

# SOFTWARE CITATION WITH FINE GRANULARITY: THE *g.citation* MODULE FOR GRASS GIS

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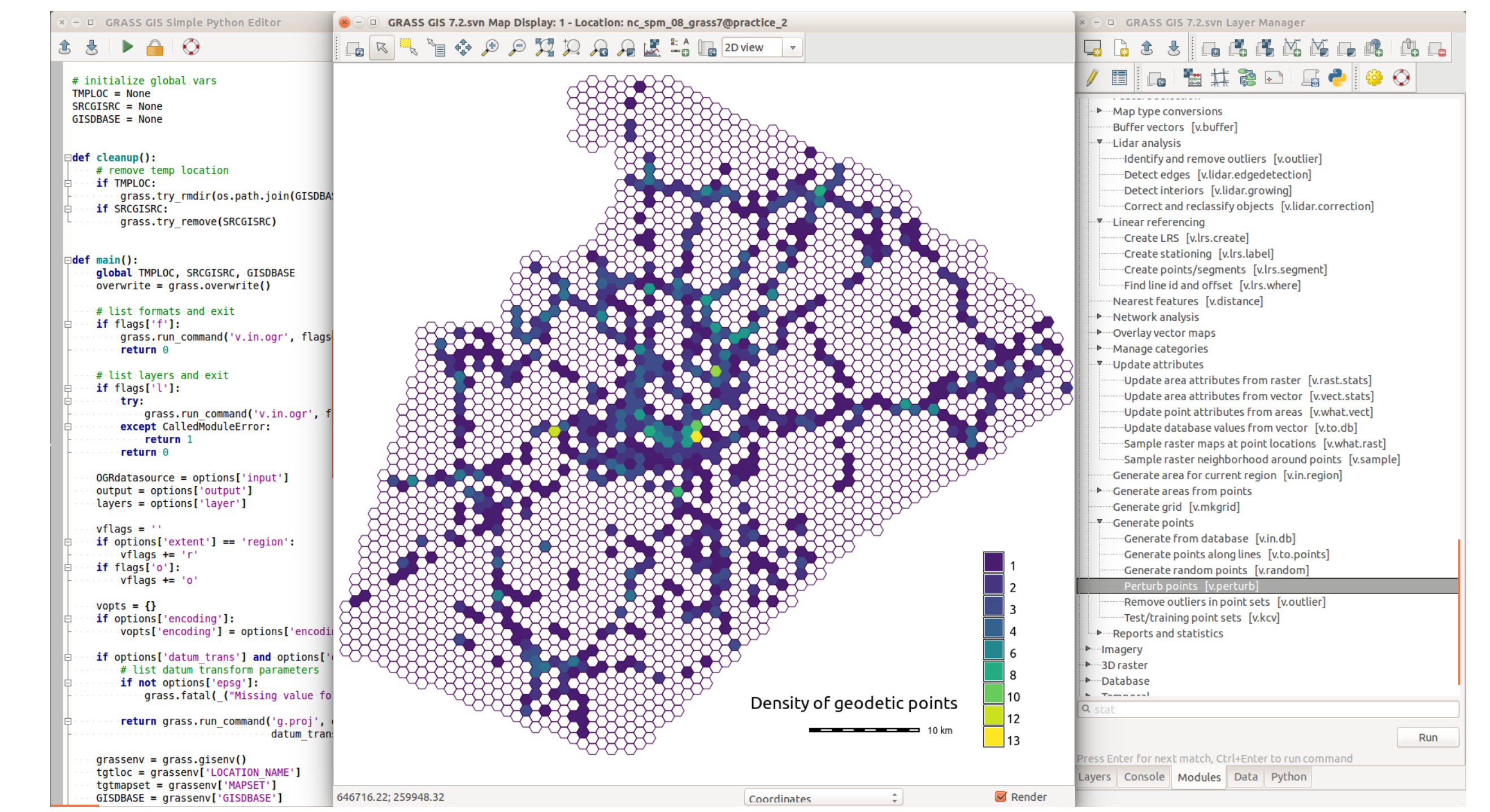
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## GRASS GIS OVERVIEW



- User-focused and community-driven
- Mature OSGeo Foundation project
- Over 30 years of continuous software development
- Long-term support releases, stable API, science emphasis
- Single integrated environment for 2D and 3D raster analysis, image processing, vector data analysis, and spatio-temporal data processing



## CURRENT APPROACHES

When using GRASS GIS for scientific publication, authors can:

- cite the entire GRASS GIS software package,
- cite a review publication associated with GRASS GIS,
- cite a book about GRASS GIS, or
- cite a publication associated with a specific module.

### REFERENCES

- Ehlschlaeger, C. (1989). Using the A\* Search Algorithm to Develop Hydrologic Models from Digital Elevation Data. *Proceedings of International Geographic Information Systems (GIS) Symposium '89*, pp 275-281 (Baltimore, MD, 18-19 March 1989). URL: <http://faculty.wvu.edu/~C.R.Ehlschlaeger/ZolderIGISpaper.html>
- Holmgren, P. (1994). Multiple flow direction algorithms for runoff modelling in grid based elevation models: An empirical evaluation. *Hydrological Processes* Vol 8(4), pp 327-334. DOI: 10.1002/hyp.3360080405
- Montgomery, D.R.; Foufoula-Georgiou, E. (1993). Channel network source representation using digital elevation models. *Water Resources Research* Vol 29(12), pp 3925-3934.

Papers relevant to the code and method in any way

### AUTHOR

Markus Metz  
Last changed: \$Date: 2017-01-04 23:59:34 -0800 (Wed, 04 Jan 2017) \$

Authors of code and documentation

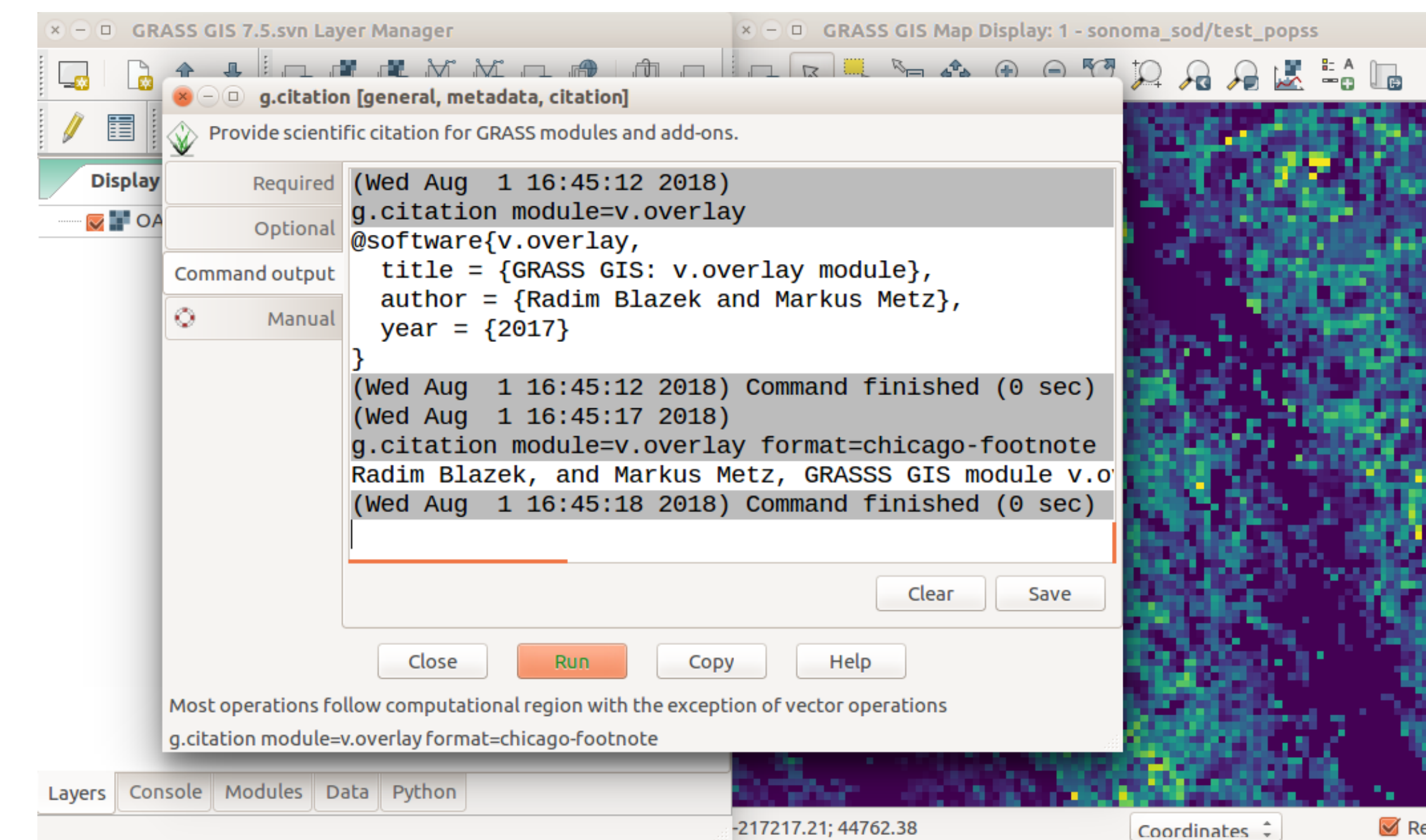
## *g.citation* MODULE

### Why do we need *g.citation*?

- Over 500 core modules and over 300 additional modules
- Many, but not all, have associated scientific publication
- No way to cite unless there is a publication
- Not clear how to identify this publication
- Publication may not include all current code authors

### *g.citation* functionality

- One stop shop for citing any part of GRASS GIS
- Creates formatted citations, BibTeX, CFF, ...
- Extracts metadata from legacy documentation
- Leverages existing technologies such as CFF and CSL



*g.citation* used from graphical user interface (GUI)

### Citation File Format (CFF)

- Citation metadata for software (Druskat et al., 2018)
- YAML (YAML Ain't Markup Language) text file
- human- and machine- readable
- CFF as *g.citation* output
- CITATION.cff file as a possible *g.citation* input

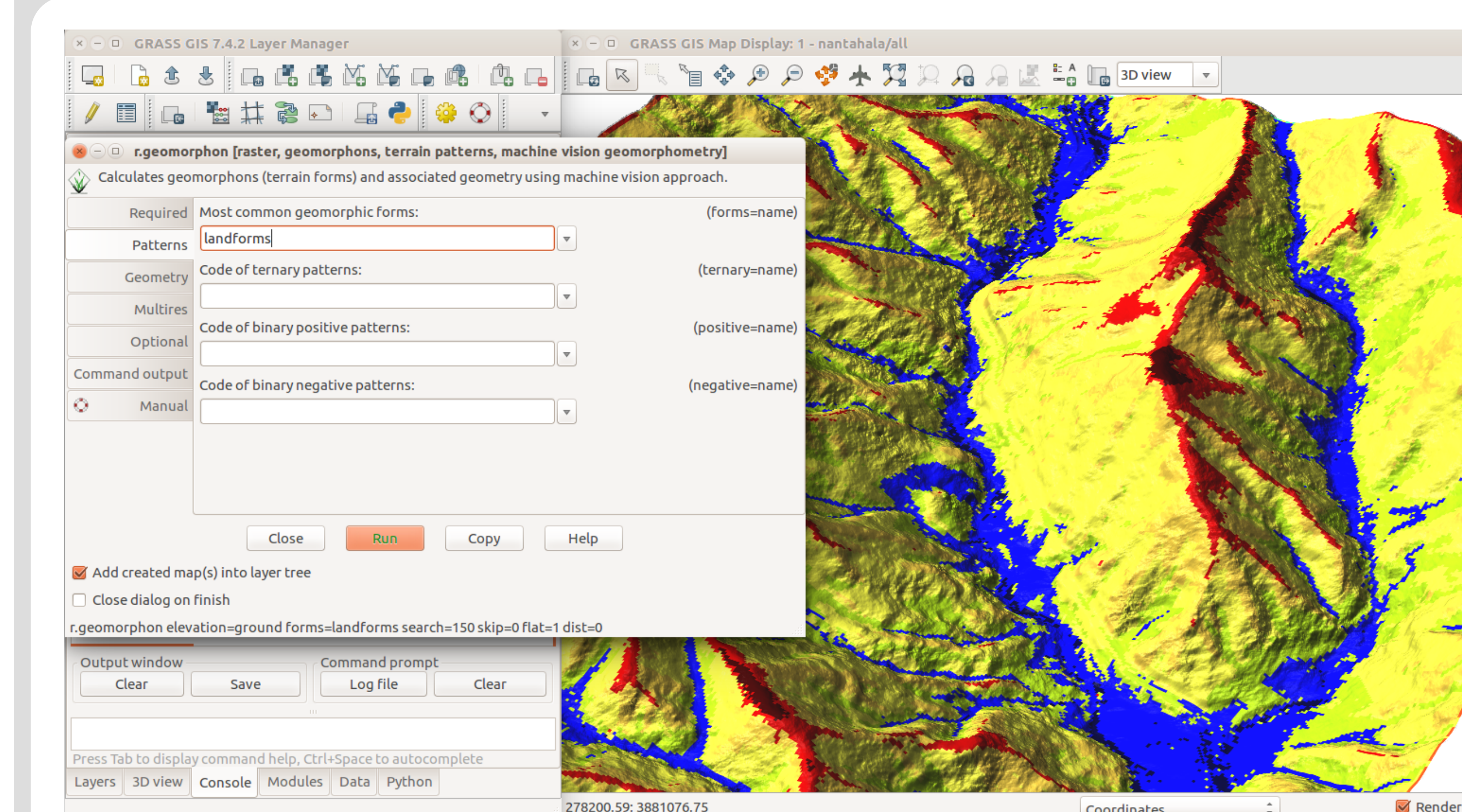
```
cff-version: 1.0.3
message: "If you use this software, please cite it as below."
authors:
  - family-names: Blazek
    given-names: Radim
  - family-names: Landa
    given-names: Martin
  - family-names: Garzon-Lopez
    given-names: Carol J.
title: "GRASS GIS: v.select module"
version: 7.7.svn
date-released: 2018-11-24
license: GPL-2.0-or-later
```

CFF generated by *g.citation* for *v.select*

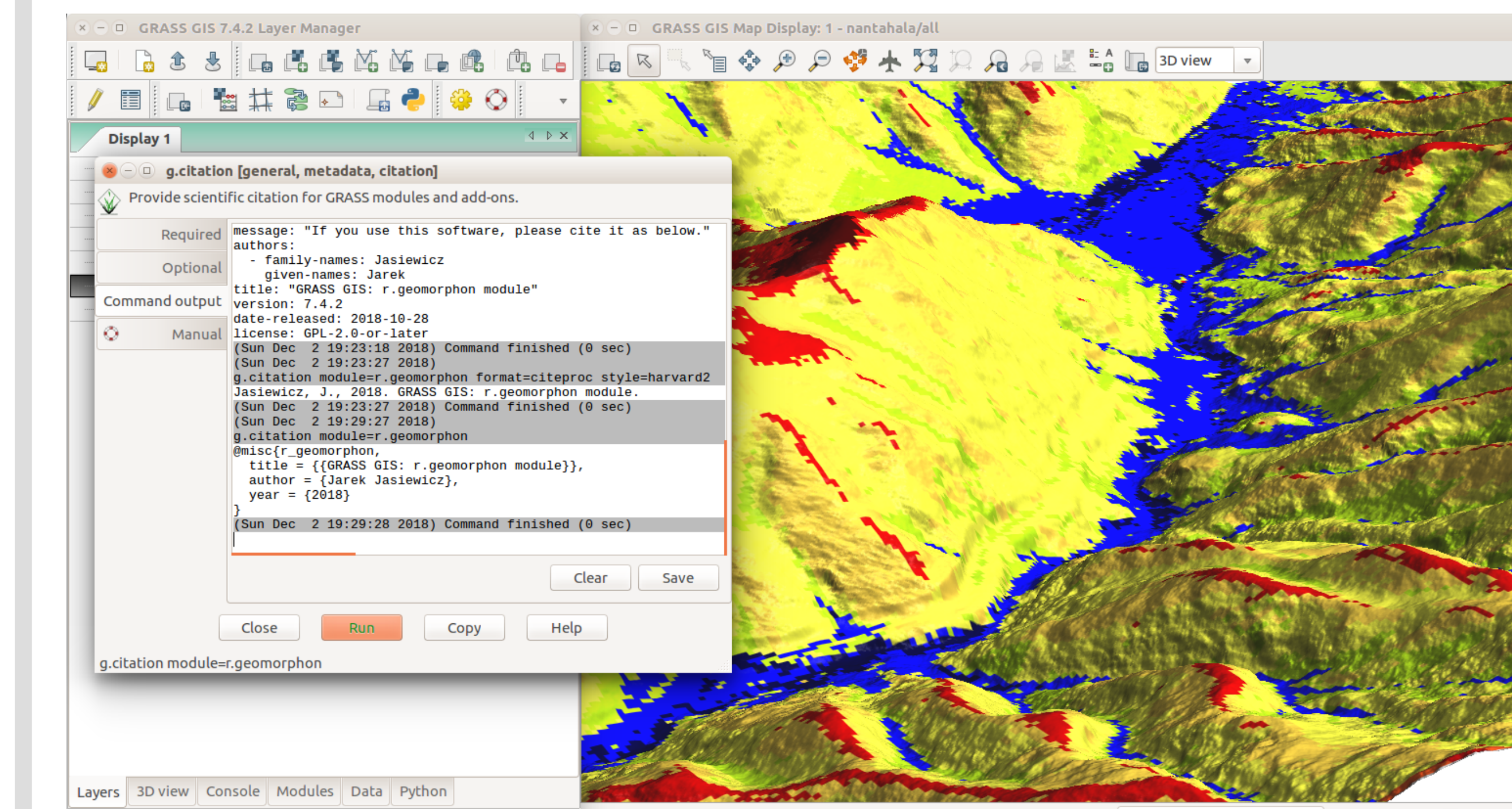
### Citation Style Language (CSL)

- used to generate citations in a variety of styles
- CSL style language for citations
- citeproc-py is a CSL processor Python package
- metadata → CSL + citeproc JSON → bibliography entry

## *g.citation* EXAMPLE WORKFLOW



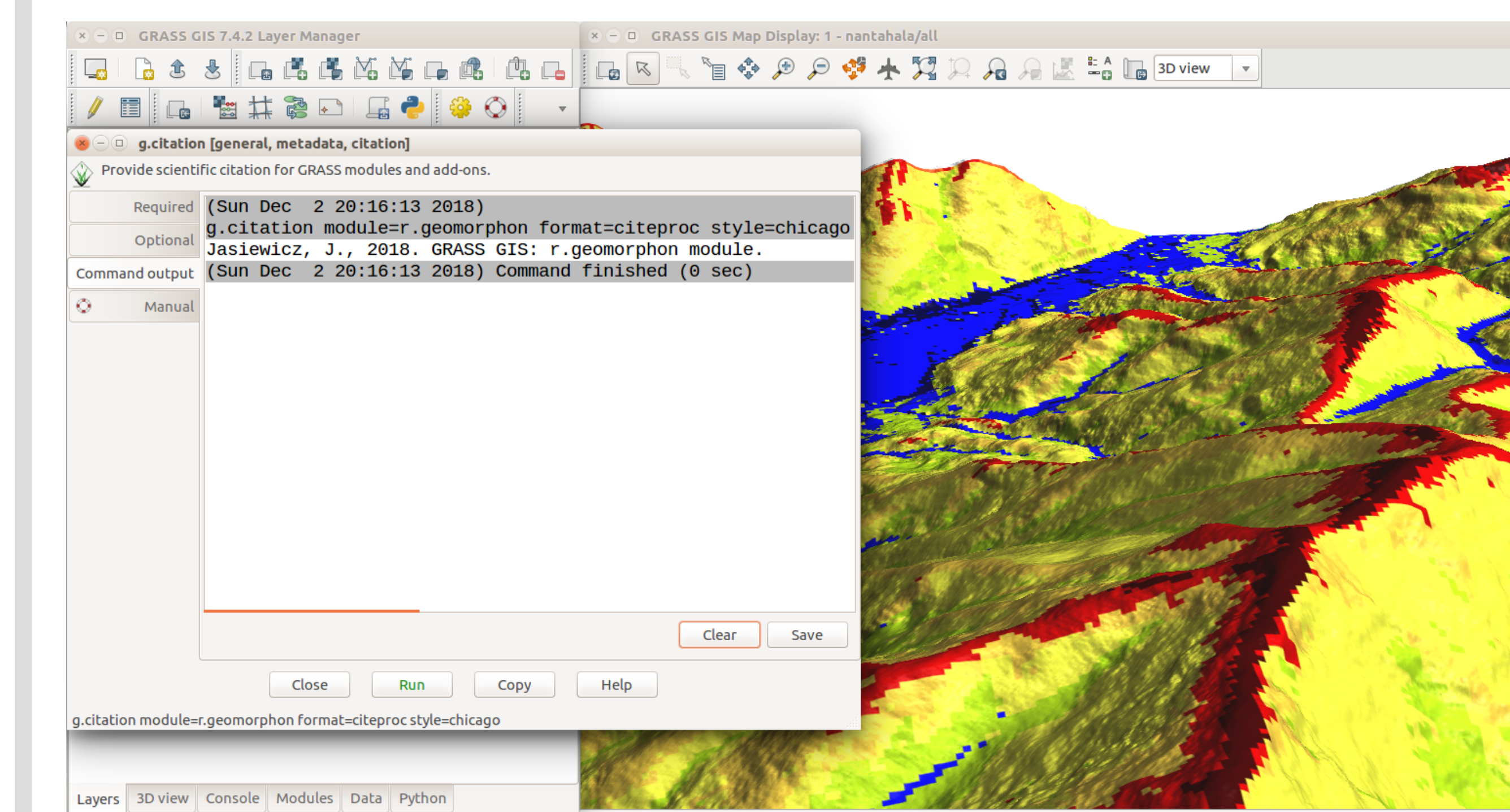
Step 1: Module *r.geomorphon* is used to detect landforms



Step 2: BibTeX citation is created using *g.citation*

[2] J. Jasiewicz, GRASS GIS: *r.geomorphon* module, 2018.

Step 3: Citation typesetted in a document



Alternative: Styled text citation created using *g.citation*

## GRASS GIS AS A SCIENTIFIC CODE REPOSITORY

- Innovations are preserved (Chemin et al., 2015)
- Code is further developed (Petras et al., 2017)
- Tools used by other scientists (Petras et al., 2018) [AGU 2018]

## AVAILABILITY

- [grass.osgeo.org](http://grass.osgeo.org) (download, documentation, source code)
- *g.citation* is a part of GRASS GIS Addons repository
- Code under GNU GPL >=v2 (SPDX: GPL-2.0-or-later)
- Poster under CC Attribution-ShareAlike 4.0 International

### References

- Chemin, Y., Petras, V., Petrasova, A., Landa, M., Gebbert, S., Zambelli, P., Neteler, M., Löwe, P., and Di Leo, M. (2015). GRASS GIS: a peer-reviewed scientific platform and future research repository. In *Geophysical Research Abstracts*, volume 17, page 8314.
- Druskat, S., Chue Hong, N., Haines, R., and Baker, J. (2018). Citation File Format (CFF) - Specifications. NCALM (2009). Nantahala NF, NC: Forest Leaf Structure, Terrain and Hydrophysiology.
- Petras, V., Chemin, Y., Landa, M., Leppelt, T., Zambelli, P., Delucchi, L., Di Leo, M., Gebbert, S., and Neteler, M. (2017). How innovations thrive in GRASS GIS. In *NCGIS*.
- Petras, V., Petrasova, A., Neteler, M., and Mitsova, H. (2018). GRASS GIS: A general-purpose geospatial research tool. In *AGU*.



# GRASS GIS