only one symbol (point, line or surface). However, some landforms need a combination of surfaces and lines (e.g. alluvial fan). The use of the symbology is detailed in the pdf files of each process categories. In the right column appears the symbol type :

pct.	punctual symbol (e.g. erratic boulder)
pct. orient.	punctual symbol with a direction (e.g. karst spring)
lin.	linear symbol (e.g. stream)
lin. dir.	linear symbol with a direction. It is necessary to draw in the right direction so that the symbol appear correctly (e.g. rock scarp)
surf.	surface symbol (e.g. rock glacier)
surf. orient.	surface symbol that indicates a movement direction (e.g. landslide)

The indication "lin. simple" means that it is necessary to draw twice a simple line to represent the landform (e.g. gorge).

Modification of a symbol :

- To modify the direction of a point or of a surface symbol, right click on the object (in the Edit mode) → Attributes → tab "surfacesenglish" (resp. "pointsenglish") (resp. français) → tab Marker : modify the angle (resp. other attributes). This has to be done for each object having a direction.
- The symbology attributed to a landform can be changed a posteriori at the same place (e.g. active rock glacier → relict rock glacier).
- To modify the symbology of a landform (e.g. to change the colour or the Marker size), open one of the three Feature Class « points », « lines » or « surfaces » in Arc Catalog (Arc Map must be closed) → tab « Représentations » → select "surfacesenglish" (resp. "surfacesfrançais") → tab "Representation" : modify the symbology.

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