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

Markus Neteler &
GRASS Development Team

grass.osgeo.org
www.mundialis.de

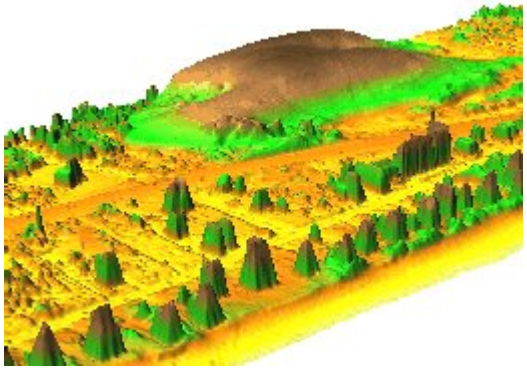
FOSSGIS 2018 – Bonn

Was ist GRASS GIS?

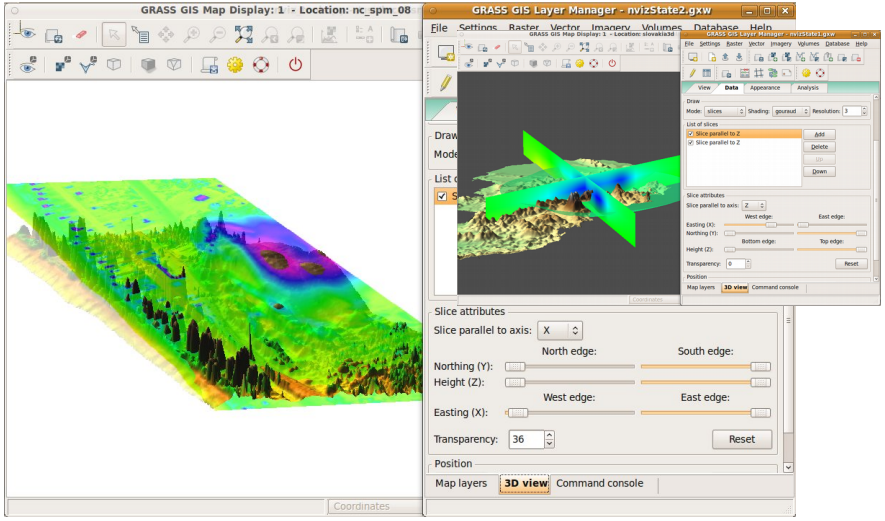
- GRASS GIS ist eine hybride, modulare GIS-Software
- GRASS = Geographic Resources Analysis Support System
- GNU General Public License – frei verfügbar

- Raster- und topologische Vektordatenfunktionalität
- 3D-Raster-Voxelbearbeitung
- Bildverarbeitung
- Visualisierungsmöglichkeiten

- Portable Software (“alle” Betriebssysteme)
- graphischen Benutzeroberfläche
- sowie Kommandozeile



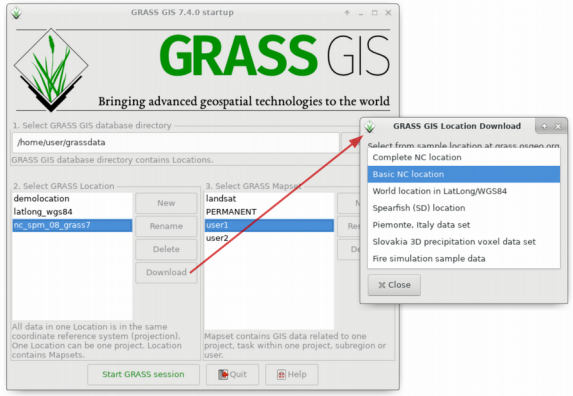
Nagshead LiDAR time series: dune moving over 9 years (NC, USA) – animation



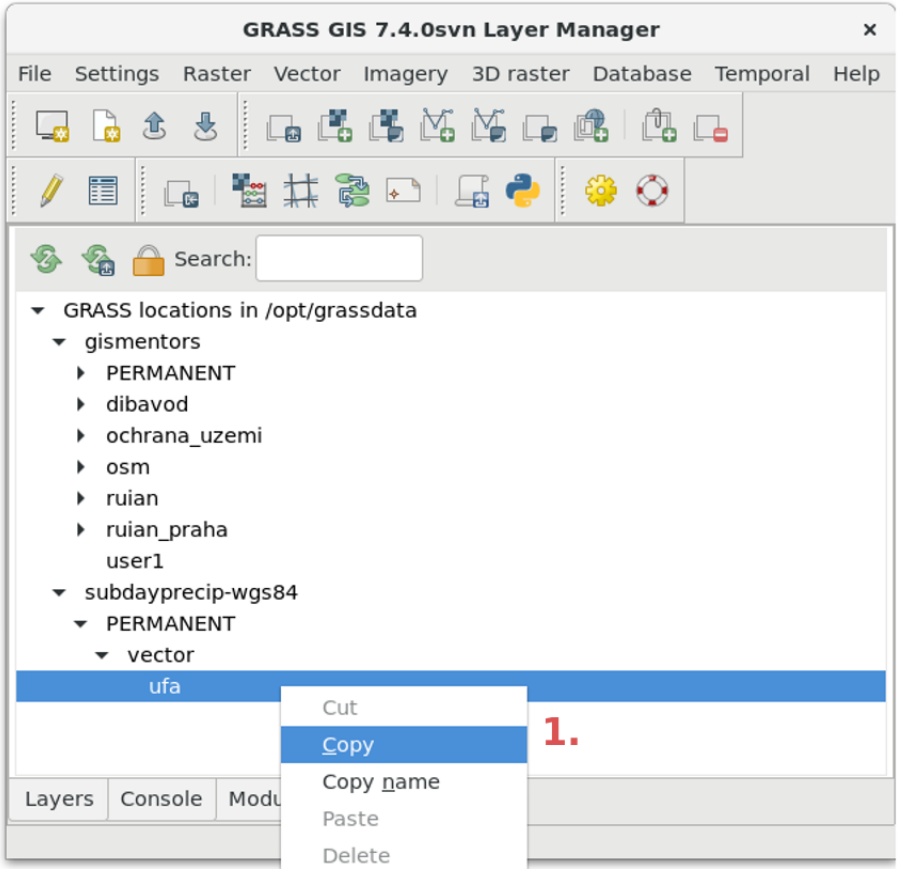
Was ist neu in GRASS GIS 7.4?

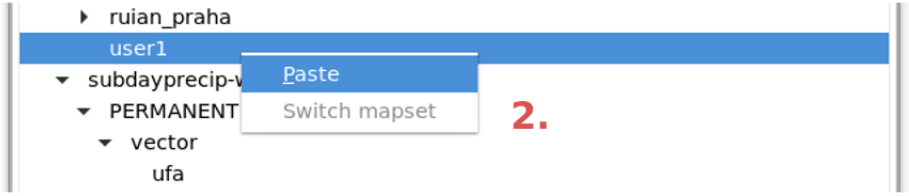
Neue stabile Version GRASS GIS 7.4.0

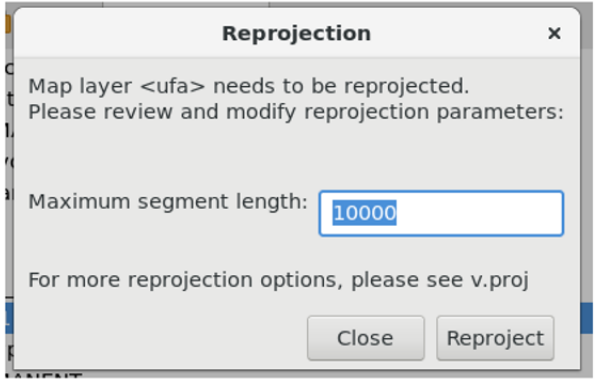
- Benutzerfreundlichkeit und grafische Benutzeroberfläche verbessert
- Neue “no data” compression
- Unterstützung für globale Daten, die über -180/+180, -90/+90 herausreichen
- Ortho-Rektifikation mit Benutzeroberfläche wurde in GRASS GIS 7 neu implementiert
- Neuer Download-Link für Beispieldaten
-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



Data catalog improvements

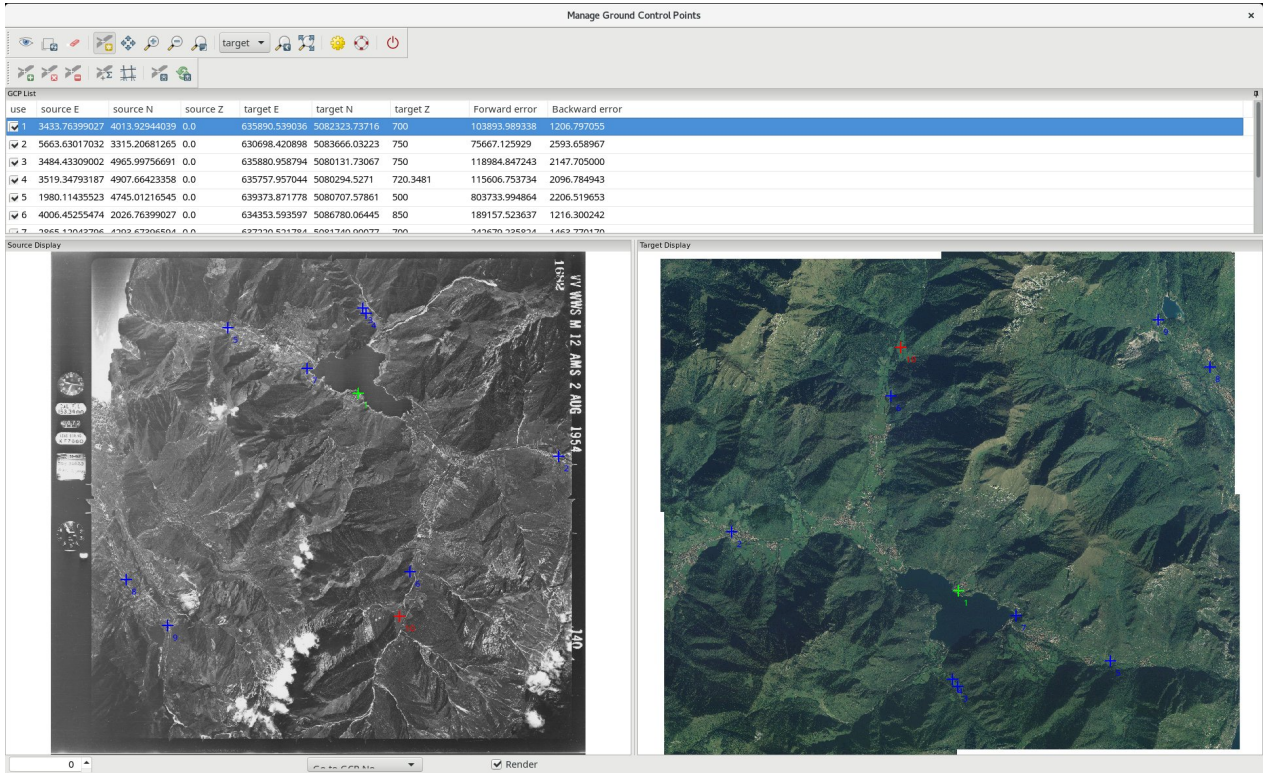


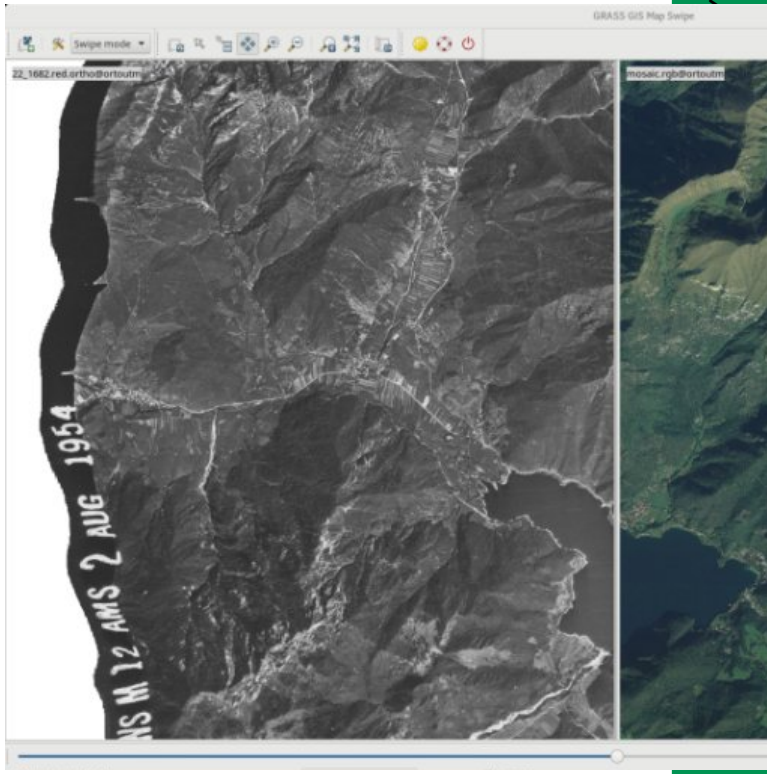




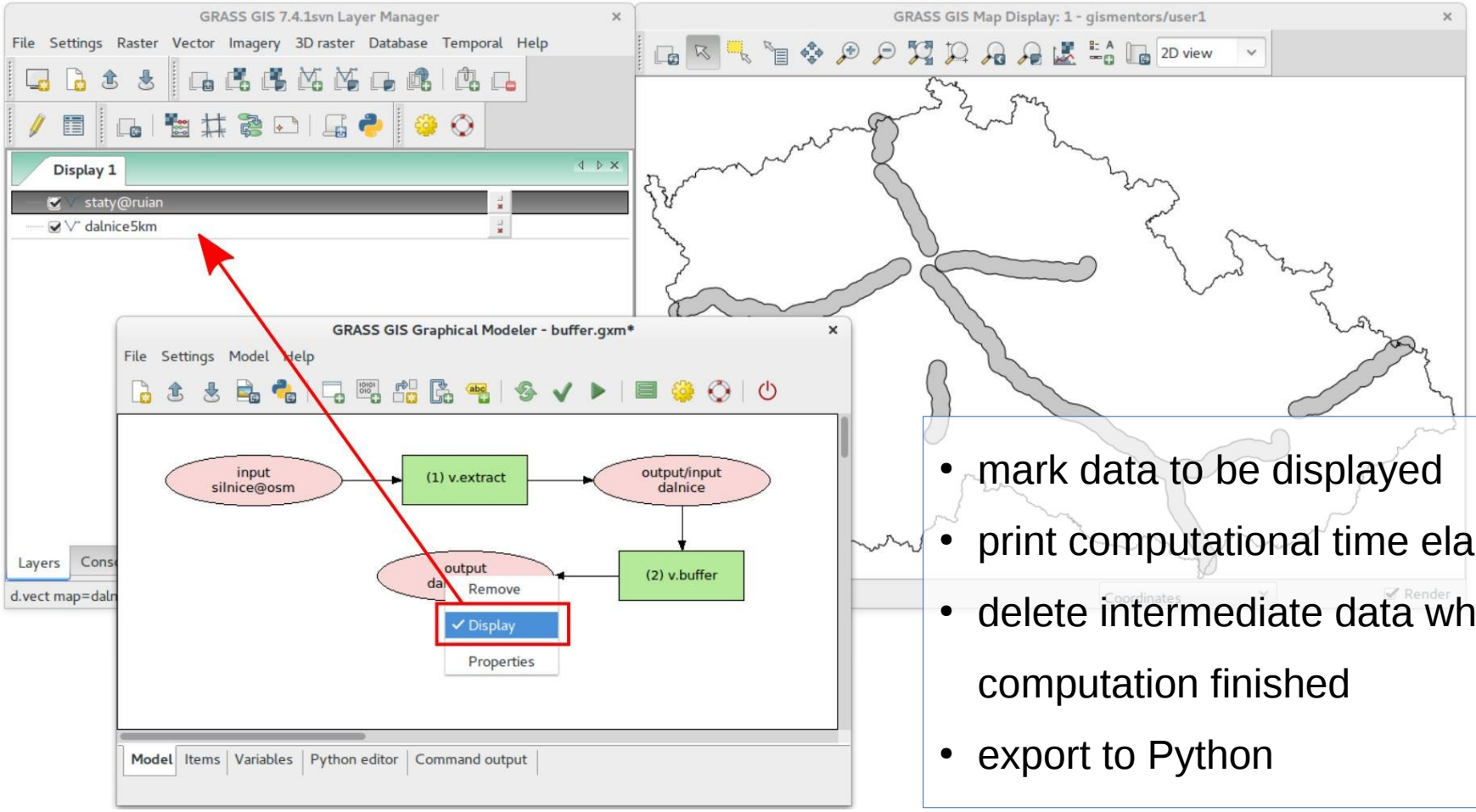
wxGUI Datenkatalog: Kopieren von Raster- und Vektorkarten zwischen verschiedenen Projekten inklusive Reprojektion

New Orthorectification GUI





Graphical Modeller

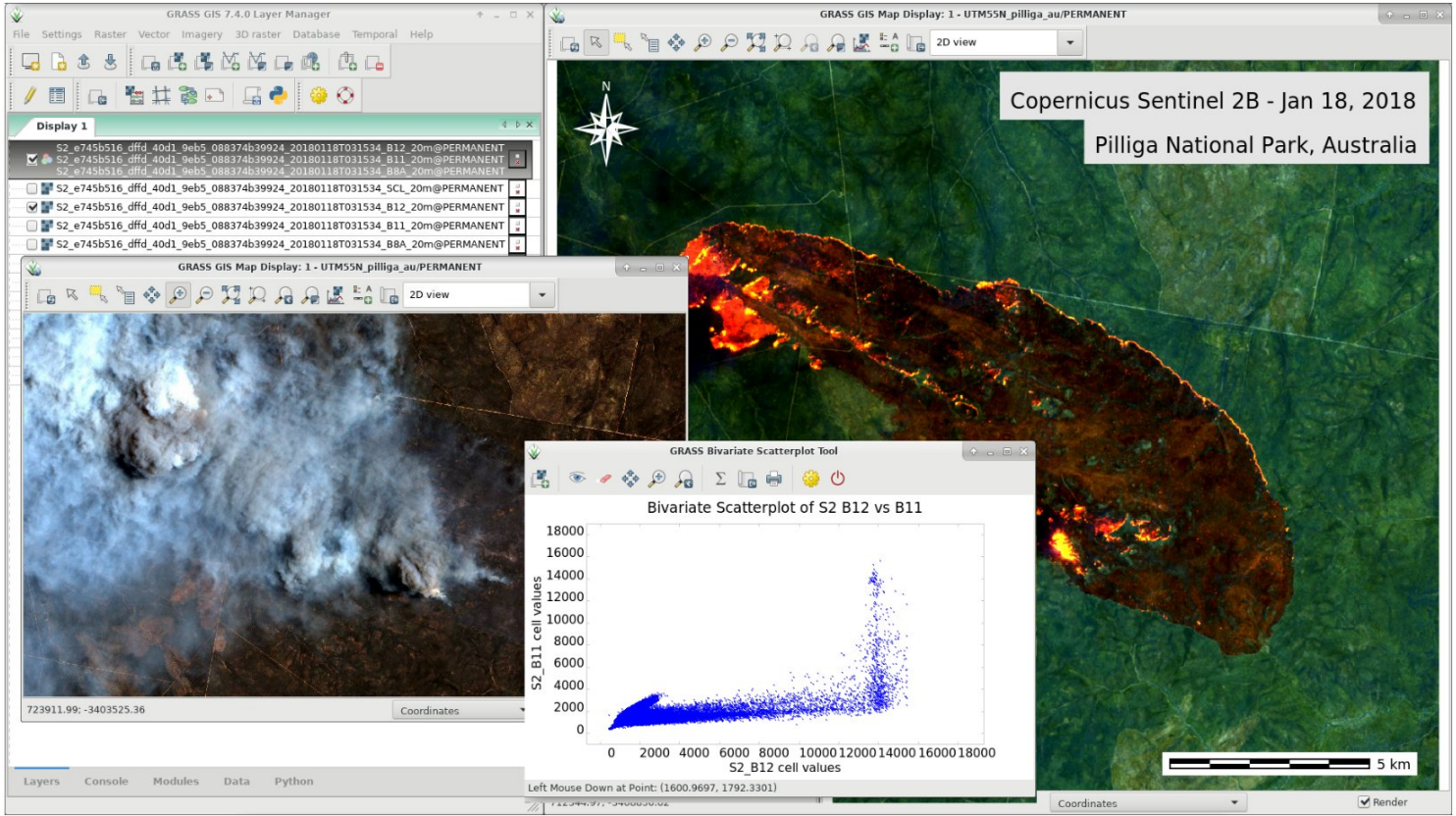


- mark data to be displayed
- print computational time elapsed
- delete intermediate data when computation finished
- export to Python

Copernicus Sentinel-2 processing

New addons:
i.sentinel.download and i.sentinel.import

Example:
Wildfire in Australia

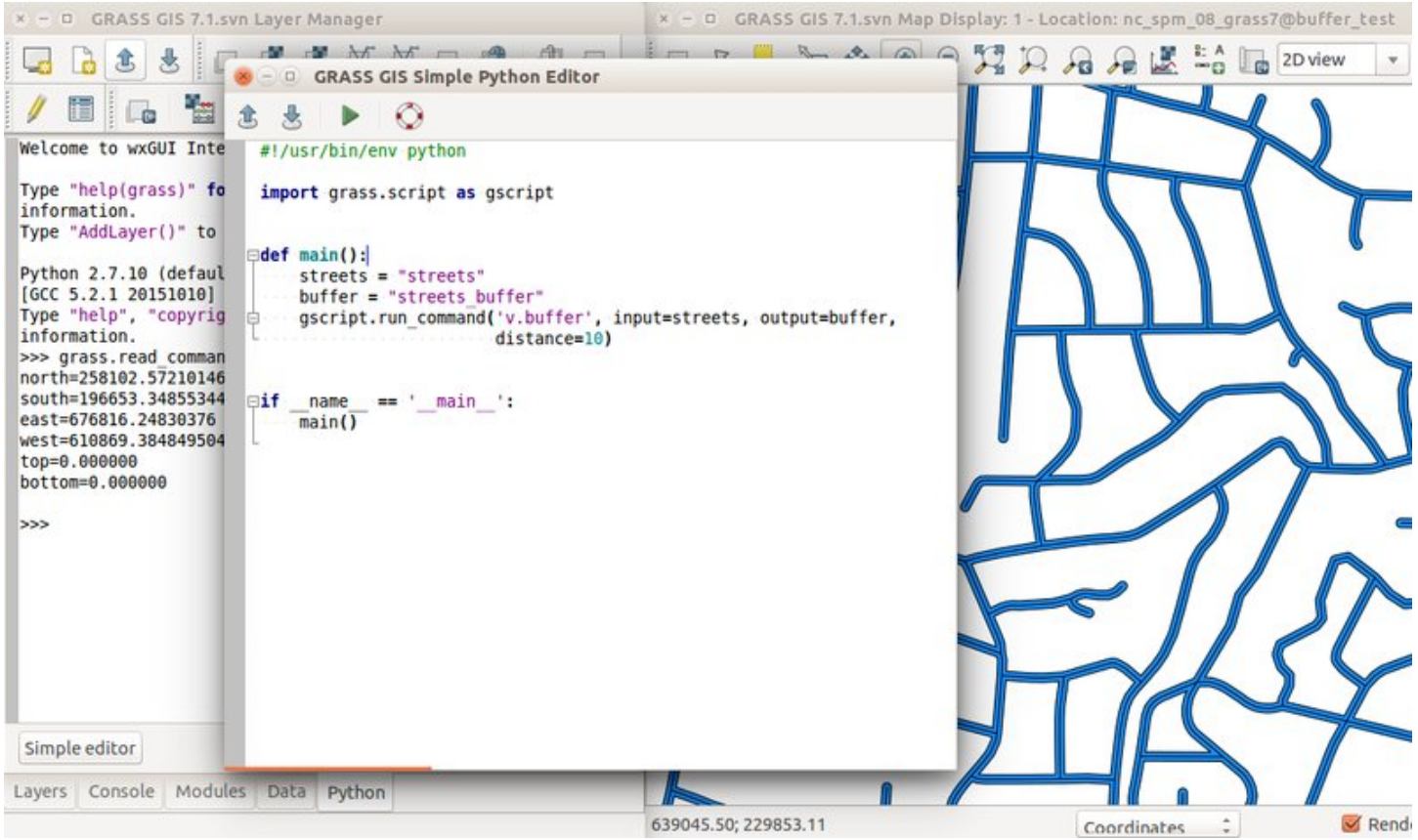


Python Editor

Integrated Python editor for rapid prototyping

Example:

Vector buffer

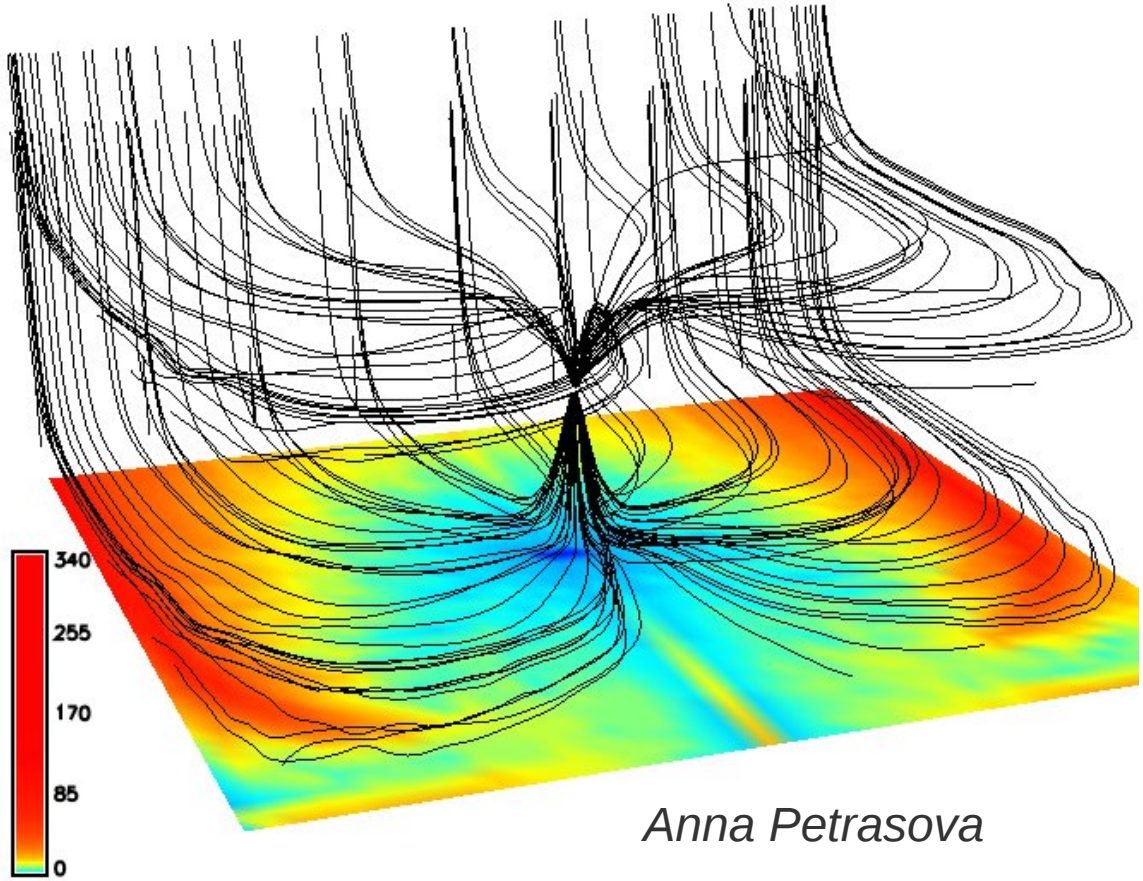


Vaclav Petras

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
ual mask, all cells set

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

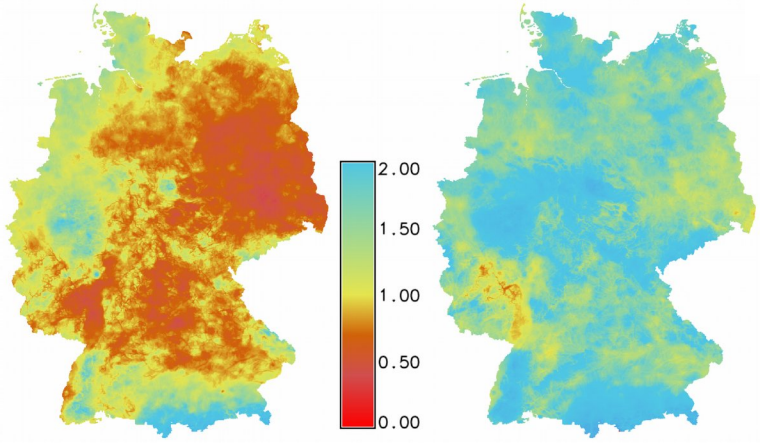


Fig. 6: HTC for 2003 and 2007

Leppelt & Gebbert, EGU 2015

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

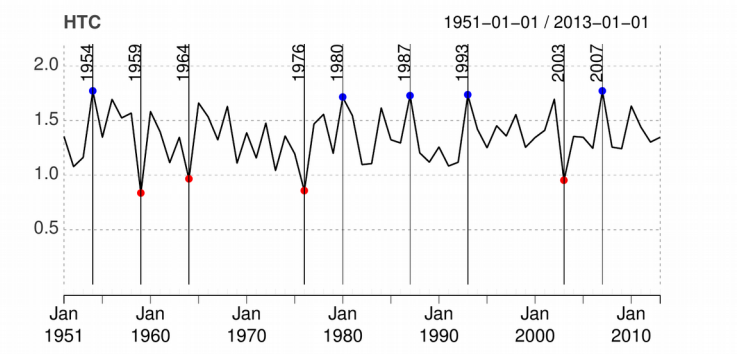


Fig. 7: HTC of extreme events for droughts (HTC < 1) in red and humid years (HTC > 1.7) in blue

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, ...

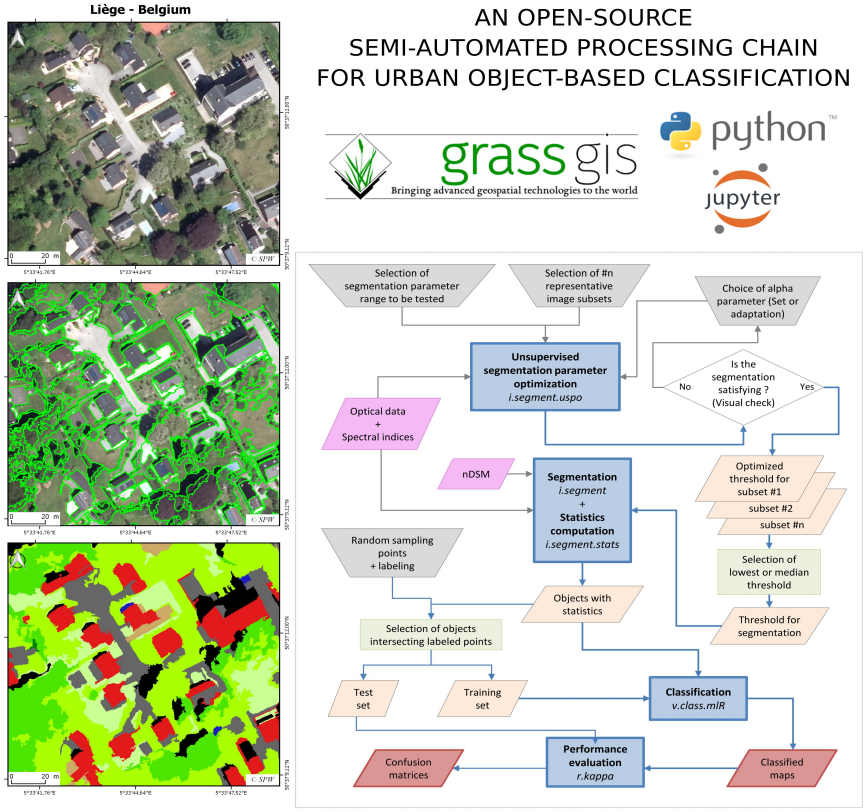
```python
#!/usr/bin/env python
# filename: test_session.py

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

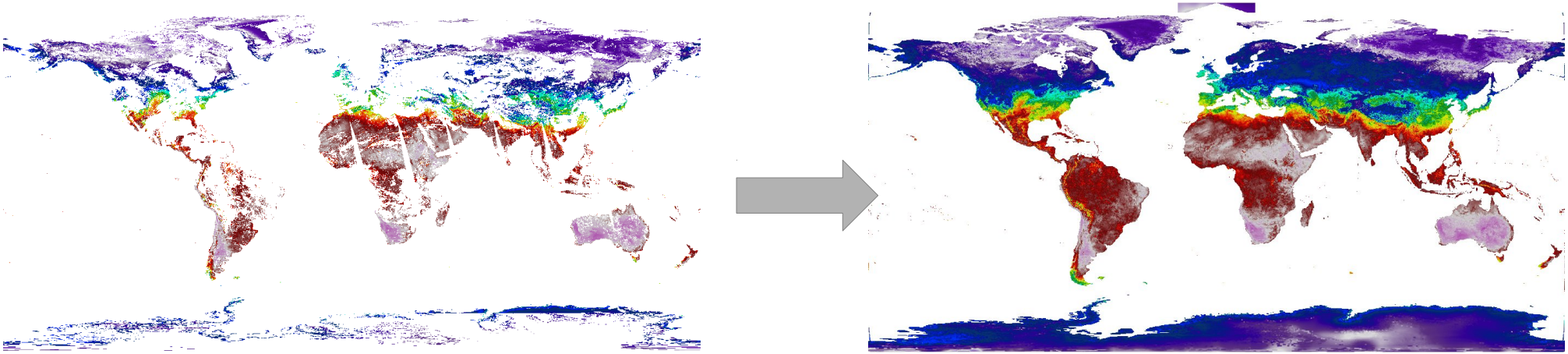


Source : http://dx.doi.org/10.3390/rs9040358

- 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

High-performance computing

MODIS Land Surface Temperature

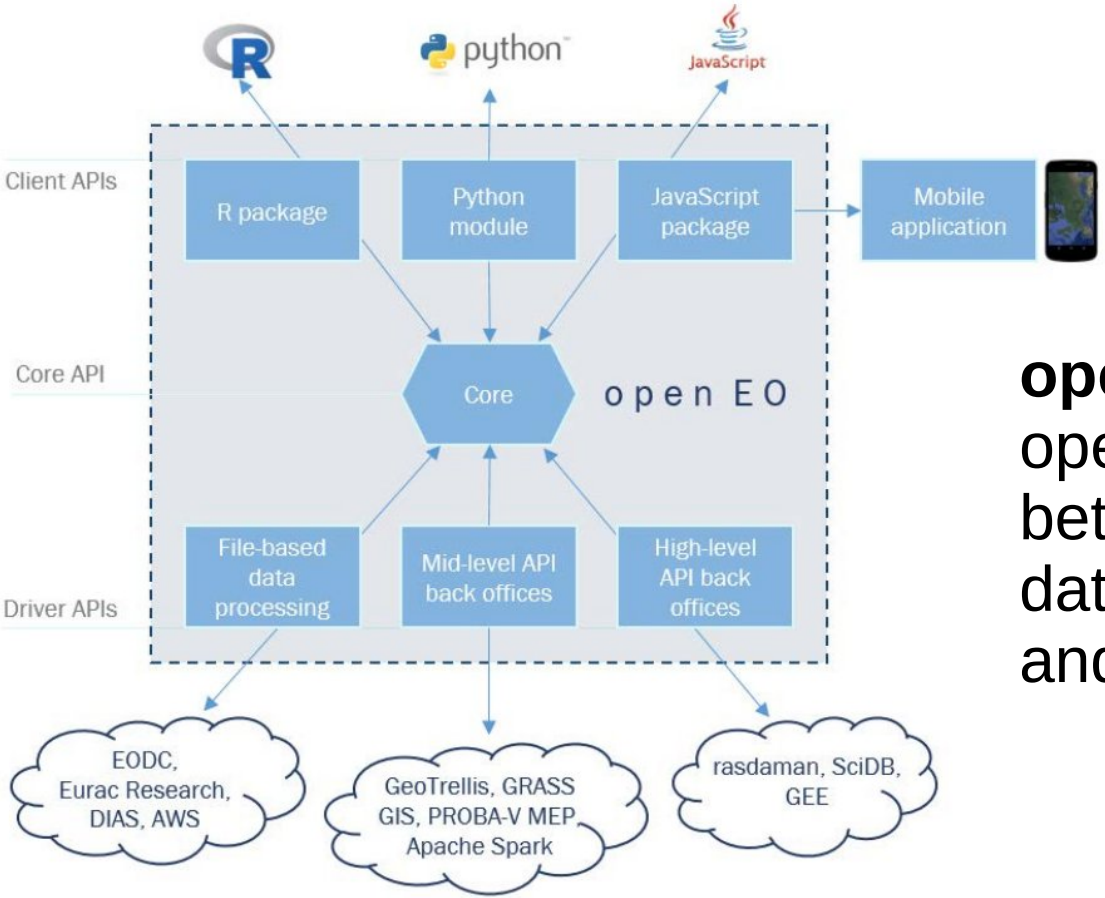


New addons for
temporal + spatial processing for
reconstruction of missing pixels

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

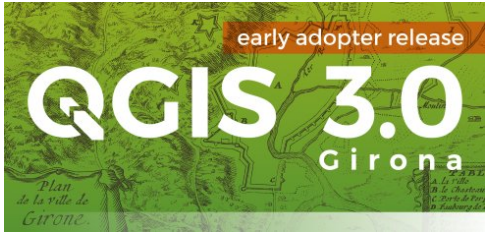
https://grasswiki.osgeo.org/wiki/GRASS_GCI_Ideas_2017

- 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.osgeo.org