GRASS GIS – Geodatenanalyse und mehr

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www.mundialis.de

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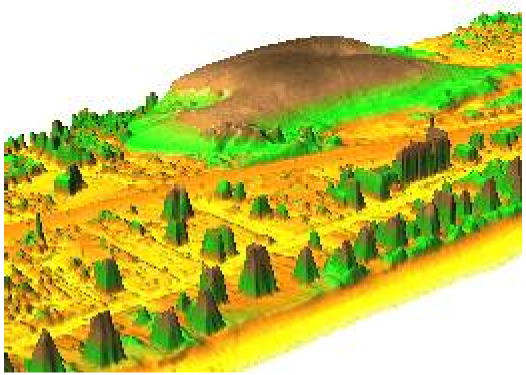
INTERGEO®
WISSEN UND HANDELN
FÜR DIE ERDE

Was ist GRASS GIS?

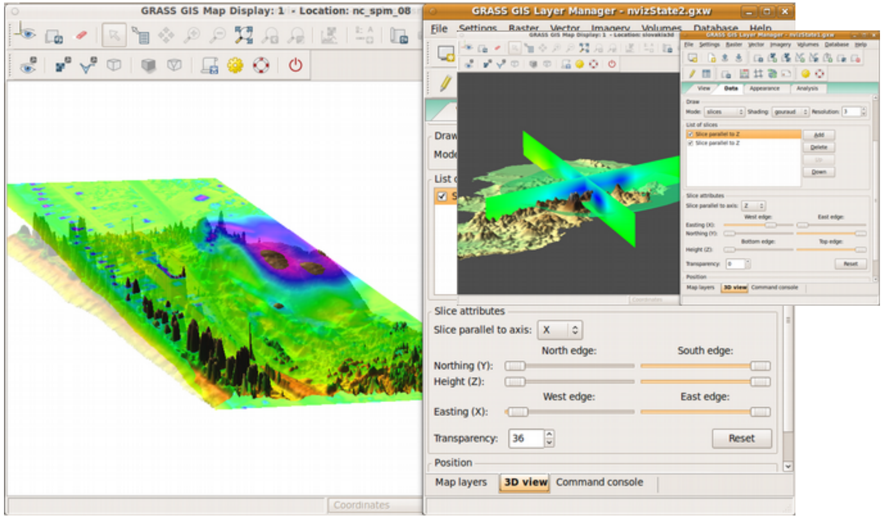
- GRASS GIS ist eine hybride, modulare GIS-Software
- GRASS = Geographic Resources Analysis Support System
- GNU General Public License – frei verfügbar

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

- Portable Software (“alle” Betriebssysteme)
- graphischen Benutzeroberfläche
- sowie Kommandozeile
- Neu: Cloud integration



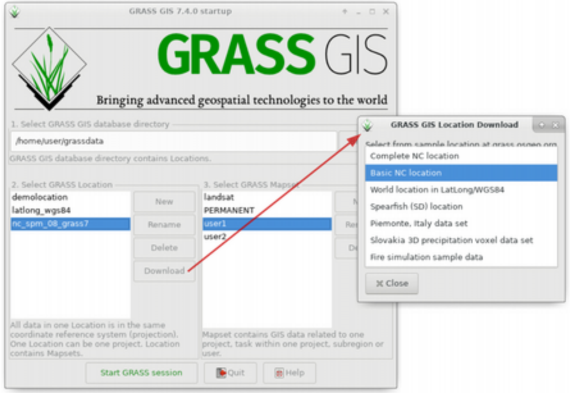
Nagshead LiDAR time series: dune moving over 9 years (NC, USA) – animation



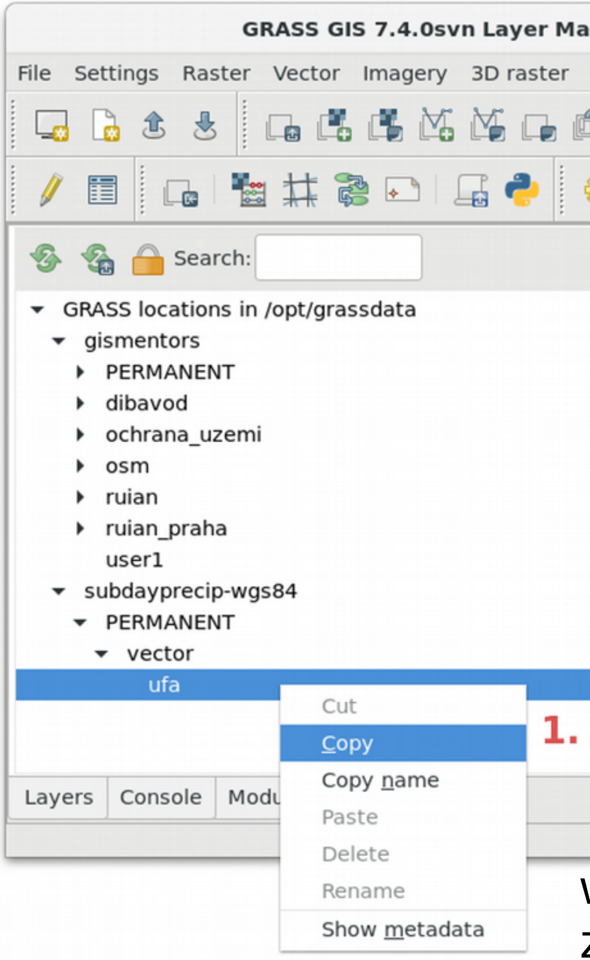
Was ist neu in GRASS GIS?

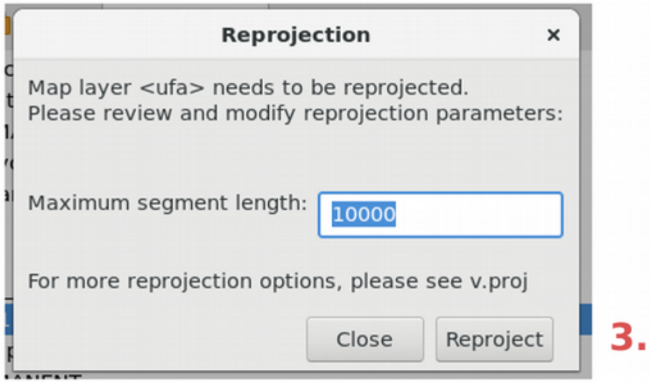
Neue stabile Version GRASS GIS 7.4 (bald neu: 7.6)

- Benutzerfreundlichkeit und grafische Benutzeroberfläche verbessert
- Datenkompression
  - neue “no data” Kompression
  - Zstandard Kompression als weitere Methode
- Unterstützung für globale Daten, die über -180/+180, -90/+90 Grad hinausreichen
- Ortho-Rektifikation mit Benutzeroberfläche neu implementiert
- Neuer Download-Link für Beispieldaten
- … über 480 Verbesserungen seit G7.2.0



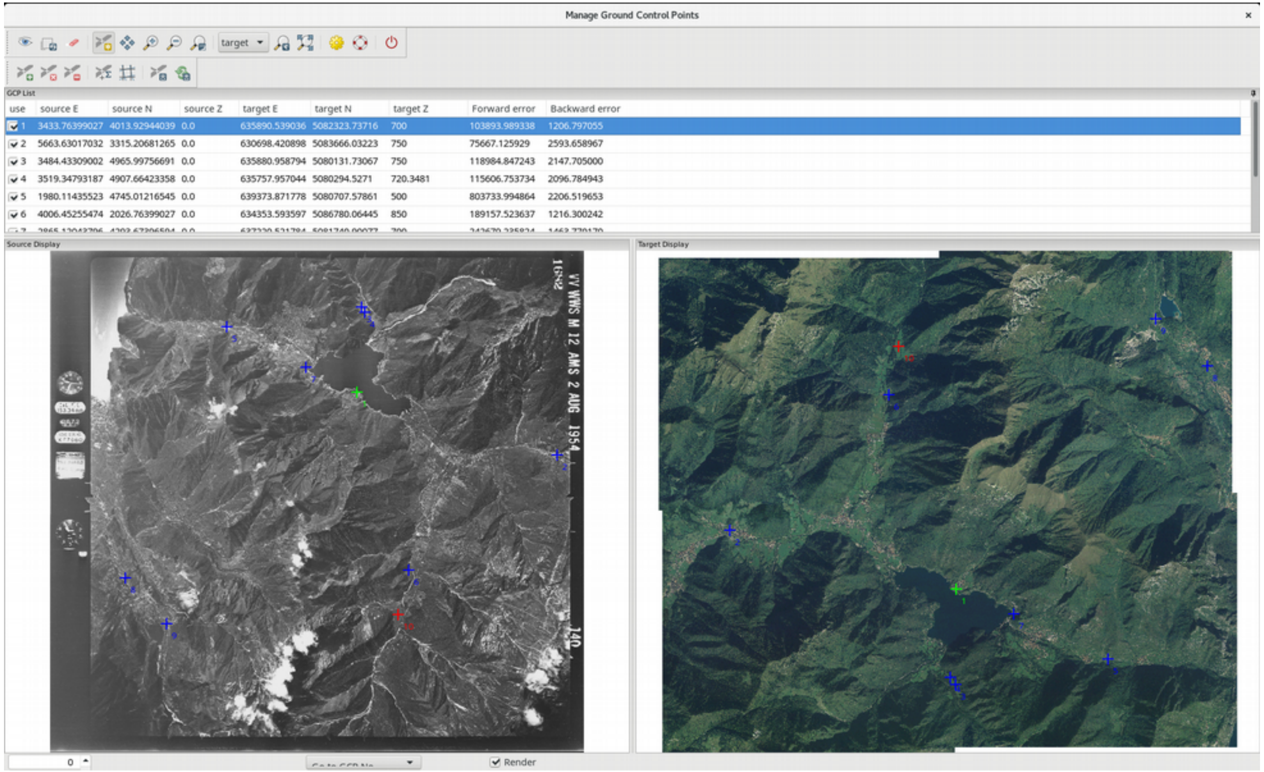
Datenkatalog: Verbesserungen

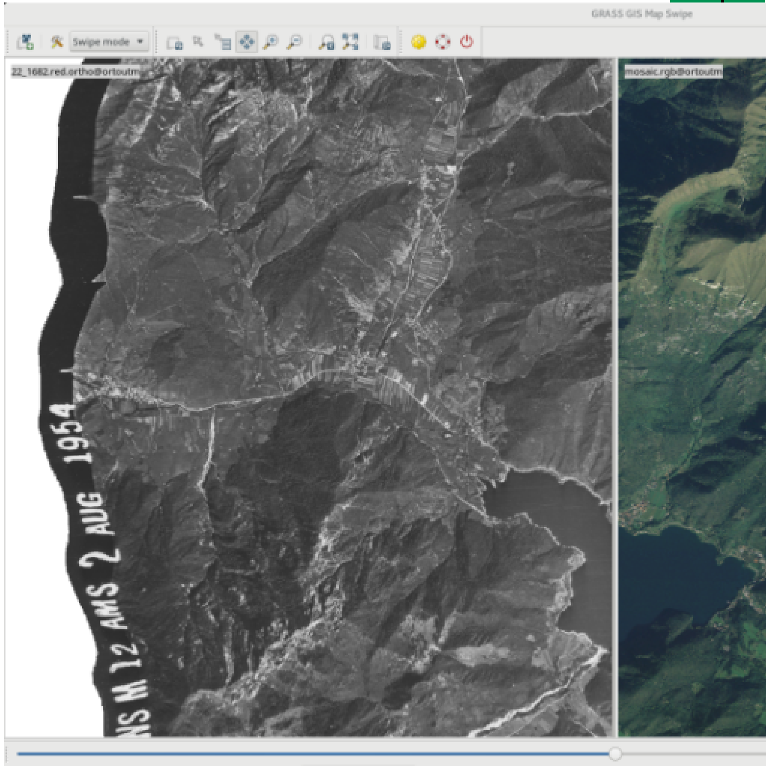




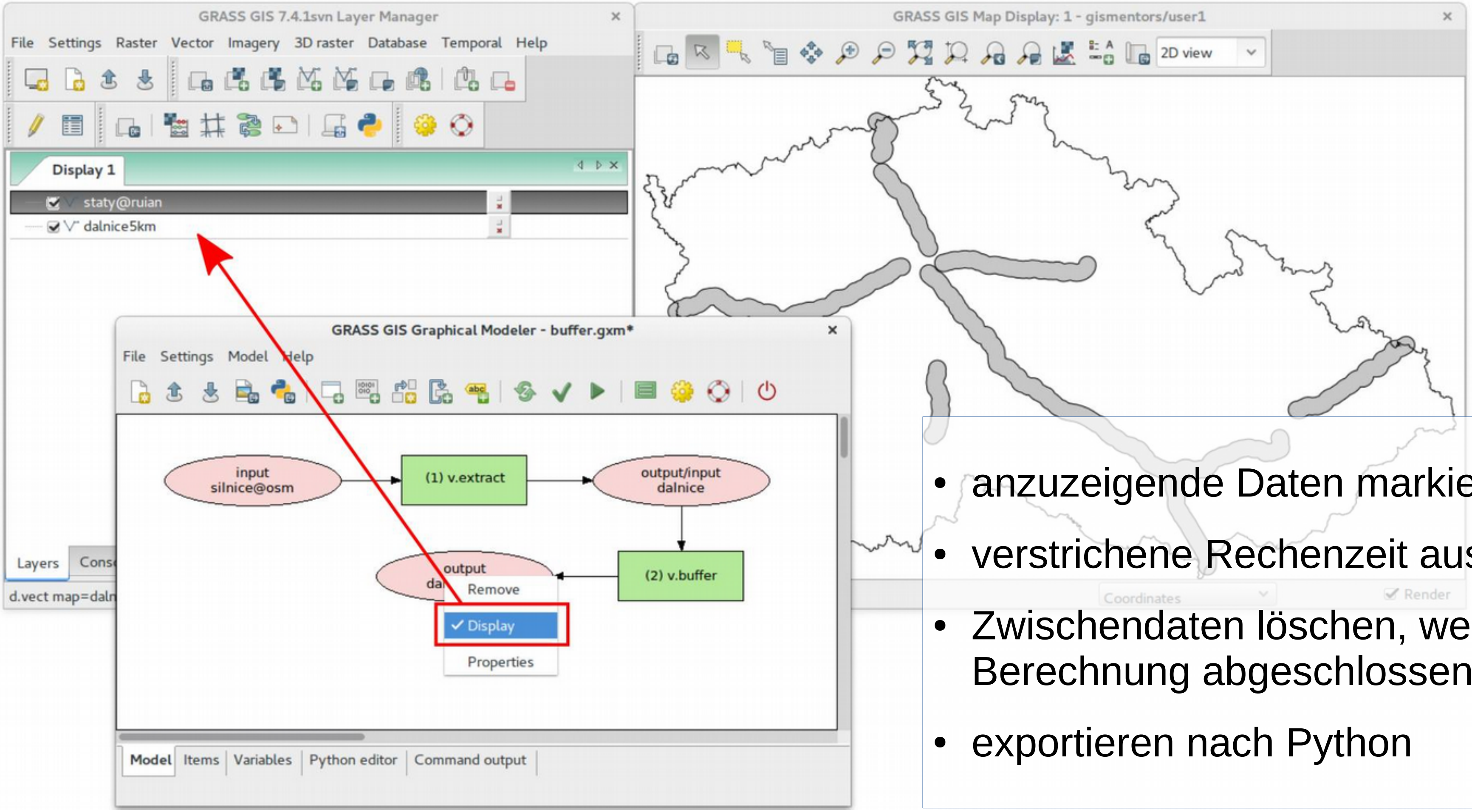
wxGUI Datenkatalog: Kopieren von Raster- und Vektorkarten zwischen verschiedenen Projekten inklusive Reprojektion

Neue Orthorectification GUI





Graphical Modeller



- anzuzeigende Daten markieren
- verstrichene Rechenzeit ausgeben
- Zwischendaten löschen, wenn Berechnung abgeschlossen
- exportieren nach Python

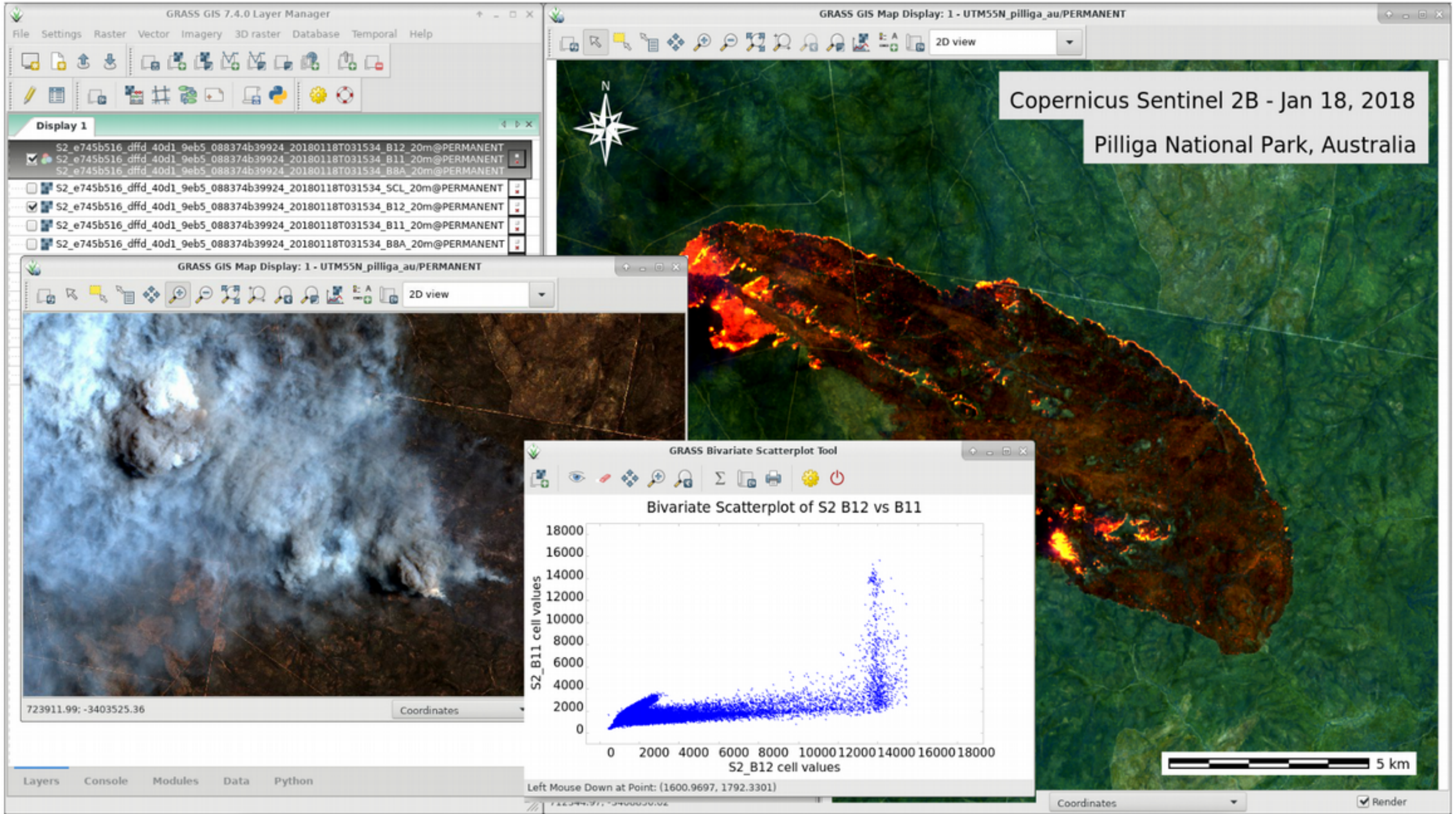
Copernicus Sentinel-2 Prozessierung

Neue Erweiterungen:

i.sentinel.download and i.sentinel.import

Beispiel:

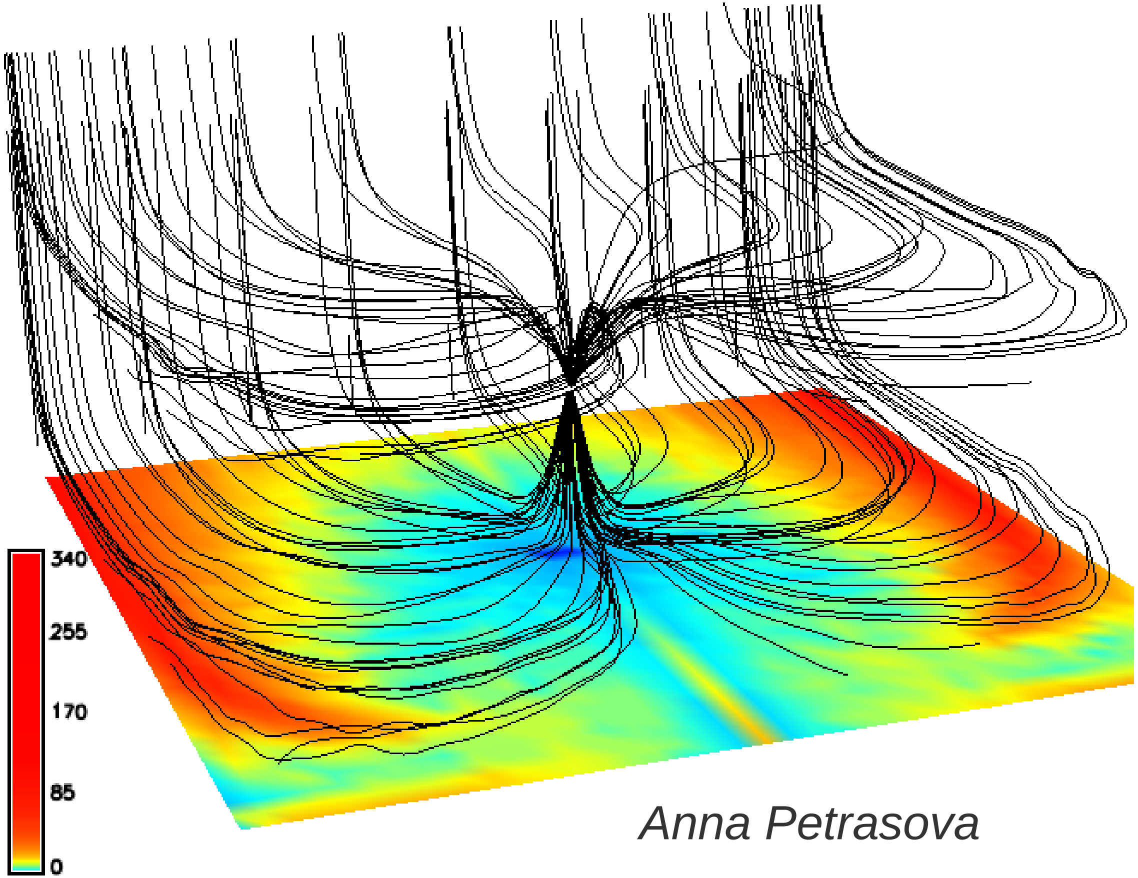
Waldbrand
in Australien



3D Rasterfließlinien

Voxel-Prozessierung:

r3.flow und r3.gradient zur Berechnung von 3D Fließlinien, 3D Fließakkumulation und zugehörige Gradienten



Anna Petrasova

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

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

$$HTC = \frac{\sum P_{(T>10^\circ C)}}{\sum T_{(T>10^\circ C)} \cdot \frac{1}{10}}$$

T := daily temperatures,
P := daily precipitation

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

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

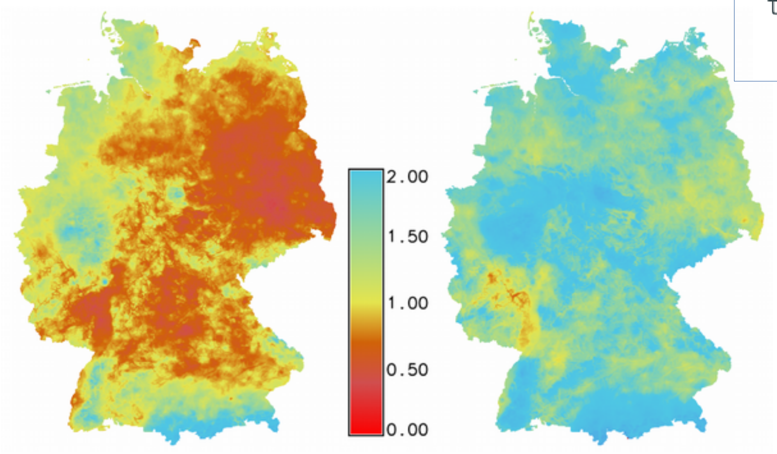


Fig. 6: HTC for 2003 and 2007

Leppelt & Gebbert, EGU 2015

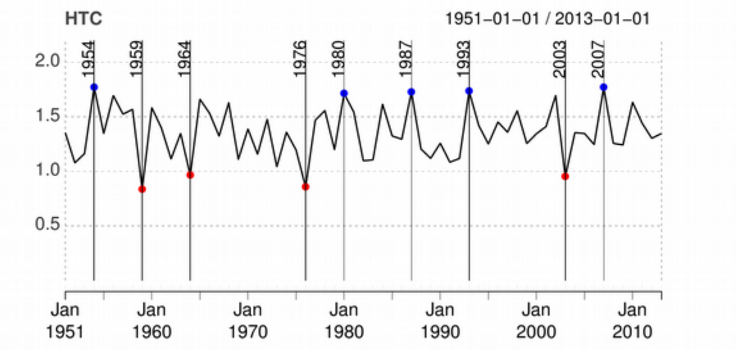


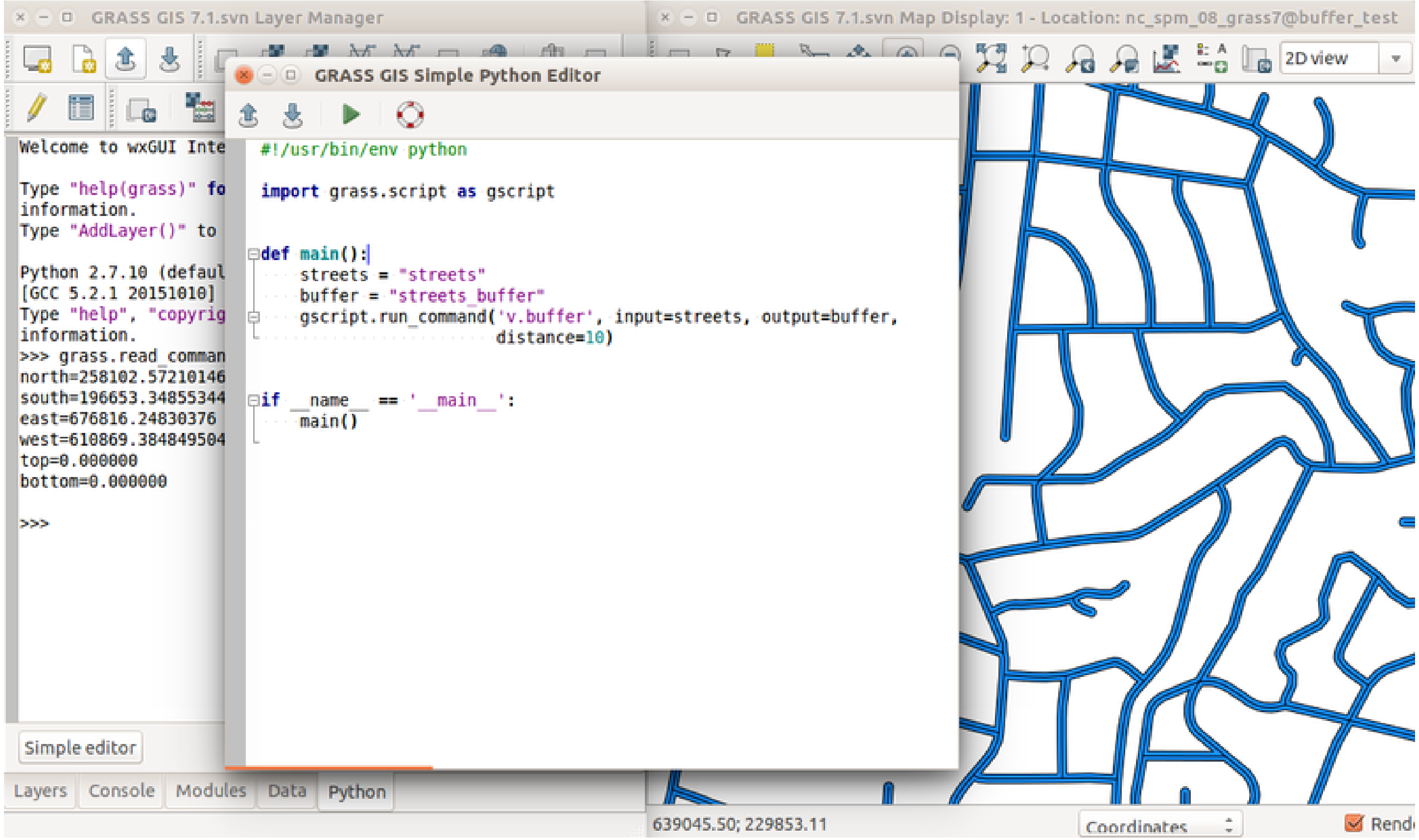
Fig. 7: HTC of extreme events for droughts (HTC < 1) in red and humid years (HTC > 1.7) in blue

Python Editor

Integrated Python editor for rapid prototyping

Example:

Vector buffer



Vaclav Petras

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, ...

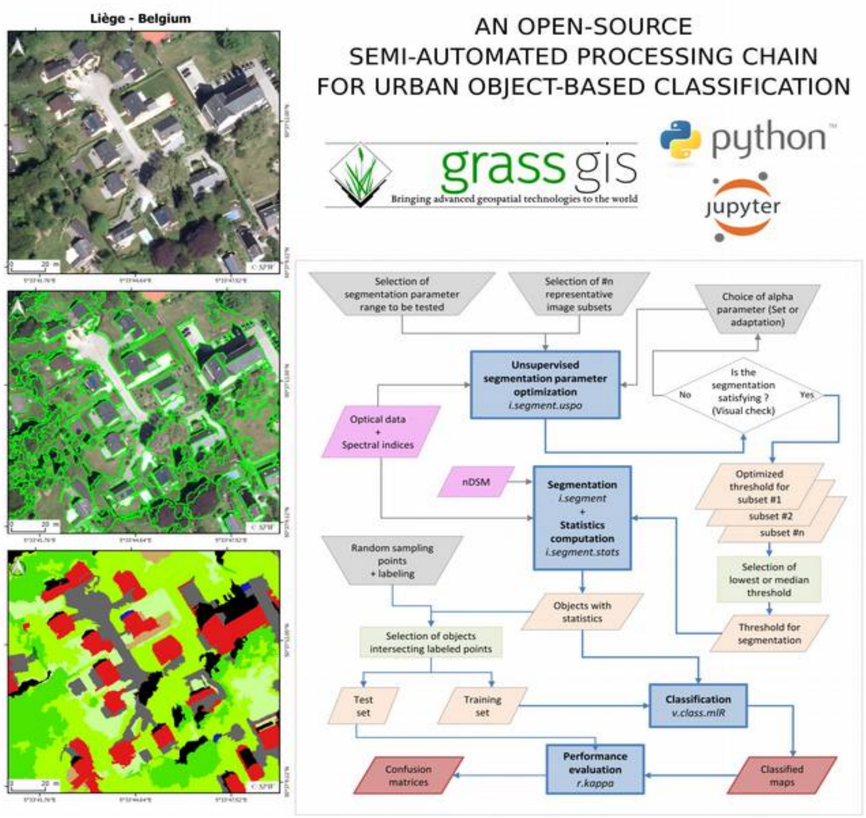
```python
#!/usr/bin/env python
# filename: test_session.py

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

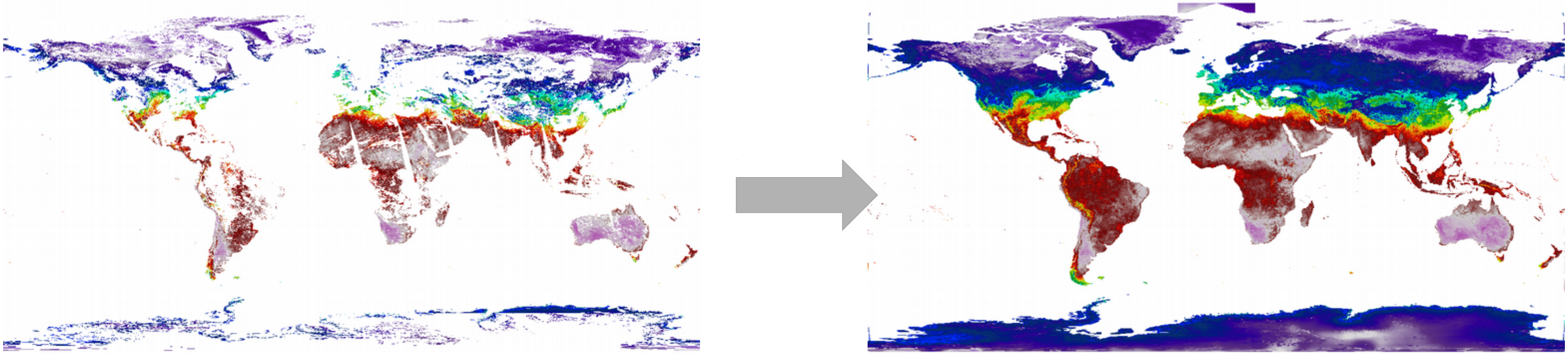


Source : *http://dx.doi.org/10.3390/rs9040358*

- 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

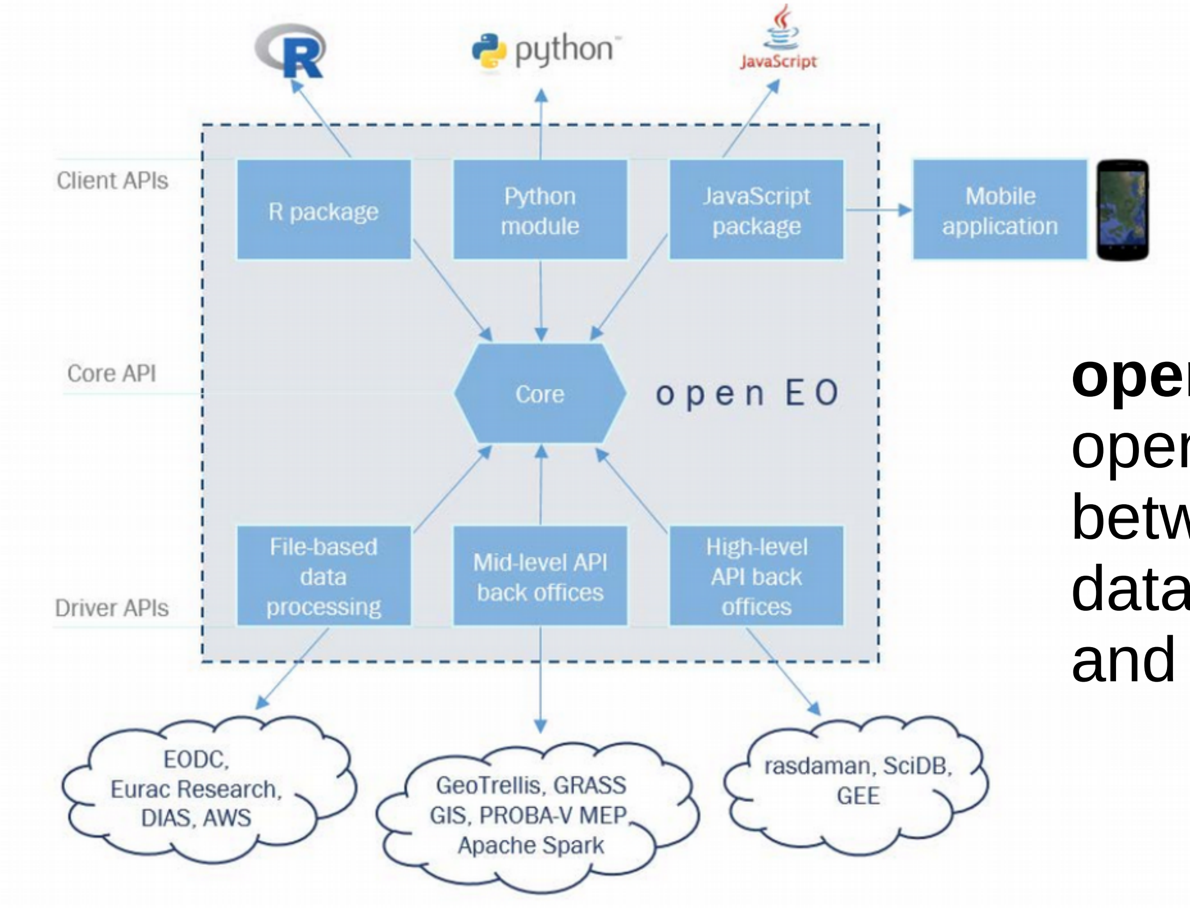
MODIS Land Surface Temperature



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: Code Sprint 2018 at Basecamp Bonn

20 March 2018

Integration with QGIS 3

Vielen Dank!

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