

r.slopeunits - a GRASS GIS module

for Slope Units Delineation

Description

The software r.slopeunits requires a DEM, an optional raster layer showing alluvial plains, and the following user-defined parameters :

- the initial flow accumulation area threshold (t in square meters),
- the reduction factor r (integer, >1), that is used to calculate, iteratively, new values for the flow accumulation area threshold ($t = t-t/r$). Values larger than 5 are recommended.
- the minimum surface area for the slope-units (a in square meters),
- the minimum circular variance of terrain aspect within a slope-units (c , varies between 0 and 1, where 0 means no variance, i.e. cells dip in the same direction, and 1 means maximum variance)
- the maximum surface area for the slope-units (*maxarea*, in square meters, optional),
- threshold area value for the cleaning procedures (*cleansize*, in square meters, used to remove very small slope units that may occur give some geomorphological conditions)

Software Availability

The software is free software under the GNU General Public License ($\geq v2$). Read the file <https://grass.osgeo.org/home/copyright/> that comes with GRASS GIS for details. The download link is <http://geomorphology.irpi.cnr.it/tools/slope-units>

Data

We provide a compressed location for GRASS GIS 7.0 that can be used to test the code.

Requirements

GRASS GIS 7.0, Python, Bash

Installation and run

The software have been tested on a Ubuntu 14.04 LTS server but should run on a generic GNU/Linux machine.

The two files provided must be copied inside the “scripts” folder of the GRASS GIS installation directory. The must be set executable. A typical approach, for the installation, is:

```
#open a bash shell
```

```
#move to the download folder, e.g.
```

```
cd /home/$USER/Downloads
```

#move the files

```
mv r.slopeunits /usr/lib/grass70/scripts
```

```
mv clean_method_3.sh /usr/lib/grass70/scripts
```

#give execution rights

```
chmod ugo+x /usr/lib/grass70/scripts/r.slopeunits
```

```
chmod ugo+x /usr/lib/grass70/scripts/clean_method_3.sh
```

#Run GRASS GIS, move in the location containing the digital elevation model type and:

```
r.slopeunits --help
```

#to see the options. The minimal command line to obtain a slope-units delineation is

```
r.slopeunits demmap=[dem] slumap=[output_SU_map] thresh=[t, square meters]
circularvariance=[c] areamin=[a, square meters] reductionfactor=[r, r>2] maxiteration=[max
number of iterations]
```

#see M. Alvioli, I. Marchesini, P. Reichenbach, M. Rossi, F. Fiorucci, F. Ardizzone, F. Guzzetti

#(2015) for explanations and additional options.

#

#please address comments, questions and bug fix requests to:

#ivan.marchesini[AT]irpi.cnr.it;

#alvioli[AT]pg.infn.it

#