



Neues aus dem GRASS GIS Projekt: die Version 7.4.0 steht bereit

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grass.osgeo.org
www.mundialis.de

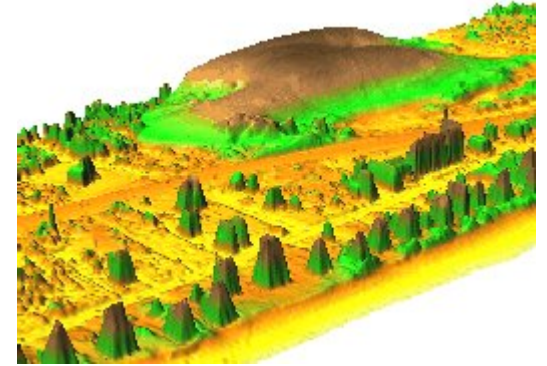
FOSSGIS 2018 – Bonn



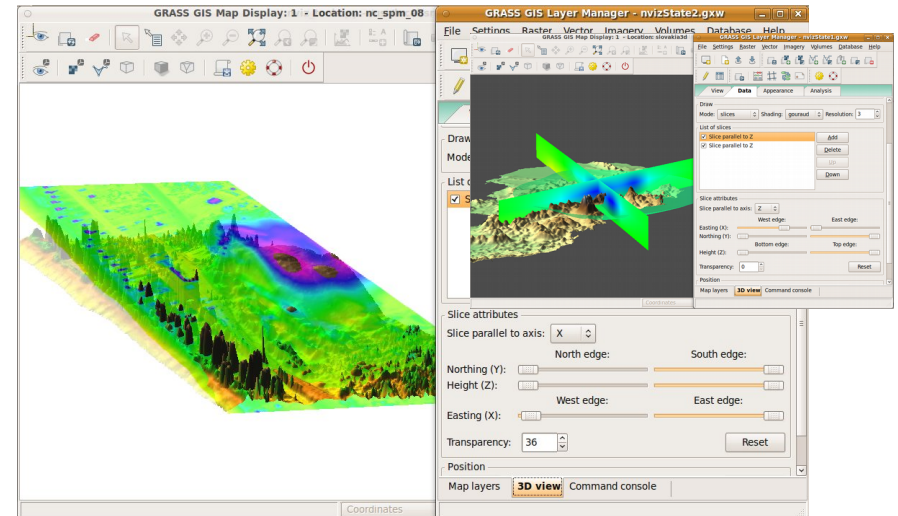
Was ist GRASS GIS?



- GRASS GIS ist eine hybride, modulare GIS-Software
- GRASS = Geographic Resources Analysis Support System
- GNU General Public License – frei verfügbar
- Raster- und topologische Vektordatenfunktionalität
- 3D-Raster-Voxelbearbeitung
- Bildverarbeitung
- Visualisierungsmöglichkeiten
- Portable Software (“alle” Betriebssysteme)
- graphischen Benutzeroberfläche
- sowie Kommandozeile



Nagshead LiDAR time series: dune moving over 9 years (NC, USA) – [animation](#)

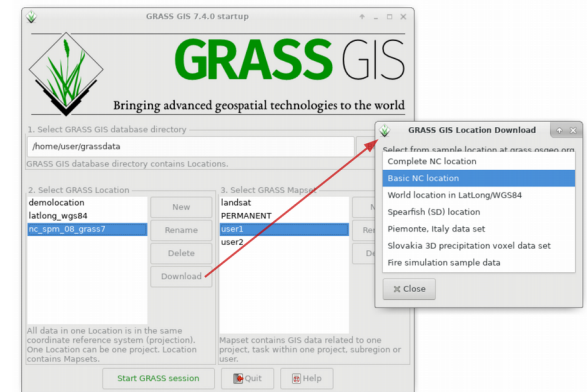




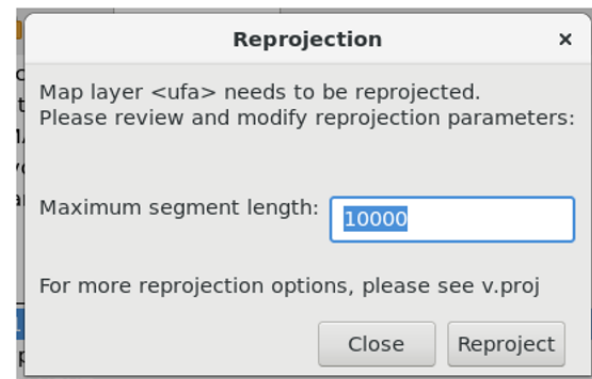
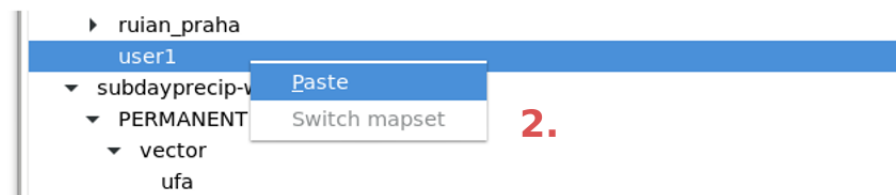
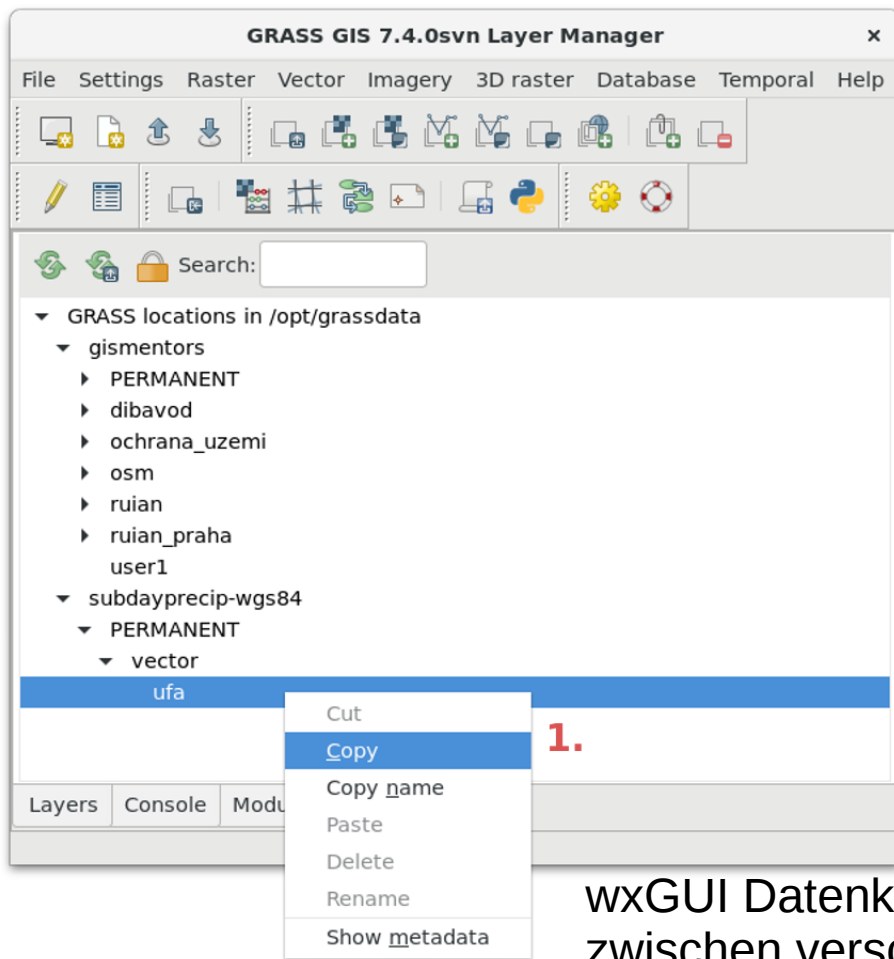
Was ist neu in GRASS GIS 7.4?

Neue stabile Version GRASS GIS 7.4.0

- Benutzerfreundlichkeit und grafische Benutzeroberfläche verbessert
- Neue “no data” compression
- Unterstützung für globale Daten, die über $-180/+180$, $-90/+90$ herausreichen
- Ortho-Rektifikation mit Benutzeroberfläche wurde in GRASS GIS 7 neu implementiert
- Neuer Download-Link für Beispieldaten
- ... über 480 Verbesserungen seit G7.2.0



Data catalog improvements



wxGUI Datenkatalog: Kopieren von Raster- und Vektorkarten zwischen verschiedenen Projekten inklusive Reprojektion

New Orthorectification GUI



Manage Ground Control Points

target

GCP List

use	source E	source N	source Z	target E	target N	target Z	Forward error	Backward error
1	3433.76399027	4013.92944039	0.0	635890.539036	5082323.73716	700	103893.989338	1206.797055
2	5663.63017032	3315.20681265	0.0	630698.420898	5083666.03223	750	75667.125929	2593.658967
3	3484.43309002	4965.99756691	0.0	635880.958794	5080131.73067	750	118984.847243	2147.705000
4	3519.34793187	4907.66423358	0.0	635757.957044	5080294.5271	720.3481	115606.753734	2096.784943
5	1980.11435523	4745.01216545	0.0	639373.871778	5080707.57861	500	803733.994864	2206.519653
6	4006.45255474	2026.76399027	0.0	634353.593597	5086780.06445	850	189157.523637	1216.300242
7	3965.32043706	4303.67206804	0.0	637330.631384	5081740.00077	700	242670.326834	1443.770170

Source Display

Target Display

GRASS GIS Map Swipe

Swipe mode

Graphical Modeller



The screenshot displays the GRASS GIS 7.4.1svn interface. The 'GRASS GIS Layer Manager' window shows two layers: 'staty@ruian' and 'dalnice5km'. The 'GRASS GIS Map Display: 1 - gismentors/user1' window shows a map with a grey buffer around a network. The 'GRASS GIS Graphical Modeler - buffer.gxm*' window shows a workflow diagram with the following steps:

```
graph LR; A([input silnice@osm]) --> B[1) v.extract]; B --> C([output/input dalnice]); C --> D[2) v.buffer]; D --> E([output dalnice]); E --> F[Display];
```

The 'Display' button for the final output is highlighted with a red box. A red arrow points from this button to the 'dalnice5km' layer in the Layer Manager window.

- mark data to be displayed
- print computational time elapsed
- delete intermediate data when computation finished
- export to Python

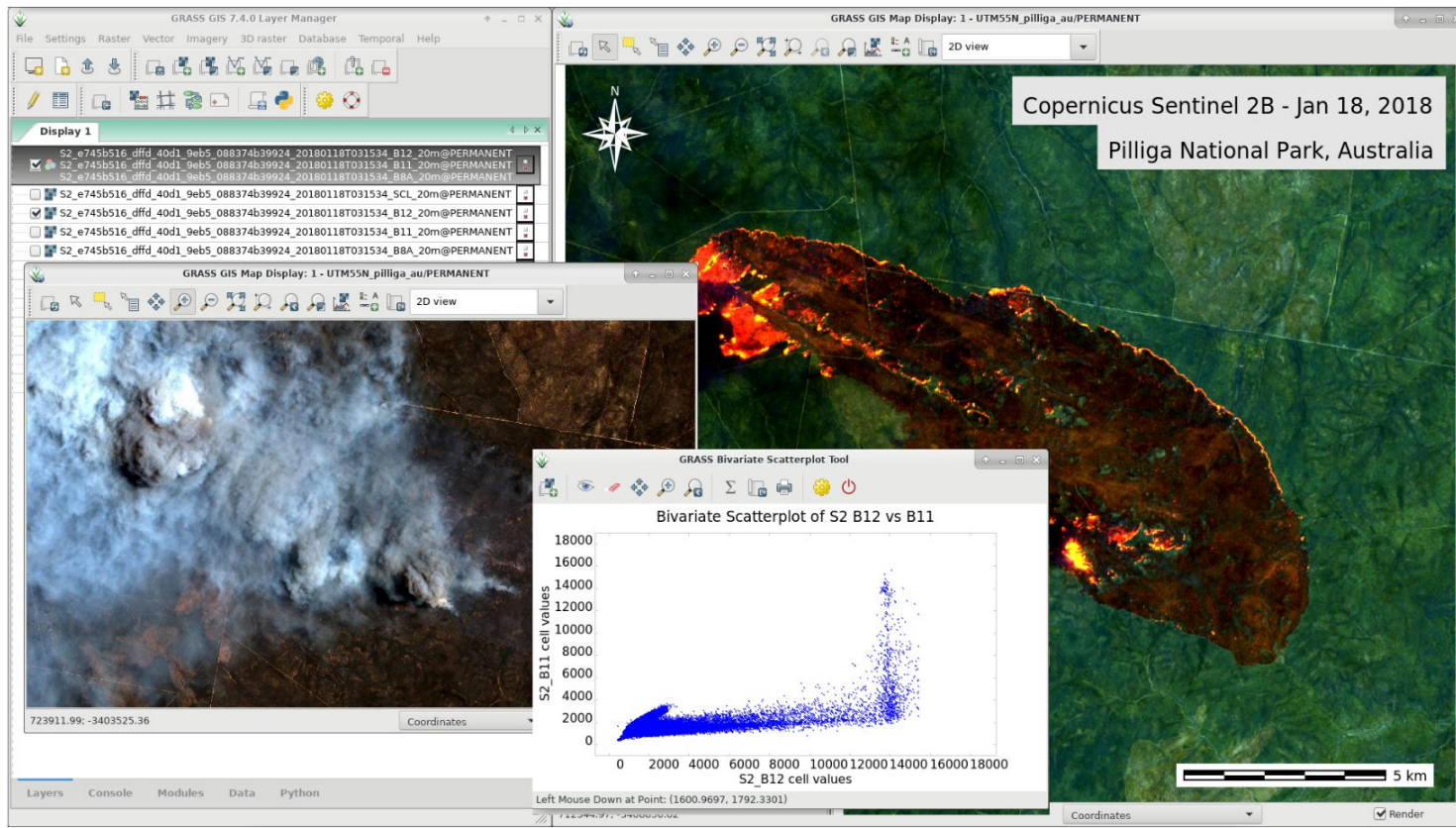


Copernicus Sentinel-2 processing

New addons:

i.sentinel.download and i.sentinel.import

Example:
Wildfire in
Australia

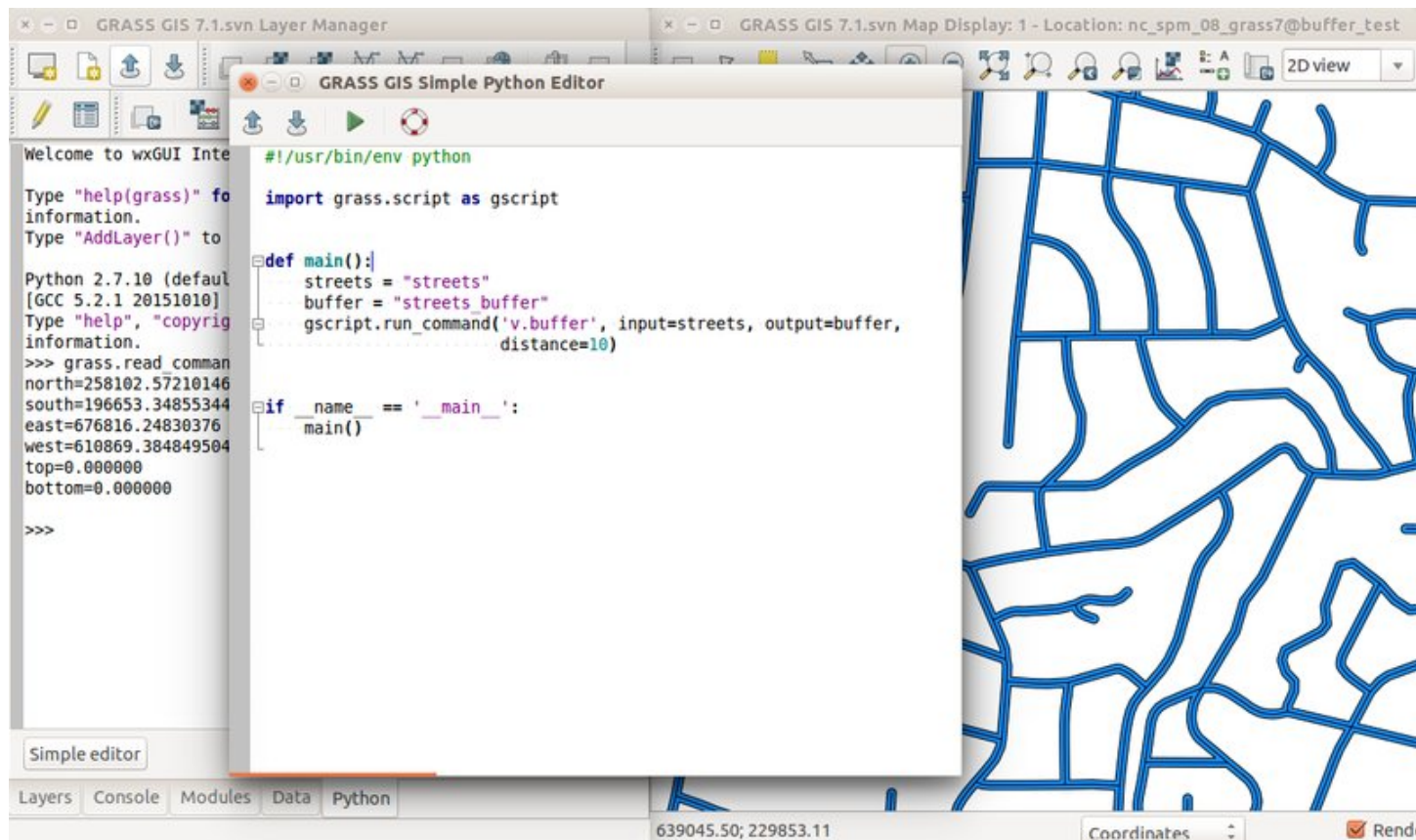




Python Editor

Integrated
Python editor
for rapid
prototyping

Example:
Vector buffer



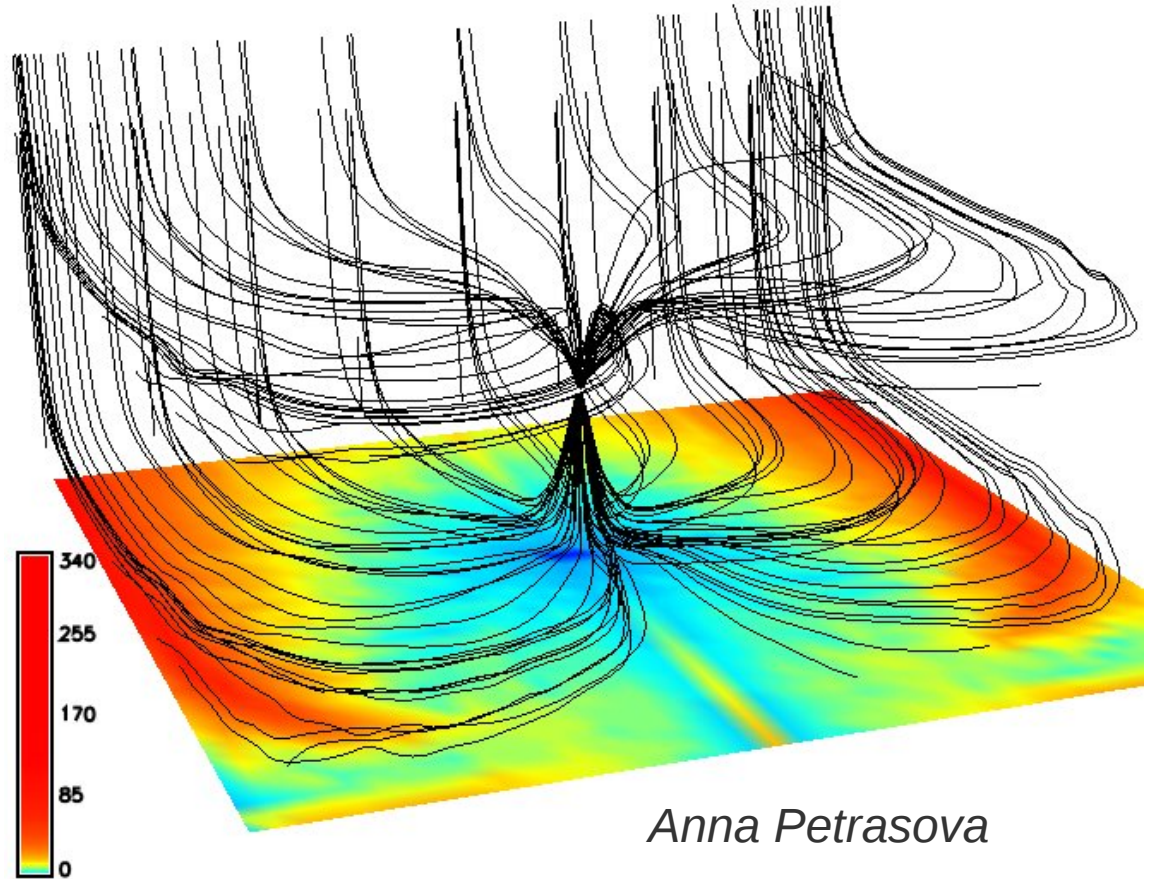
Vaclav Petras



3D raster flowlines

Voxel processing:

r3.flow and r3.gradient to
compute 3D flow lines, 3D
flow accumulation and
related gradients



Anna Petrasova

TGRASS: t.rast.algebra and t.rast3d.algebra: temporal algebra



Compute annual hydro-thermal coefficients (HTC) from daily climate data

$$HTC = \frac{\sum P_{(T > 10^\circ C)}}{\sum T}$$

T := daily temperatures,
P := daily precipitation

T := STRDS of daily temperatures,
/ precipitation
raster mask: all cells set

~ 60 years of daily data, each pixel in time = virtual meteo station

```
t.rast.algebra "HTC = (D {+,contains,1} if(T >= 10, P, 0)) / (D {+,contains,1} if(T >= 10, T / 10, 0))"
```

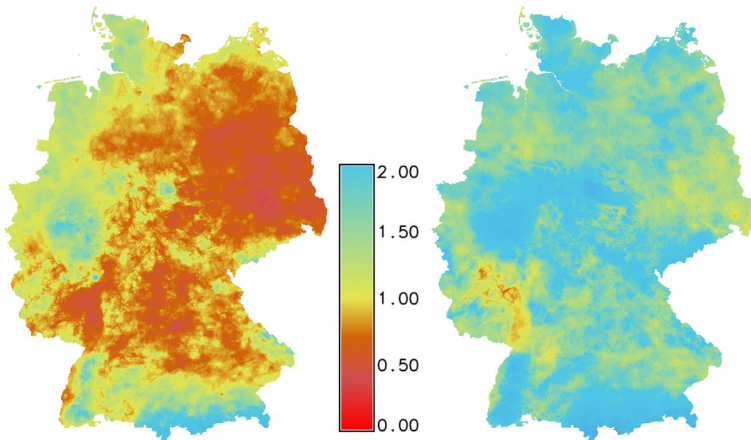


Fig. 6: HTC for 2003 and 2007

Leppelt & Gebbert, EGU 2015

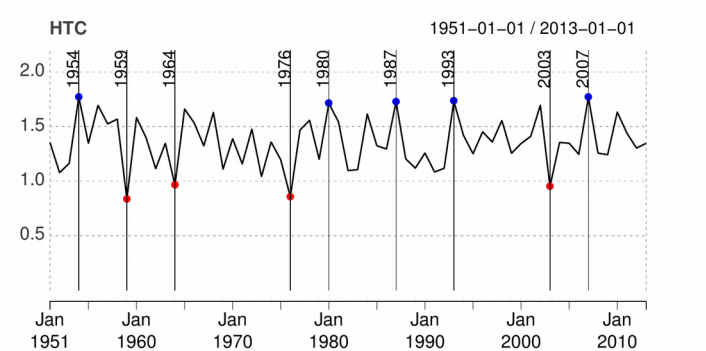


Fig. 7: HTC of extreme events for droughts (HTC < 1) in red and humid years (HTC > 1.7) in blue



GRASS GIS and Python

Using GRASS GIS from “outside” through “grass-session”

`pip install grass-session`

Finally an easy use of GRASS GIS
as a processing backend in Python!

Combine now with GDAL, OTB, ...

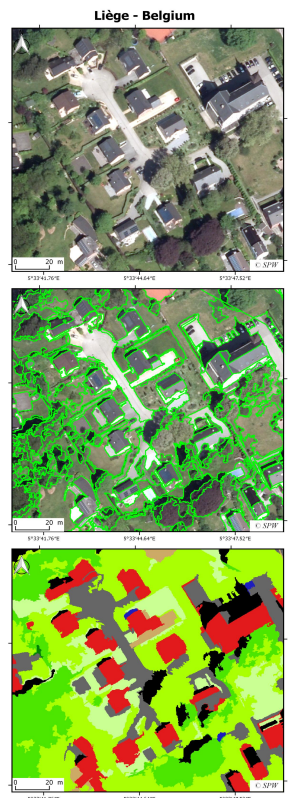
```
#!/usr/bin/env python
# filename: test_session.py

from grass_session import Session
from grass.script import core as gcore

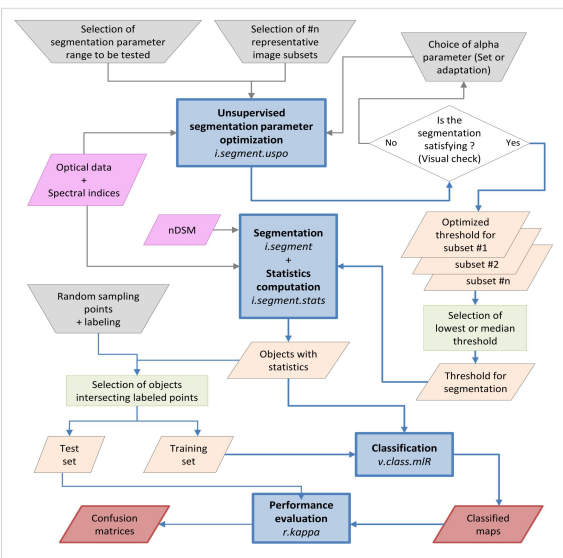
# create a new location from EPSG code (can also be a GeoTIFF or SHP or ... file)
with Session(gisdb="/tmp", location="location",
             create_opts="EPSG:4326"):
    # do something in permanent
    print(gcore.parse_command("g.gisenv", flags="s"))
# {u'GISDBASE': u'/tmp/';",
# u'LOCATION_NAME': u'epsg3035';",
# u'MAPSET': u'PERMANENT';",}

# create a new mapset in an existing location
with Session(gisdb="/tmp", location="location", mapset="test",
             create_opts=""):
    # do something in the test mapset.
    print(gcore.parse_command("g.gisenv", flags="s"))
# {u'GISDBASE': u'/tmp/';",
# u'LOCATION_NAME': u'epsg3035';",
# u'MAPSET': u'test';",}
```

Remote sensing in GRASS GIS : object-based image analysis



AN OPEN-SOURCE
SEMI-AUTOMATED PROCESSING CHAIN
FOR URBAN OBJECT-BASED CLASSIFICATION



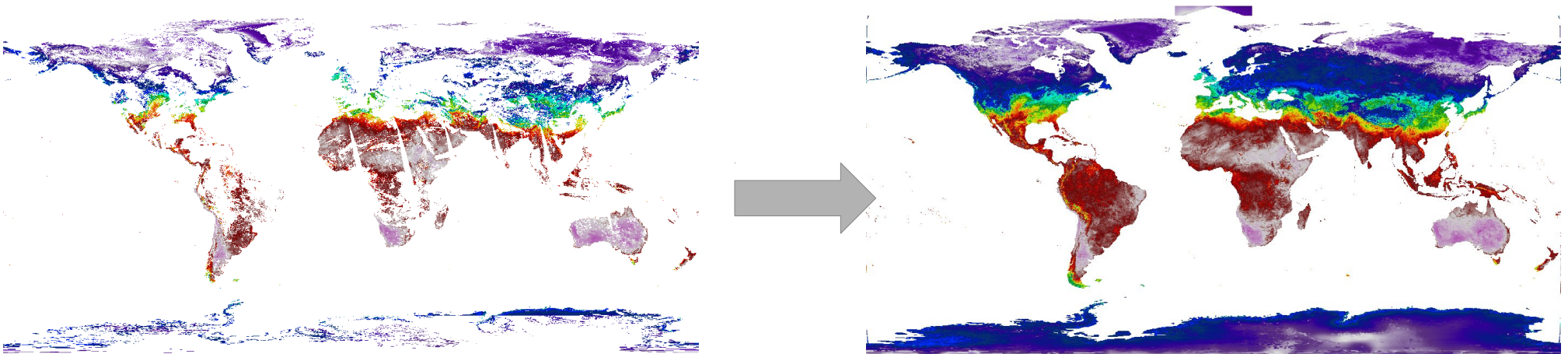
- Complete toolchain from segmentation to classification
- Including
 - unsupervised segmentation parameter optimization
 - high performance object statistics calculation
 - module-level parallelization
- Recently created module for SLIC superpixel creation

Source : <http://dx.doi.org/10.3390/rs9040358>



High-performance computing

MODIS Land Surface Temperature

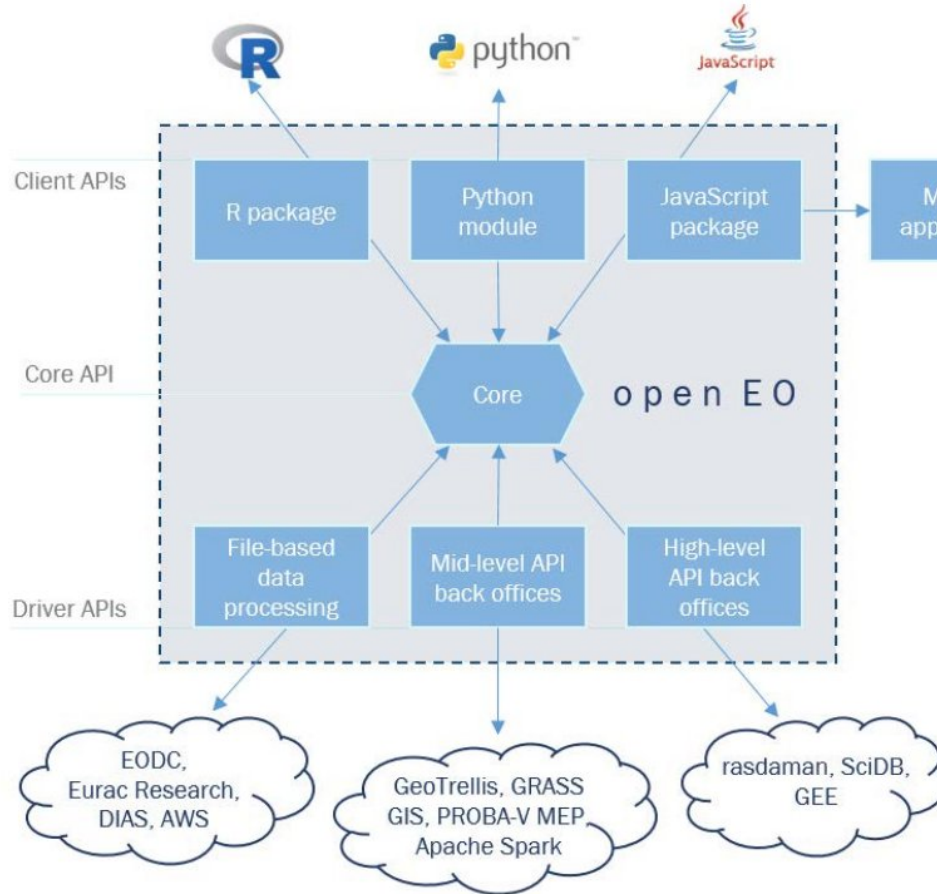


New addons for
temporal + spatial processing for
reconstruction of missing pixels

Data: <https://zenodo.org/record/1135230>

The openEO H2020 EU Project

2017-2020 – <http://www.openeo.org>



openEO - a common, open source interface between Earth Observation data infrastructures and front-end applications

Community activities: Google Code-IN for 13-17 year old pre-university students



https://grasswiki.osgeo.org/wiki/GRASS_GCI_Ideas_2017

3.1 **Install** GRASS GIS on your computer and
download North Carolina dataset

3.2 **Compile** GRASS GIS

3.3 Add examples and/or screenshots to different **manual** pages

3.4 Add **test suites** to different modules

3.5 **Designs**

3.5.1 Splash screen for GRASS GIS GUI start-up

3.5.2 T-shirt for 2018 Code Sprint

3.5.3 Banner for location wizard

3.6 **Blog** entry about GRASS GIS

3.7 **Videos**

3.7.1 How to create a location

3.7.2 Give a talk about GRASS GIS

Community activities: Code Sprint 2018 at Basecamp – Integration



20 March 2018



Integration with QGIS 3





Community activities: GSoC 2018

Google Summer of Code 2018 – bitte **bewerben!**

<https://trac.osgeo.org/grass/wiki/GSoC/2018>

- OSS-Fuzz - Continuous **Fuzzing** for Open Source Software for GRASS GIS
- Implement a series of **image fusion** algorithms in GRASS GIS
- Enhance 3D **rendering** capabilities in GRASS GIS
- Additional functionality for running GRASS GIS modules in **Jupyter** Notebook
- Integration of **PDAL** into GRASS GIS
- Benchmarking** framework for GRASS GIS
- GRASS GIS as a post-processing part of **WebODM**
- Additional **GUI** tools for image analysis
- Module to create quadtree **tiling**
- Tools for generating **unit tests** from examples in the manual
- Mapnik** rendering engine for GRASS GIS
- Generalized GUI code for **Qt-based GUI**
- GRASS GIS **3D viewer** NVIZ module independent of the main GUI
- Integration of v.profile into **GUI** profiling tool
- Add **CMake** build system for GRASS GIS
- Add a cloud masking module for **Sentinel** data in GRASS GIS
- Full support of **Python 3** in GRASS GIS
- Improve GRASS integration in **QGIS 3**
- New easy-to-use CLI and **API** for GRASS GIS

Vielen Dank!



GRASS GIS

grass.osgeo.org