

# Workshop 1 – Geomorphological mapping

## Objectives

1. Create and organize a GIS for geomorphological mapping
2. Apply and possibly complete/modify a GM key
3. Draw a geomorphological map from digital documents (topo map, aerial photography, geological map, digital terrain model)

## Area

**Group A:** around Mellingen AG, river Reuss <https://goo.gl/GPjMMK>

Download data: <http://www.grosfichiers.com/ANDPczcO9hMeb>  
<https://www.grosfichiers.com/6J9z5Anv4M2l4> | <http://www.grosfichiers.com/CPFBmuPTLzhRS>

**Group B:** around Kleinandelfingen ZH, river Thur <https://goo.gl/ndYtgR>

Download data: <http://www.grosfichiers.com/2F5ETJxHk0py5>

**Group C:** around Zaborze, river Debnica <http://goo.gl/CGc3Ny>

Download data: <http://www.grosfichiers.com/FSI8WxSEAkWwR>

**Group D:** around Luboradza, river Debnica <http://goo.gl/CGc3Ny>

Download data: <http://www.grosfichiers.com/FSI8WxSEAkWwR>

## Tutorial

QuantumGIS official tutorial: [http://docs.qgis.org/2.8/pl/docs/user\\_manual/](http://docs.qgis.org/2.8/pl/docs/user_manual/)

### Preparation: base data

Create a new QuantumGIS project. For groups A + B, set CRS **CH1903/LV3 (EPSG:21781)** in Project/Project Properties menu. All data are in this projection system.

Open and organize the base data (topo map, aerial photography, geological features, digital terrain model)

Create an hillshade layer from the DEM (terrain folder) using Raster/Analysis menu.

[optional] Create other layers from the DEM: slope, aspect, roughness, TPI using same menu (or SAGA).

### Preparation: own data

Create the data structure for your map using shapefiles; options:

1. **Recommended: 3 shapefiles: points, lines, polygons (you can use the supplied files)**
2. 3xN shapefiles, N is the number of mapped geomorphological processes
3. N shapefiles, N is the number of mapped landforms (1 shapefile for each form)

Options 1 and 2 necessitate to use a Rule-based symbology. Option 3 is the most basic (no real data structure), but creates a lot of shapefiles (think about naming policy for the many files).

In order to use rule-based symbology, each shapefiles should have 3 attributes:

1. PROCESS (string, 3) >> will control the color
2. FORM (string) >> will control the symbols
3. ANGLE (int, 3) >> will control the orientation of symbols

## Preparation: color and legend

Colors: load GM\_key\_colors.gpl from Settings/Options/Colors.

Symbols: load GM\_key\_symbols from Settings/Style Manager (optimized for 1:10'000 scale).

In the Style Manager, you can create new symbols (or modify the existing ones) using the Standard colors you have firstly loaded. Proposed symbols are very basic, but you can improve graphic quality using self-made SVG symbols (tutorial: [http://docs.qgis.org/2.0/ca/docs/training\\_manual/basic\\_map/symbology.html](http://docs.qgis.org/2.0/ca/docs/training_manual/basic_map/symbology.html)).

If you use the three-file structure, you can directly load the 3 symbologies (

## Let's map!

Choose your layer of reference (hillshade, aerial photo, or topographic map): you will map the landforms on this layer. The other layers will be used to complete information and for data validation.

For each mapped feature, fulfill the attribute table:

PROCESS: three-letters code (STR for structural, HYD for hydro, FLU for fluvial, GRA for gravitational, GLA for glacial, KAR for karstic, ANT for anthropogenic)

FORM: type the names used in the symbologies or use your own designation of landforms (then you will have to change the conditions in the rule-based symbology).

ANGLE: some symbols can be oriented, for instance the scree follow the slope direction. You can adapt this at the end of the mapping.

### Don't forget to regularly save your edits!

You can add as many items you need in the proposed key. Be inspired by other examples of geomorphological keys: for instance, you can add slope classes like in German legend, work specifically on geomorphometry, or focus on only one process or aspect of the landscape.

## Printed map

When you're finish with mapping, user the Composer to create a map with title, scale and legend and export it as picture or PDF. You can adapt the legend in another programm (like Corel Draw or Adobe Illustrator).