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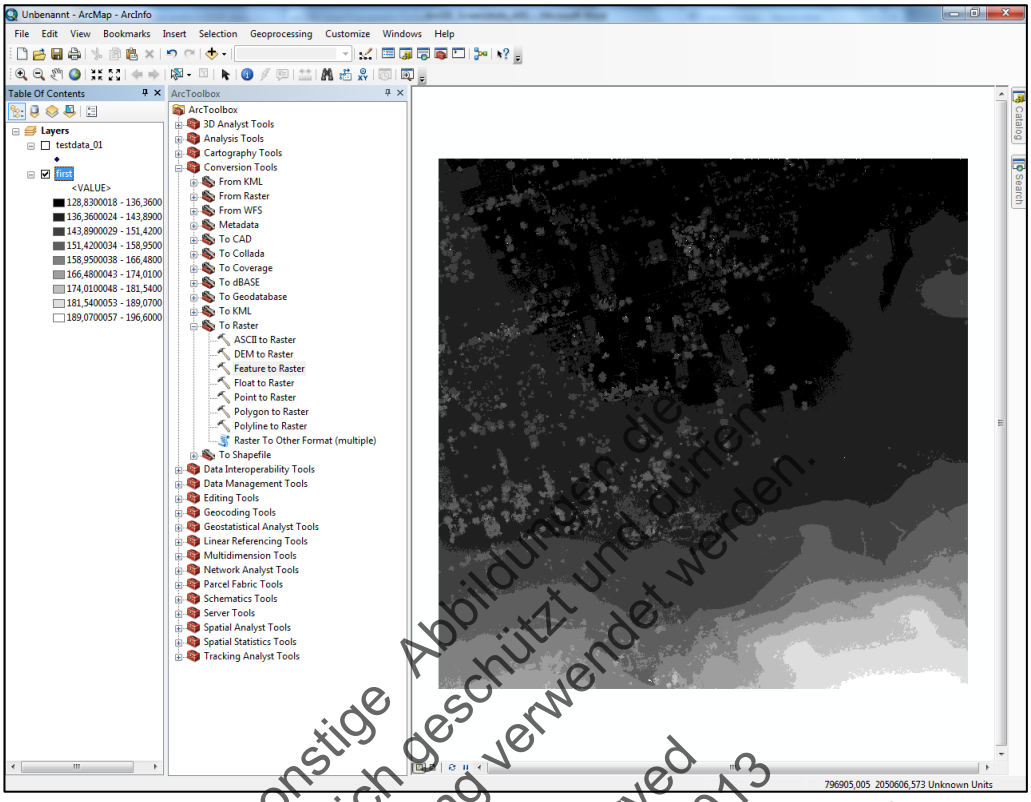

Fig.1: The first raster

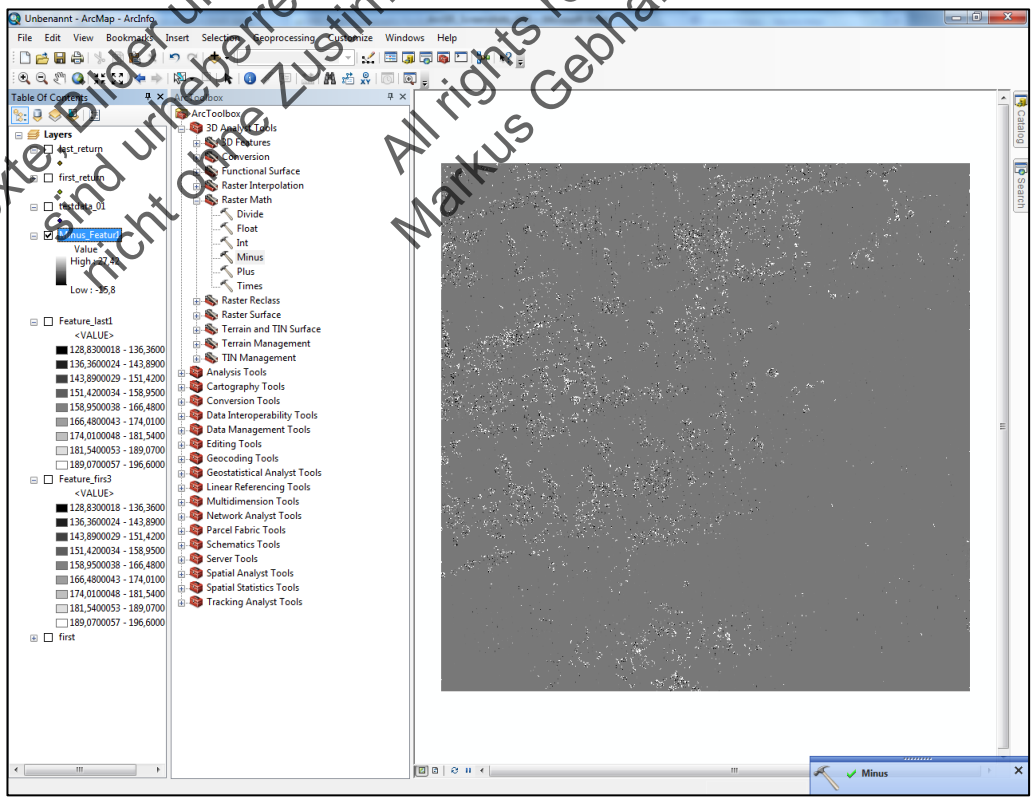

Fig. 2:Vegetation first minus last

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How can we use different returns we obtain from LiDAR? (one use-case scenario!)

There are different use-case-scenarios we can obtain from LiDAR:

- Agriculture
- Archeology
- Biology and conservation
- Geology and soil science
- Meteorology and atmospheric environment
- Law enforcement
- Military
- Physics and astronomy
- Robotics
- Surveying
- Transportation
- Wind farm optimization
- Solar photovoltaic

To "Agriculture":

LIDAR also can be used to help farmers determine which areas of their fields to apply costly fertilizer. LIDAR can create a topographical map of the fields and reveals the slopes and sun exposure of the farm land. Researchers at the Agricultural Research Service (ARS) blended this topographical information with the farm land's yield results from previous years. From this information, researchers categorized the farm land into high-, medium-, or low-yield zones. The researchers contracted to have a plane with LIDAR (light detection and ranging) sensors fly over the 1,000 rolling acres of the farm. LIDAR is a form of radar that can map elevations digitally, showing slopes and sun exposures, by bouncing laser light off the landscape. By blending yield results with the maps, the scientists divided fields into high-, medium-, and low-yield zones. One advantage of LIDAR landscape mapping is that it only has to be done once (http://www.ars.usda.gov). This technology is valuable to farmers because it indicates which areas to apply the expensive fertilizers to achieve the highest crop yield.

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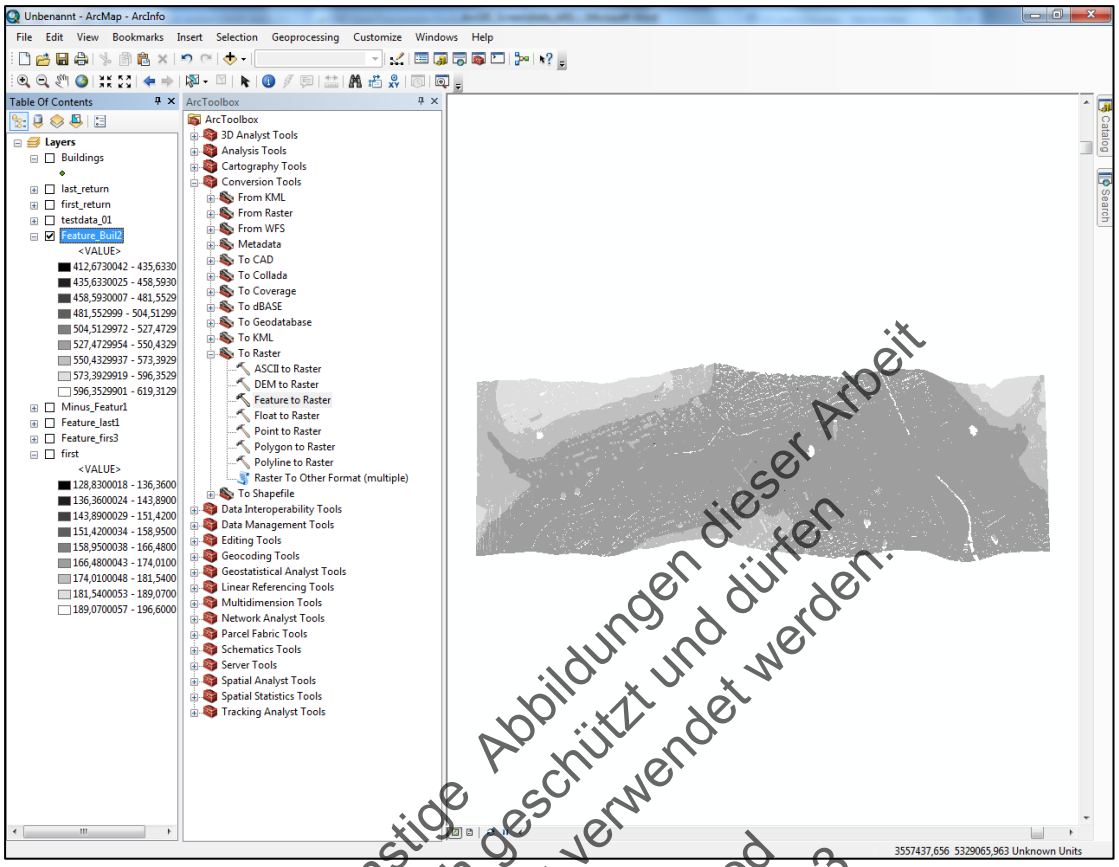

Fig.3: A building raster

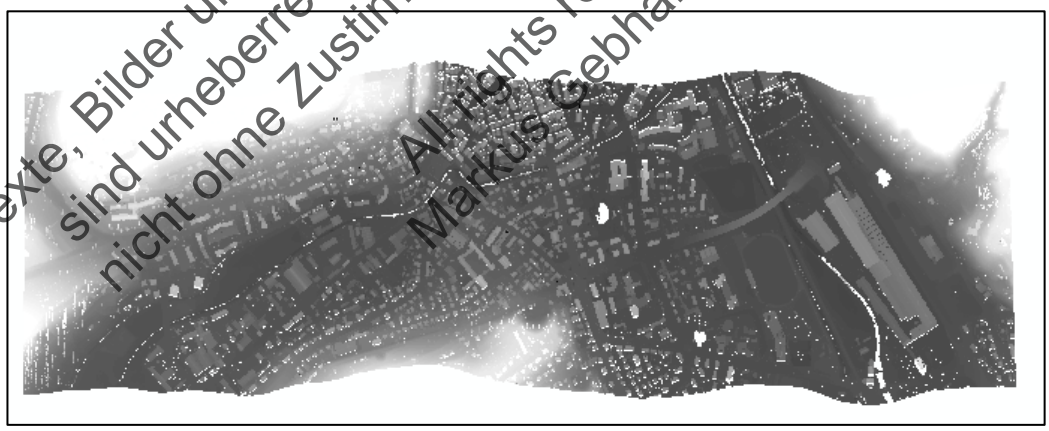

Fig.4: closer view of the building raster

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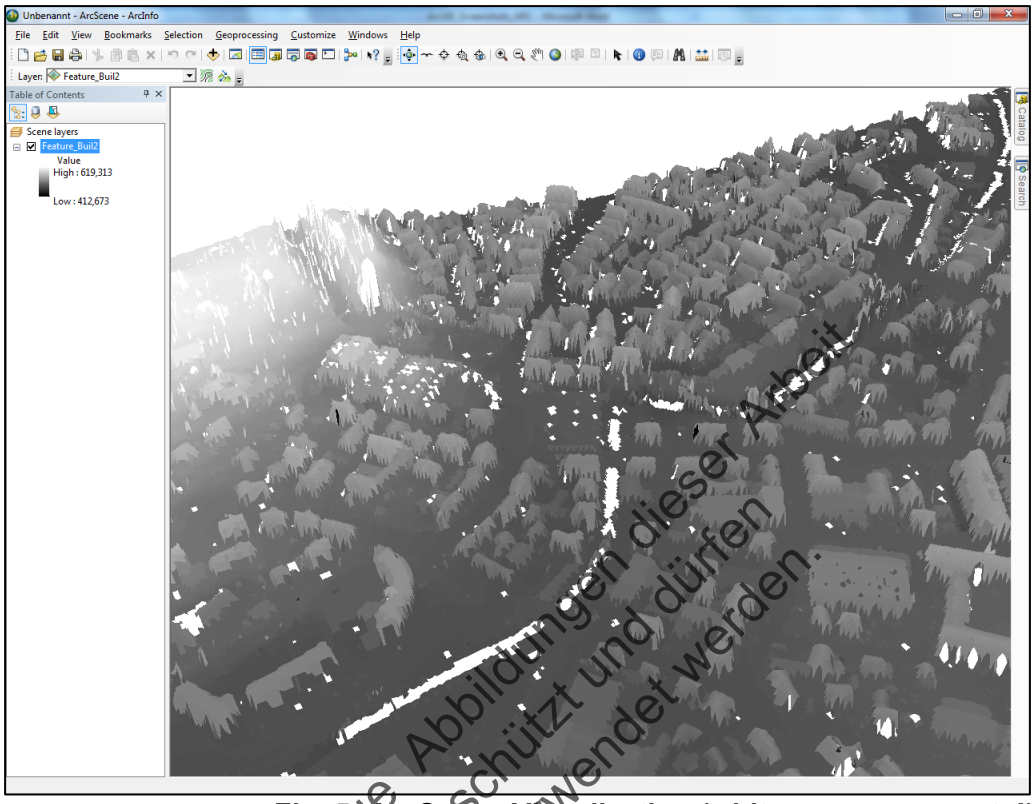

Fig. 5: ArcScene Visualization (white areas are empty!)

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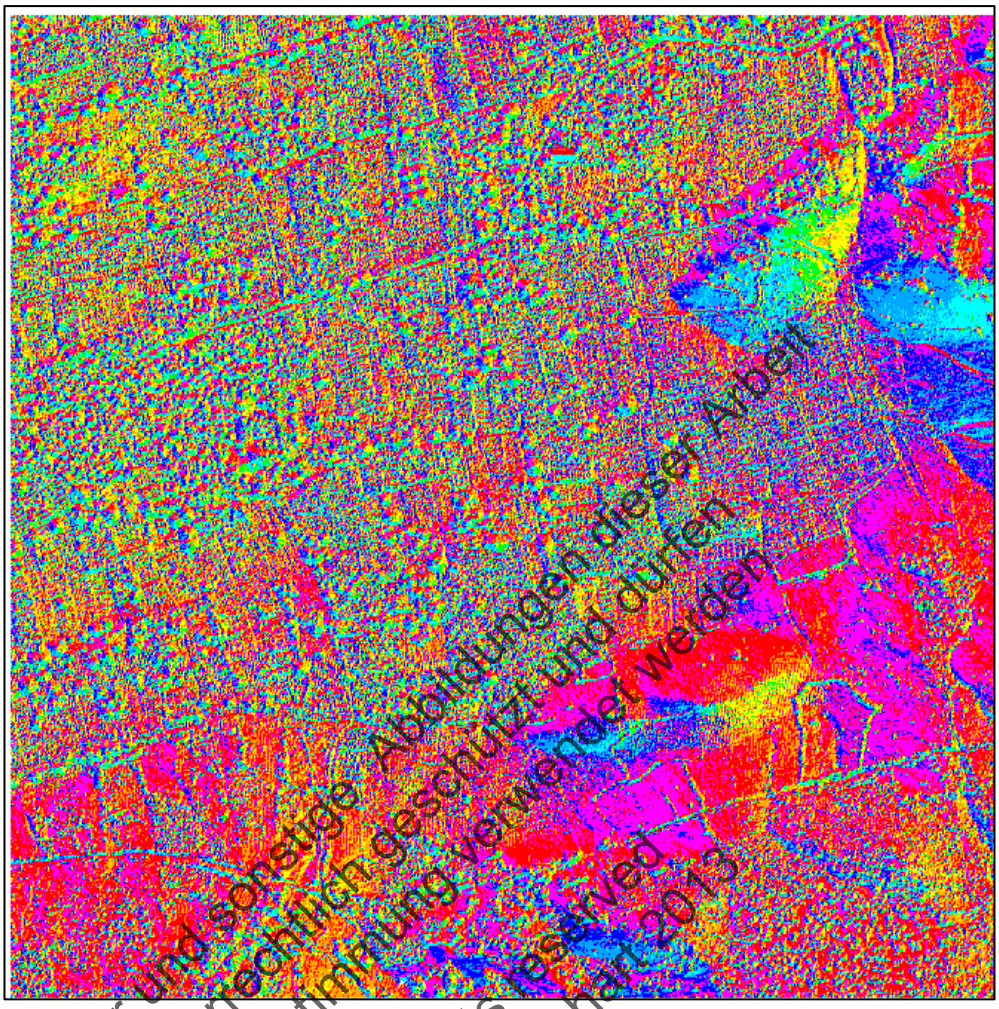

Fig.5: Aspectmap

Aspect? What is it? What can we use it for?

Derives aspect from a raster surface.

→ Aspect identifies the downslope direction of the maximum rate of change in value from each cell to its neighbors. It can be thought of as the slope direction. The values of the output raster will be the compass direction of the aspect.

Aspect is the direction of the maximum rate of change in the z-value from each cell in a raster surface.

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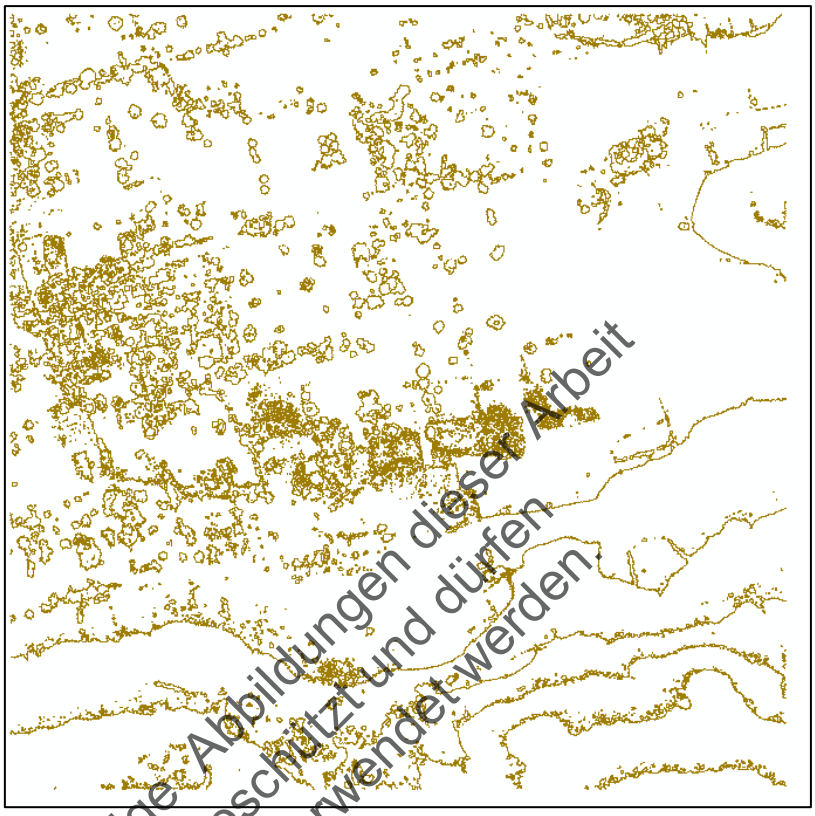

Fig.6: Contourmap

Contour? What is it? What can we use it for? (Find Screenshot of a real contour map!)

Creates contours or isolines from a raster surface.

Contours do not extend beyond the spatial extent of the raster, and they are not generated in areas of NoData. Therefore, adjacent contour inputs should first be edgematched into a continuous feature dataset. As an alternative to edgematching, you can merge the adjacent rasters before computing contours.

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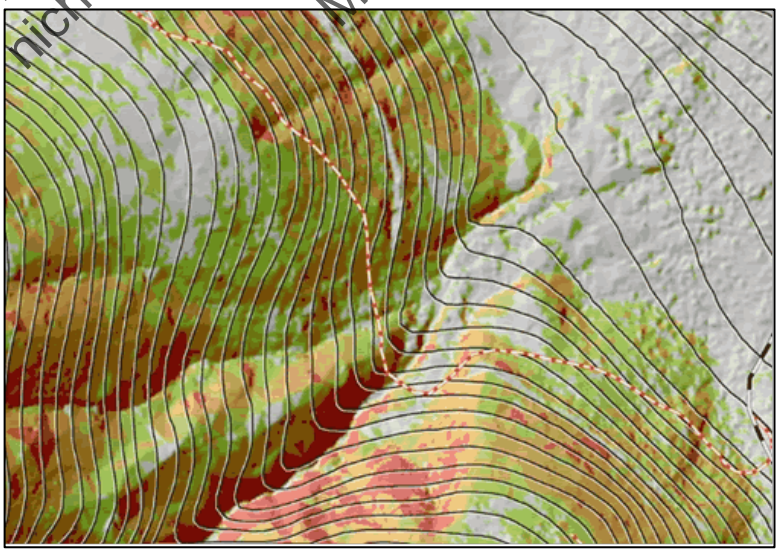

Fig.7: Contourmap (www.lidarbasemaps.org)

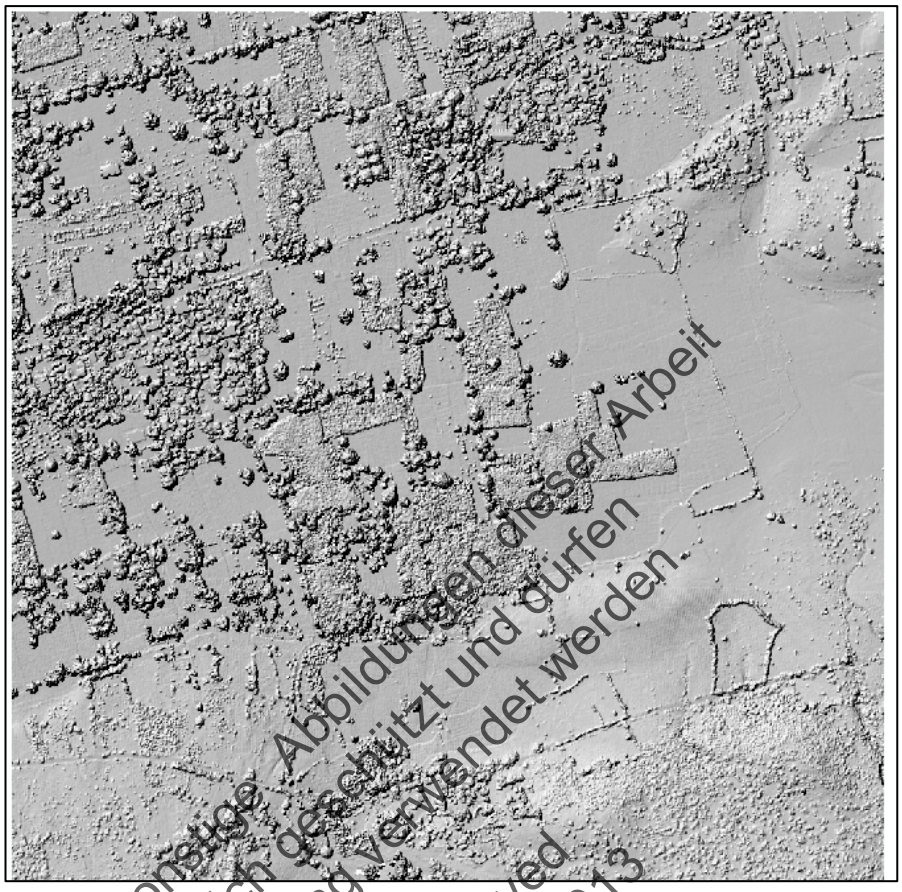

Fig.8: Hillshademap

Hillshade? What is it? What can we use it for?

Computes hillshade values for a raster surface by considering the illumination angle and shadows.

The Hillshade tool creates a shaded relief raster from a raster. The illumination source is considered at infinity. Two types of shaded relief rasters can be output. If the Model shadows option is disabled (unchecked), the output raster only considers local illumination angle. If it is enabled (checked), the output raster considers the effects of both local illumination angle and shadow.

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Fig.9: Slopemap

Slope? What is it? What can we use it for?

Slope identifies the slope (gradient, or rate of maximum change in z-value) from each cell of a raster surface.

Slope is the rate of maximum change in z-value from each cell. Identifies the rate of maximum change in z-value from each cell. The use of a z-factor is essential for correct slope calculations when the surface z units are expressed in units different from the ground x,y units. If any neighborhood cells are NoData, they are assigned the value of the center cell; then the slope is computed.

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