

Geographic information systems

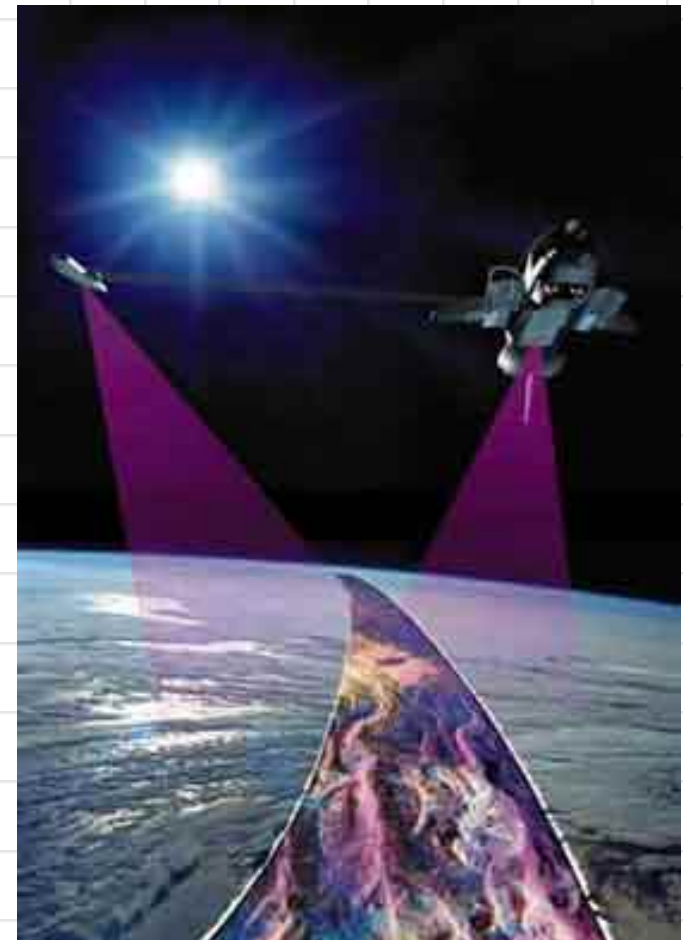
Working with raster layers – part III (Lesson 9)

Contents

- SRTM
- raster reprojection
- raster clipping
- raster reclassification
- shaded relief
- viewshed analysis
- homework assignment no.4

SRTM

- **SRTM (Shuttle Radar Topography Mission)**
- mapping of the Earth surface by radar systems
- principle – data acquired by two radar antennas allow us to create stereo (3D) model – digital elevation model (DEM)



Raster reprojection

- transformation of spatially localized raster into different spatial reference system
- e.g. WGS84 <-> SJTSK
- in QGIS:

Raster → Projections → Warp (Reproject)

- it is possible to set additional parameters by editing the command line

Raster reprojection

Exercise:

- transform the raster of SRTM DEM from WGS84 to SJTSK with target resolution of 50 m

Raster reprojection

Exercise:

- transform the raster of SRTM DEM from WGS84 to SJTSK with target resolution of 50 m

Solution:

- add following parameter to command line:
-tr 50 50

Raster clipping

- clipping the specified area from raster:

Raster → Extraction → Clipper

- select the extent by drag on canvas

Exercise:

- clip the rectangular area from SRTM DEM

Reclassification

- replacing the values in the input raster with new values according to certain rules
- there is no special tool for reclassification in QGIS
- however, we can use **Raster calculator** for simple reclassification (two categories)
- for advanced reclassification (more than two categories) we can use GRASS tool **r.reclass**

Reclassification



- example of reclassification rules:
0 thru 20 = 1
20 thru 40 = 2
40 thru 60 = 3
... etc.
- rules are set in the text file or directly in the r.reclass dialog window

Reclassification



Exercise:

- reclassify the clipped DEM as follows:
 - lowlands (up to 300 m.a.s.l.)
 - low highlands (301 to 800 m.a.s.l.)
 - medium highlands (801 to 1500 m.a.s.l.)
 - high highlands (over 1500 m.a.s.l.)

Shaded relief

- DEM tools:

Raster → Analysis → DEM (Terrain models)

- shaded relief (Hillshade), slope (Slope), aspect (Aspect) ... etc.

Exercise:

- create the shaded relief from clipped DEM

Viewshed analysis



- viewshed analysis using DEM
- GRASS module **r.viewshed** creates the raster of cells visible from the location specified by coordinates X,Y
- in each cell a value of vertical angle (in degrees) is stored below which is that cell visible from specified location (0° – under, 90° – horizontally, 180° - above)

Viewshed analysis



Exercise:

- create a raster of surface visibility from arbitrary location on clipped DEM

Homework no.4



Find out how many square kilometers of National Park (NP) or Protected Landscape Area (PLA) is located in certain elevation range.

- input data:
 - elevation points (vector layer)
 - NP or PLA boundary (vector layer)
- output:
 - area in km^2 (single value)

Homework no.4



Workflow:

1. Creation of DEM.
2. Reclassification of DEM to specified elevation levels.
3. Conversion of reclassified raster to vector.
4. Overlay of NP (PLA) and the polygon from step 3.
5. Computing the area of polygons.

Homework no.4



1. Creation of DEM

- use v.surf.rst tool for interpolation of DEM from input point layer (see Lesson 8 for details)
- set target resolution to 100 m

Homework no.4



2. Reclassification of DEM

- use r.reclass tool for reclassification of DEM values into elevation levels (see Lesson 8 and 9 for details)
- set target value 1 for elevation range of interest
- set target value NULL for elevation range out of interest

Homework no.4



3. Conversion to vector

- use Polygonize tool for conversion of reclassified raster to vector (see Lessons 8 for details)

Homework no.4



4. Overlay

- use Clip or Intersect tool for overlay the elevation polygon and NP polygon (see Lessons 7 for details)

Homework no.4



5. Computing the area

- find out the area of intersected polygon by Identification tool (icon with **i**) in Derived attributes
- for multiple polygons use Dissolve tool to obtain a single multipolygon prior to area identification

The End

Thank you for attention!