Geocomputation with R

Introducing RQGIS and RSAGA

Jannes Muenchow

GeoStats 2018

Find the slides and the code

https://github.com/geocompr/geostats_18

Installing QGIS

- **Follow** the steps described in
  !

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- Windows users: Use the OSGeo-network-installer (also described in the vignette)!

Installing RQGIS

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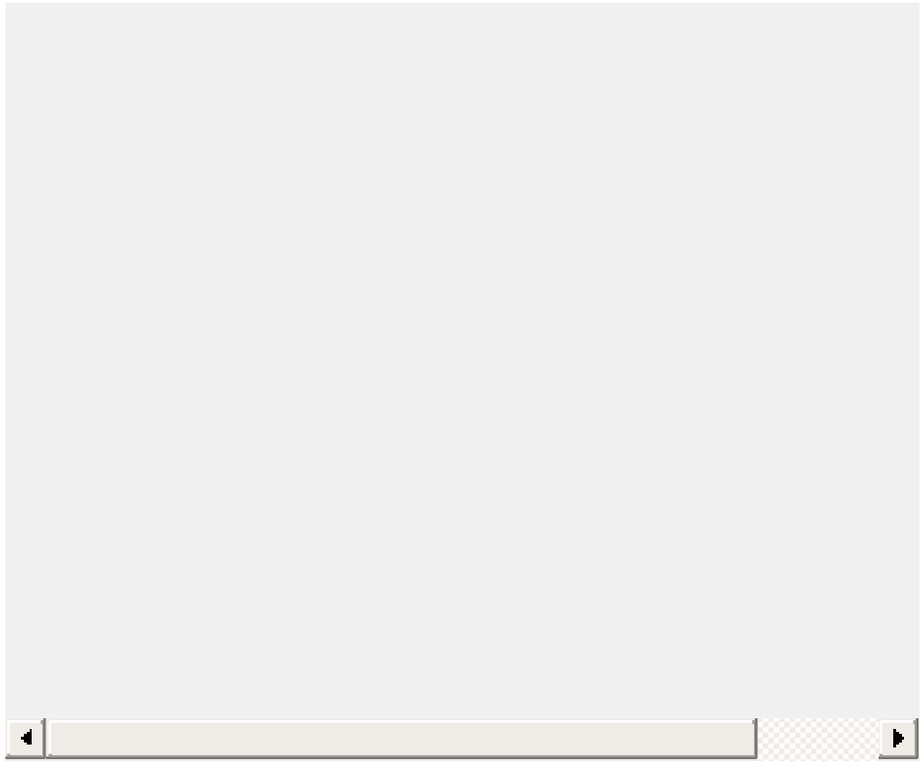
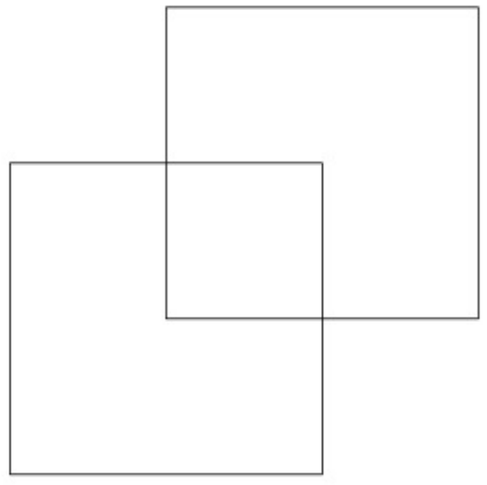
For more information and a short introduction by example refer to:

https://github.com/jannes-m/RQGIS

RQGIS by example

To introduce the RQGIS package, let's find the intersection between two polygons. For this we create two polygons using the -package.





Find a QGIS algorithm

Now we would like to know which QGIS geoalgorithm we can use for this task. We assume that the word will be part of the short description of the searched geoalgorithm.

How to use it

To find out the parameter names and corresponding default values, use

.

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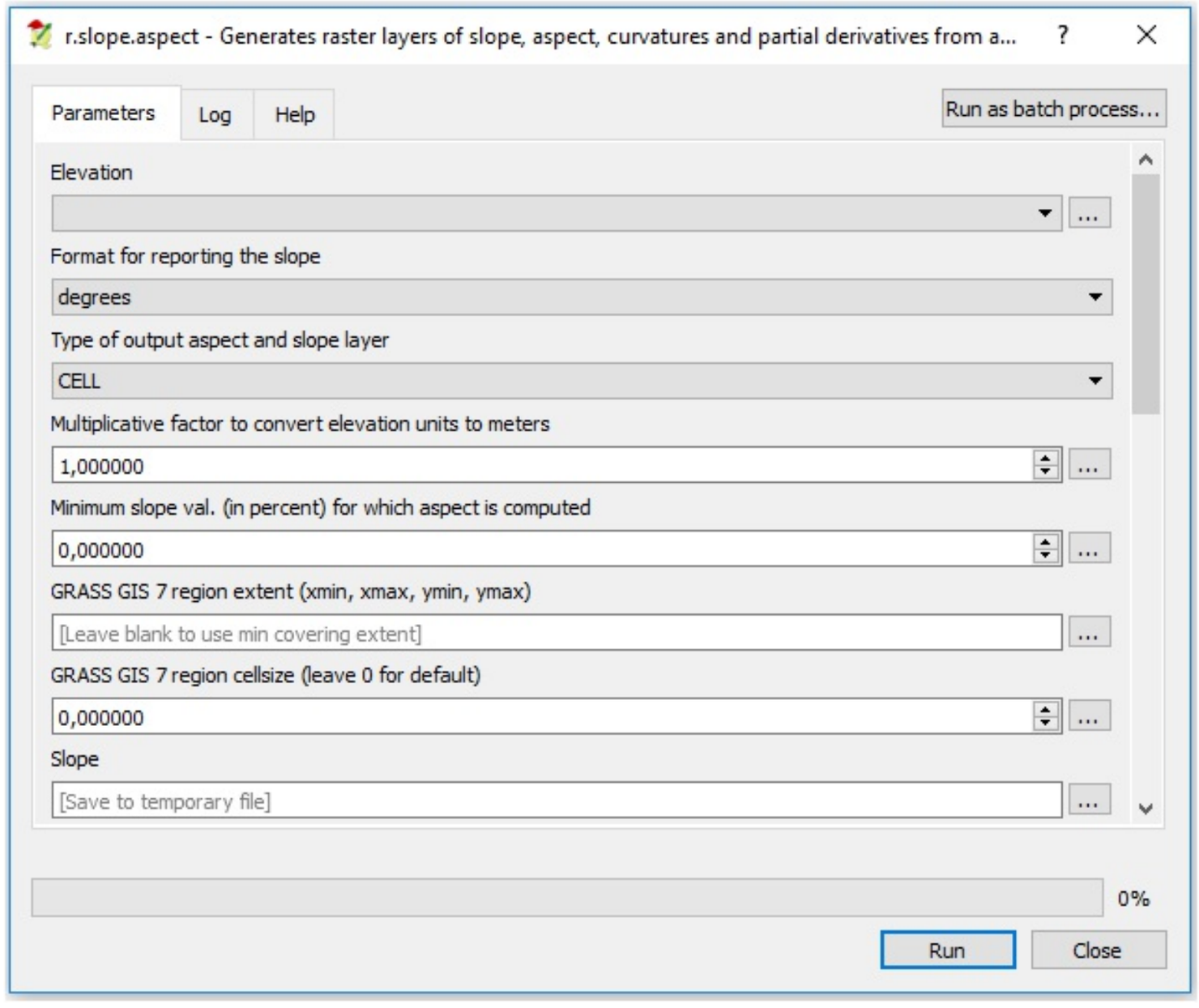
Here, we only have three function arguments, and automatic parameter collection is not necessary, but when I first looked at...

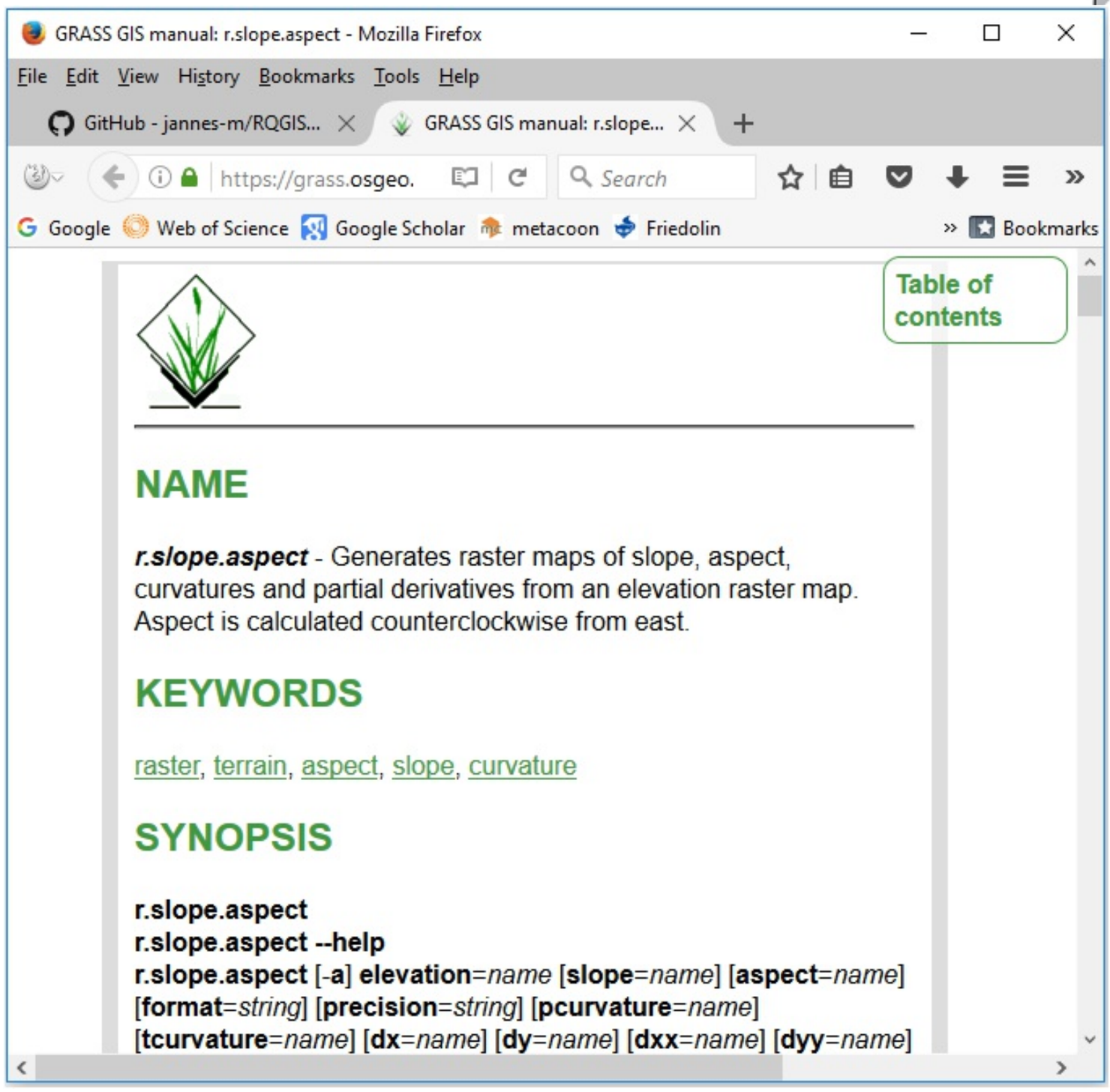
But looking at the QGIS GUI...



Convenience function

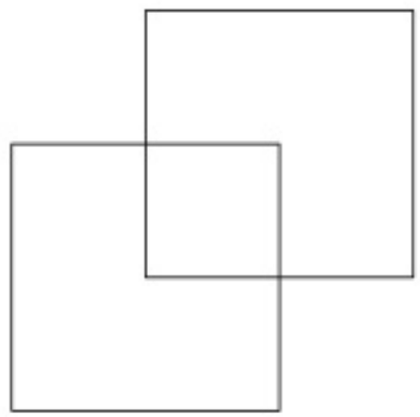
Access the online help

By the way, use to access the online help and possibly find out more about a specific geoalgorithm:


GRASS GIS manual: r.slope.aspect - Mozilla Firefox
File Edit View History Bookmarks Tools Help
GitHub - jannes-m/RQGIS...
GRASS GIS manual: r.slope...
https://grass.osgeo.
Search
Google
Web of Science
Google Scholar
metacoon
Friedolin
Bookmarks
Table of contents
NAME
r.slope.aspect - Generates raster maps of slope, aspect, curvatures and partial derivatives from an elevation raster map. Aspect is calculated counterclockwise from east.
KEYWORDS
raster, terrain, aspect, slope, curvature
SYNOPSIS
r.slope.aspect
r.slope.aspect --help
r.slope.aspect [-a] elevation=name [slope=name] [aspect=name] [format=string] [precision=string] [pcurvature=name] [tcurvature=name] [dx=name] [dy=name] [dxx=name] [dyy=name]

Back to our use case

We have created two polygons using
, and would like to find the
intersection between the two.



Back to our use case

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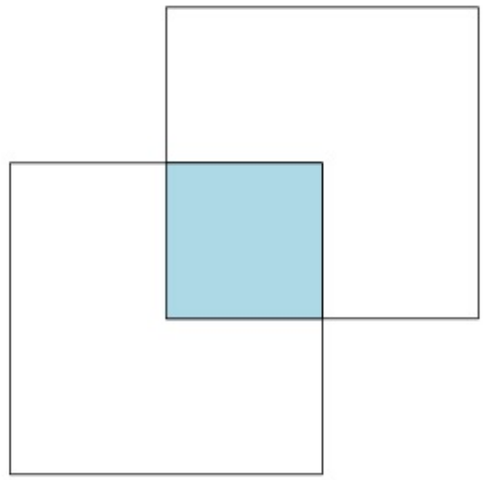
Hence, we have to specify , and . We can do so using R named arguments.

Run QGIS from within R

Spatial objects as inputs

Load QGIS output into R

Visualizing the result



Further (R)QGIS reading

- RQGIS R Journal paper (Muenchow, Schratz, and Brenning, 2017).
- Nice paper on QGIS and its architecture (Graser and Olaya, 2015).
- https://geocompr.robinlovelace.net/gis.html

RSAGA

Ok, let's do the same using **RSAGA**. First, we need to tell our system where SAGA is installed, searches our system automatically for a SAGA installation.

SAGA modules

Remember SAGA is structured in modules. It also might to have a look at the SAGA GUI. Let's have a look at the available module libraries.

Geoalgorithms

We want to intersect two polygon layers, so we would assume to find a corresponding function in module .

How to use a specific geoalgorithm

Now that we found out that there is an command, we need to know its parameters.

Run SAGA

Ok, before running SAGA, we need to export our -objects.

Now, run SAGA

is the workhorse that calls the SAGA algorithms using the command-line API. Parameters and corresponding arguments have to be specified in a list (looks a bit like).

Visualize it

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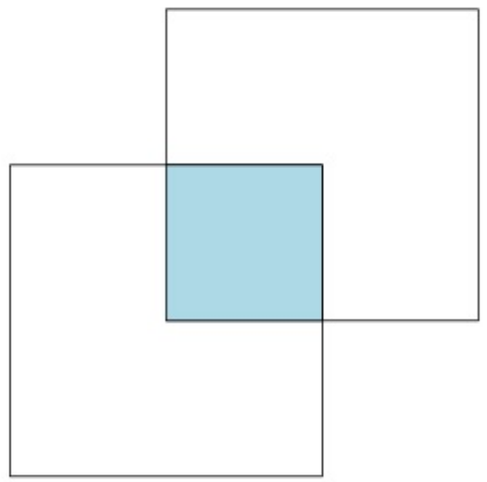

Further (R)SAGA reading

- We recommend reading for a deeper look at **RSAGA**.
- Nice paper on SAGA, it's history and architecture (Conrad, Bechtel, Bock, Dietrich, Fischer, Gerlitz, Wehberg, Wichmann, and Böhner, 2015)
- https://geocompr.robinlovelace.net/gis.html

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3. Optional: calculate the intersection of and with the help of , SAGA and/or GRASS (hint: overlay and).
4. Optional: Select randomly a point from and find all pixels that can be seen from this point (hint: viewshed). Visualize your result. Plot a hillshade, and on top of it the digital elevation model, your viewshed output and the point. Additionally, give a try.

References

Conrad, O, B. Bechtel, M. Bock, et al. (2015). "System for Automated Geoscientific Analyses (SAGA) v. 2.1.4". In: 8.7, pp. 1991-2007. ISSN: 1991-9603. DOI: 10.5194/gmd-8-1991-2015. URL: http://www.geosci-model-dev.net/8/1991/2015/ (visited on Jun. 12, 2017).

Graser, Anita and Victor Olaya (2015). "Processing: A Python Framework for the Seamless Integration of Geoprocessing Tools in QGIS". En. In: 4.4, pp. 2219-2245. ISSN: 2220-9964. DOI: 10.3390/ijgi4042219. URL: http://www.mdpi.com/2220-9964/4/4/2219 (visited on Jul. 21, 2018).

Muenchow, Jannes, Patrick Schratz and Alexander Brenning (2017). "RQGIS: Integrating R with QGIS for Statistical Geocomputing". In: 9 (2). Accepted for publication on 2017-12-04, pp. 409-428. URL: https://rjournal.github.io/archive/2017/RJ-2017-067/RJ-2017-067.pdf.