Relief Representation

Relief is so perfectly and precisely represented on topographic maps that if you look on them at a distance of 1 meter you will see crests and valleys, as on a thermoformed map. In the following, you will learn the different techniques used to represent relief on topographic maps.

👉 Remark: However, some practice and imagination are needed by the map reader to visualise hills and valleys from the contour lines of a topographic map.

Contour lines

Contour lines are an effective device for representing relief on topographic maps. They can be defined as an imaginary line connecting points of equal elevation on the ground surface.
As with all types of isolines, when contour lines are close together, they represent a steep slope, whereas when lines are far from each other, they represent a gradual slope. Every fifth or tenth contour starting at sea level is an index contour, which is drawn as a heavier line and is labelled. Each topographic map uses a contour interval, or equidistance, (the distance in elevation between contour lines) appropriate for that area. While flat areas may be mapped with a 5 meter contour interval, stepped terrain may have a 20 meter or more contour interval. This is why the contour interval is still specified on the topographic map legend.

Discover graphically the relation between contour lines and relief. (Swisstopo)

Pull the slider (small black triangle on the left) along the red line to see a cross profile corresponding to the relief along the red line. The red points on the profile symbolise the contour lines. You can add / remove a grid and features on the profile by selecting the adequate buttons on the right.

The following optional link opens an internet SVG tool for creating profiles from contour lines: http://contourmapcreator.urgr8.ch/

☞ Remark: You can optionally reach some further information about contour lines in the following PDF documentation: contour_lines.pdf (7 Kb)

Elevation point

In addition to contour lines, heights of many points occur on the map, such as road intersections, summits of hills, lake shorelines, etc. These points are called Spot Heights. More precisely located and more accurate in elevation, the Trigonometric Points are marked by a plate fixed permanently on the ground. On a 1:25 000 Swisstopo topographic map, those Elevation Points are represented by the following symbols:

Shading

Shading is a method for representing relief on maps ir natural, aesthetic, and intuitive manner.

The light direction is the most important element for shac relief. Normally, as shown in the following graphics, the li illuminates the terrain from the upper-left. However, l popular is illumination from the south, as the relief shad tends to look more correct. In extreme cases, relief invers occurs where mountains appear as valleys and vice ver Some local adaptations are also possible.
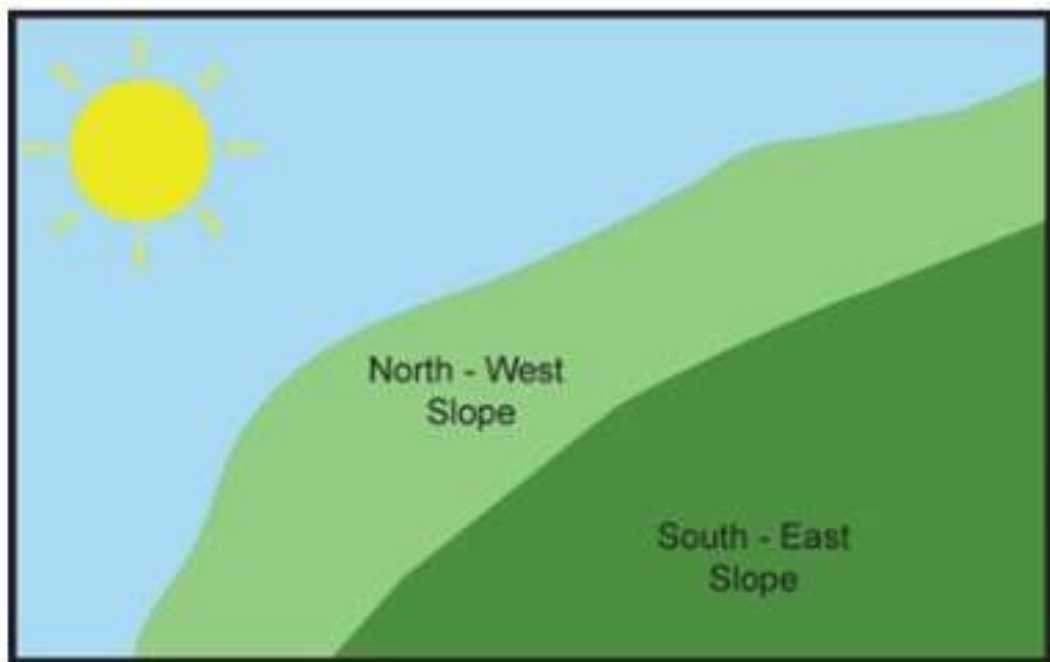
Shading on topographic maps

You can have a look (optional) on the **relief shading website** learn all rules existing for shading: colours, landforms, ae perspectives, small scales, generalisation, etc.

See the importance of shading to well perceive relief with that animation.
()

Roll over the previous map with your mouse to get the same map with relief shading! Click on it to enlarge!

👉 Remark: At a distance of 1-2meters, topographic map shading is most effective to be recognised for human eyes. Remark: The shading layer is still the base layer for a topographic map.

Rocks and cliffs representation

The representation of cliffs and rocks on topographic maps is a very difficult task still yet, even in the realm of digital cartography: the painting of rock hachures is mostly "hand-made". Furthermore, this expensive method can only be produced by specialists: the painter has to use graphical tricks to give steep rocks depicted on a map equivalent visual importance compared to that observed in nature. During the last two centuries, cartographers have developed different cliff representation styles. On the following slide show, some of those methods are presented.

sualise the relation between relief (here represented usir
gital Elevation Model) and contour lines.
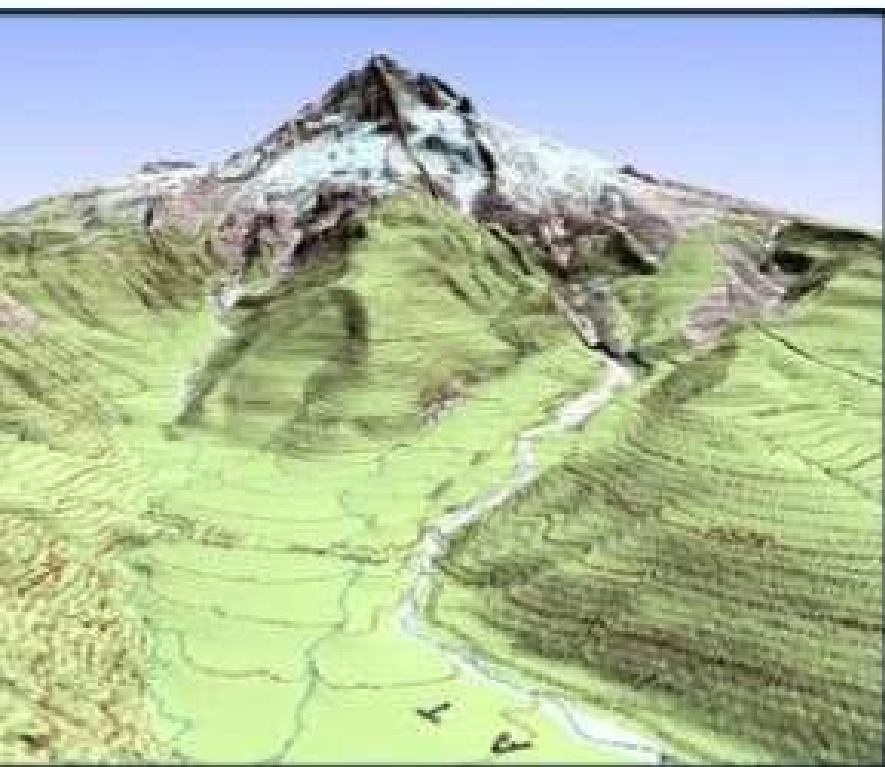
Picture of Old Maid Fl
and Lost Creek (M
Hood) Digital Elevatic
Model, overlaid with
raster file of th
topographic Ma
Created with Wor
Construction Set 4 by N
Dobler (IKA).

Raw Data used:

- USGS 7.5-minu
  DEMs, 1:24'00
  Digital Elevatic
  Model, 10-Met
  Resolution
- USGS 7.5-minu
  DRGs, 1:24'00
  Digital Rast
  Graphics 4000x600

- USGS 7.5-minute DEMs, 1:24'000, Digital Elevation Model, 10-Meter Resolution
- USGS 7.5-minute DRGs, 1:24'000, Digital Raster Graphics, 4000x6000 Pixels, rgb Colors, 72dpi

USGS Geographic Data Download (external link).

Find the correct profile

In the following exercise, you have to find out which topographic isolines representation matches which profile. Drag the isolines on the bottom to the white rectangle corresponding to the correct profile. After you decided the five isolines representations, you can check your evaluation by clicking the button "Check Answers" which will appear. Try to be precise when dropping your isolines!