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markus.metz @ iasma.it

Community based GIS development: GRASS GIS and OSGeo

1st Hellenic GRASS and GFOSS camp
Volos, 2011

Fondazione Edmund Mach, Trento, Italy

- **Founded 1874** as IASMA - Istituto Agrario San Michele all'Adige (north of Trento, IT)
- **Research Centre**, Tech. Transfer Center and highschool, 720 staff
- … of those **250 staff in research** (Environmental research, Agro-Genetic research, Food safety)

FEM GIS and Remote sensing unit: Spatial modelling of disease vectors, biodiversity and beyond

http://gis.cri.fmach.it

ISTITUTO AGRARIO DI SAN MICHELE ALL'ADIGE
Fondazione Edmund Mach

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GIS and Remote Sensing Unit at Fondazione Edmund Mach

The mission of the GIS and Remote Sensing unit (*Piattaforma GIS & Remote Sensing*) is to develop and provide multi-scale approaches for the description of 2-, 3- and 4-dimensional biological systems and processes. Core activities are the acquisition, processing and validation of geographical data, the support for the scientific analysis and management of physical, ecological and geographical data, collected within research projects or monitoring activities. The Geographic Information System (GIS) approach allows the description of continental down to landscape scale systems such as including the 3D-reconstruction of small sampling sites. We focus on the geostatistical analysis of such information layers, the creation and processing of indicators, and the production of ecological, landscape genetics, eco-epidemiological and physiological models. The group pursues actively the development of innovative methods and their implementation in a GIS framework including the analysis of proximal and remote sensing data and time-series.
The Edmund Mach Foundation (FEM) is a private research foundation established by the government of the Autonomous Province of Trento which continues and improves the activities of the former Istituto Agrario di S. Michele all'Adige (IASMA) and the former Centro di Ecologia Alpina (CEA). The GIS and Remote Sensing group is part of the Research and Innovation Centre (FEM-CRI).

Foundation at S. Michele rendered from Lidar data and Orthophoto

News

Page 1 of 6 > >>

New paper: Climatic Factors Driving Invasion of the Tiger Mosquito (Aedes albopictus)...
Roiz D., **Neteler M.**, Castellani C., Arnoldi D., Rizzoli A., 2011: *Climatic Factors Driving Invasion of the Tiger Mosquito (Aedes albopictus) into New Areas of Trentino, Northern Italy*. **PLoS ONE**. 6(4): e14800

[More]

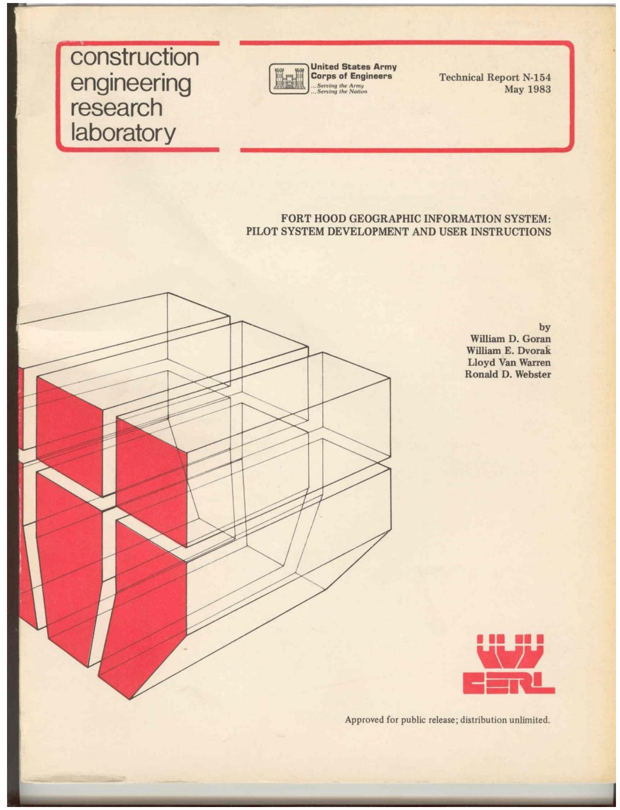
New paper: Benefits of hyperspectral remote sensing for tracking plant invasions
He, K.S., **Rocchini, D.**, **Neteler, M.**, Nagendra, H. (2011). Benefits of hyperspectral remote sensing for tracking plant invasions. ***Diversity and Distributions***, 17: 381-392.
[More]

Japanese Geodata
Here some data links and

Presentation outline

- GRASS GIS: 28 years of development
  Some history and features
- OSGeo: an umbrella foundation based on community efforts
- GRASS usage in science

The early days of open source GIS: pre-Internet times...


construction engineering research laboratory

United States Army Corps of Engineers ...Serving the Army ...Serving the Nation

Technical Report N-154
May 1983

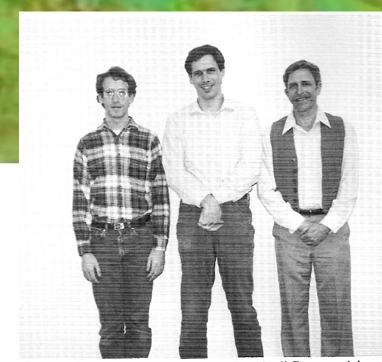
FORT HOOD GEOGRAPHIC INFORMATION SYSTEM:
PILOT SYSTEM DEVELOPMENT AND USER INSTRUCTIONS

by
William D. Goran
William E. Dvorak
Lloyd Van Warren
Ronald D. Webster

CERL

Approved for public release; distribution unlimited.

1987: William Shatner narrates ...


CERL's Michael Shapiro, Jim Westervelt, and Bill Goran, recipients of the 1st GAIA Award (photo by Brenda Johnson, USACERL, 3/90).

1978: MOSS
1982: GRASS GIS

The early days of open source GIS: pre-Internet times...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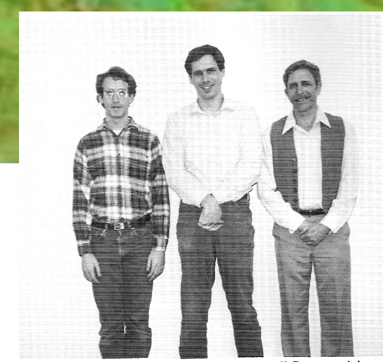


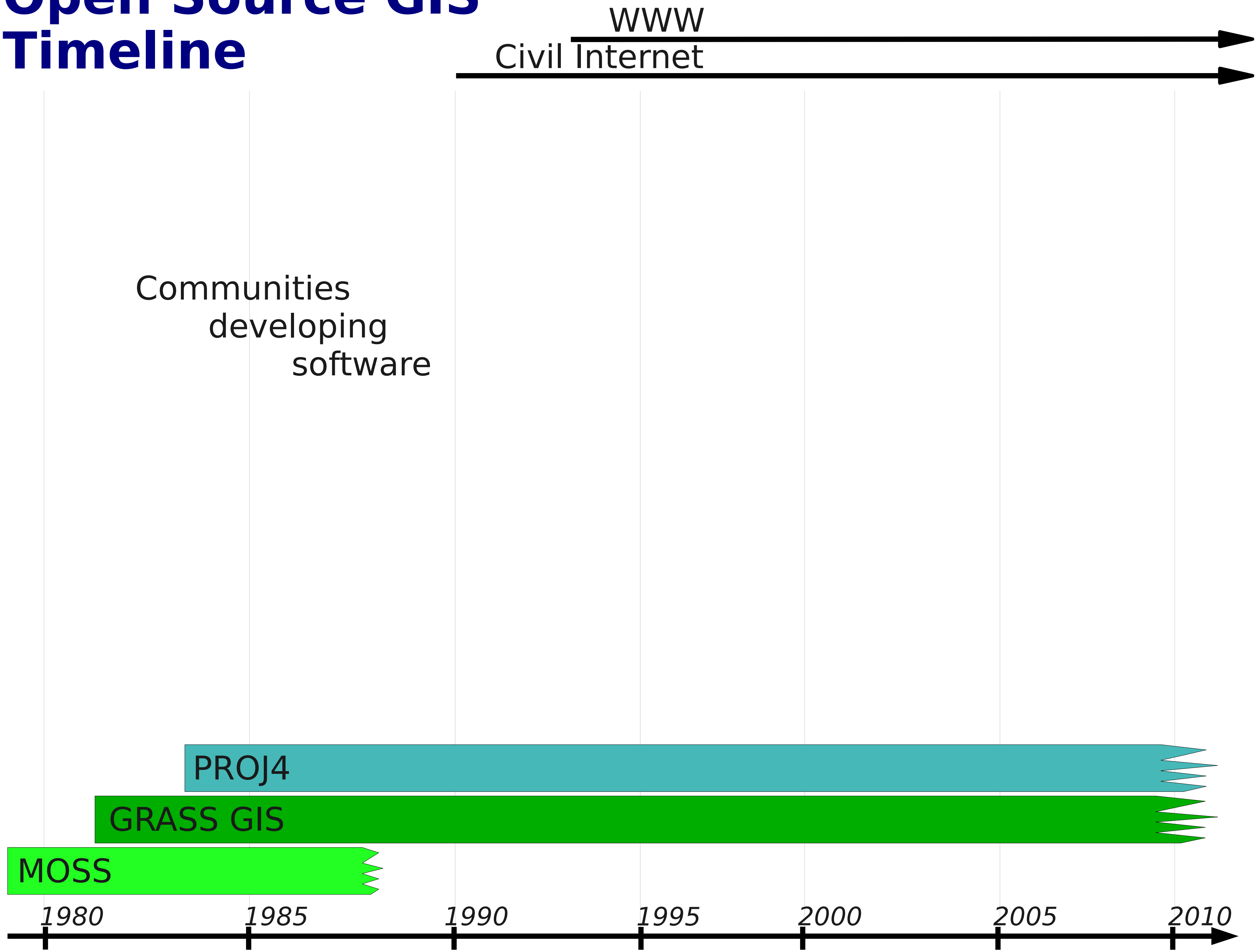
CERL's Michael Shapiro, Jim Westervelt, and Bill Goran, recipients of the 1st GAIA Award (photo by Brenda Johnson, USACERL, 3/90).

1978: MOSS
1982: GRASS GIS

OSGeo

1990 — GRASS Interagency Steering Commitee
1992 — Open GRASS Foundation (OGF)
1994 — Open GIS Consortium (OGC)
2004 — Open Geospatial Consortium (OGC)
2006

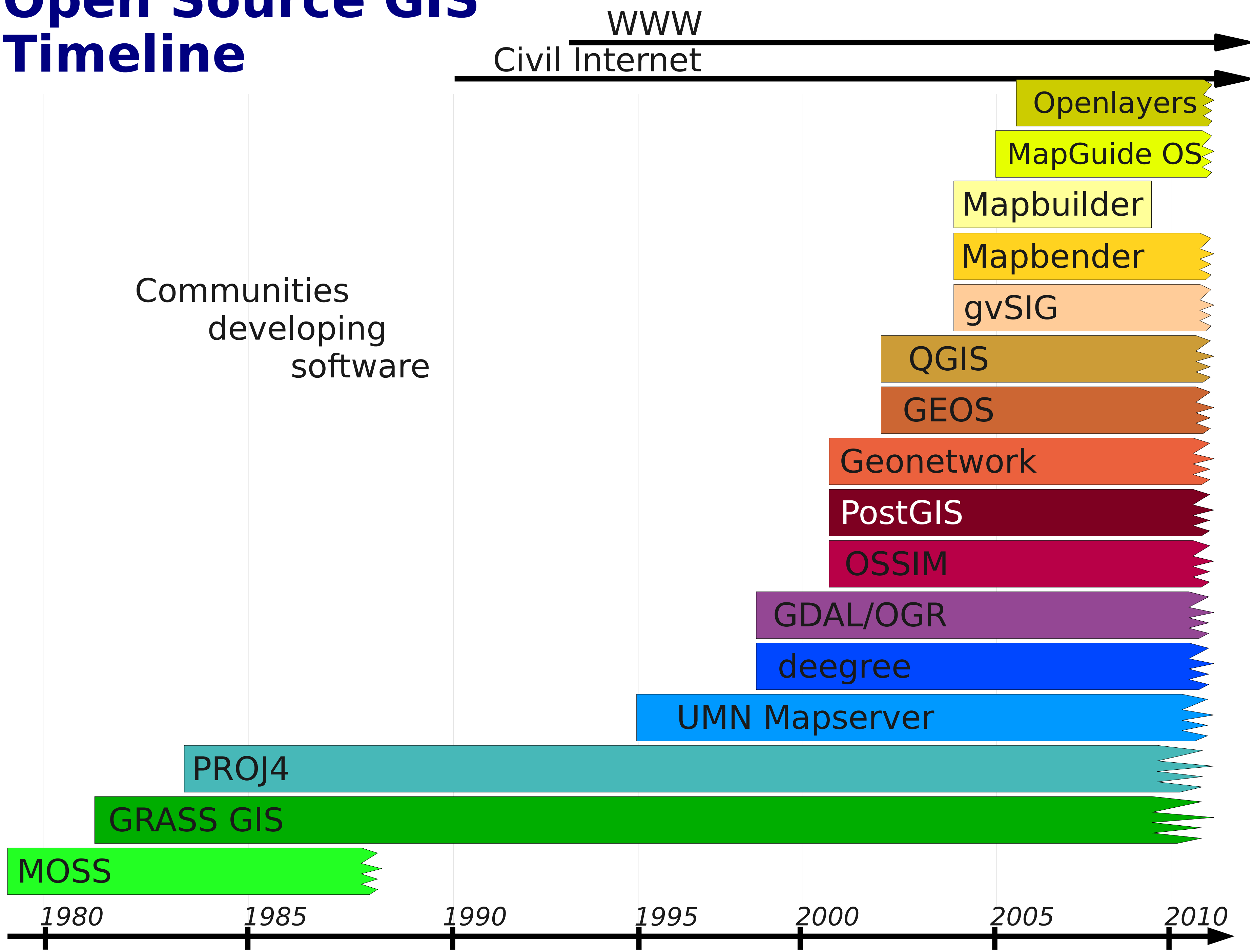
Open Source GIS Timeline



http://wiki.osgeo.org/wiki/Open_Source_GIS_History#Timeline

Neteler M. (2010): Open Source GIS. In Warf, B. (ed.) The Encyclopedia of Geography. London: SAGE

Open Source GIS Timeline



http://wiki.osgeo.org/wiki/Open_Source_GIS_History#Timeline

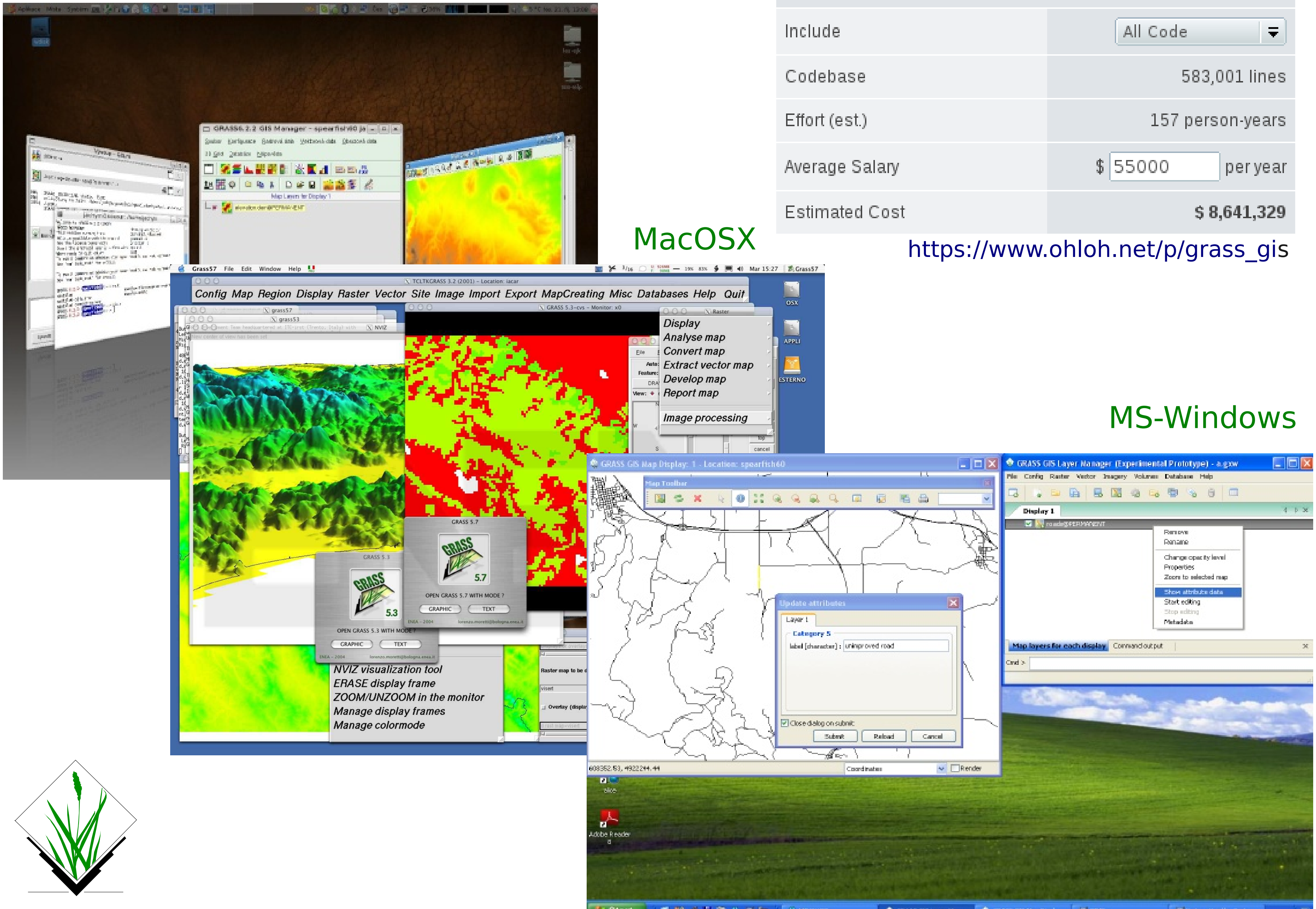
Neteler M. (2010): Open Source GIS. In Warf, B. (ed.) The Encyclopedia of Geography. London: SAGE

GRASS: a portable GIS

GNU/Linux

MacOSX

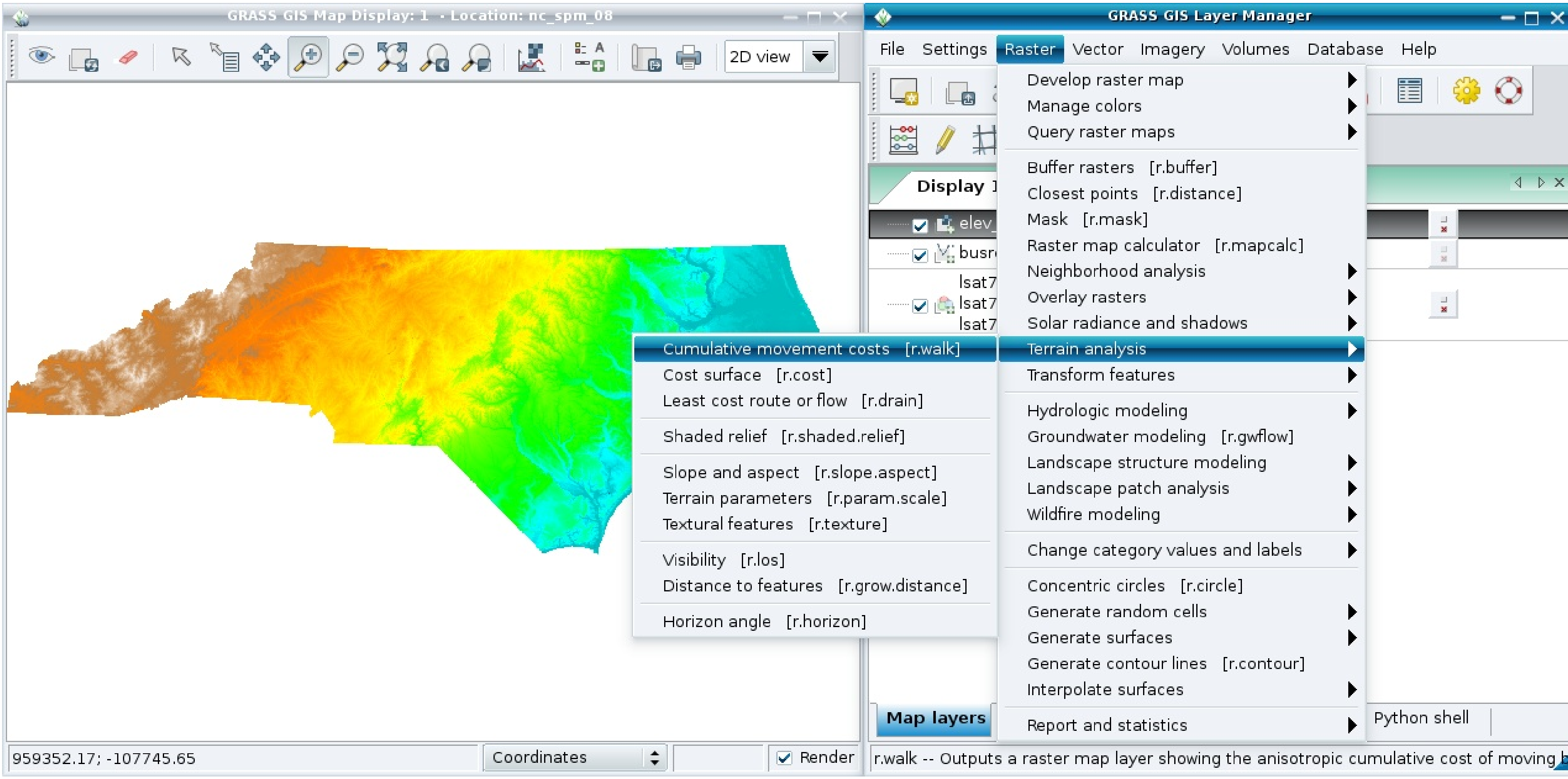
MS-Windows



Project Cost Calculator	GRASS 6 - 6/2011
Include	All Code
Codebase	583,001 lines
Effort (est.)	157 person-years
Average Salary	$ 55000 per year
Estimated Cost	**$ 8,641,329**

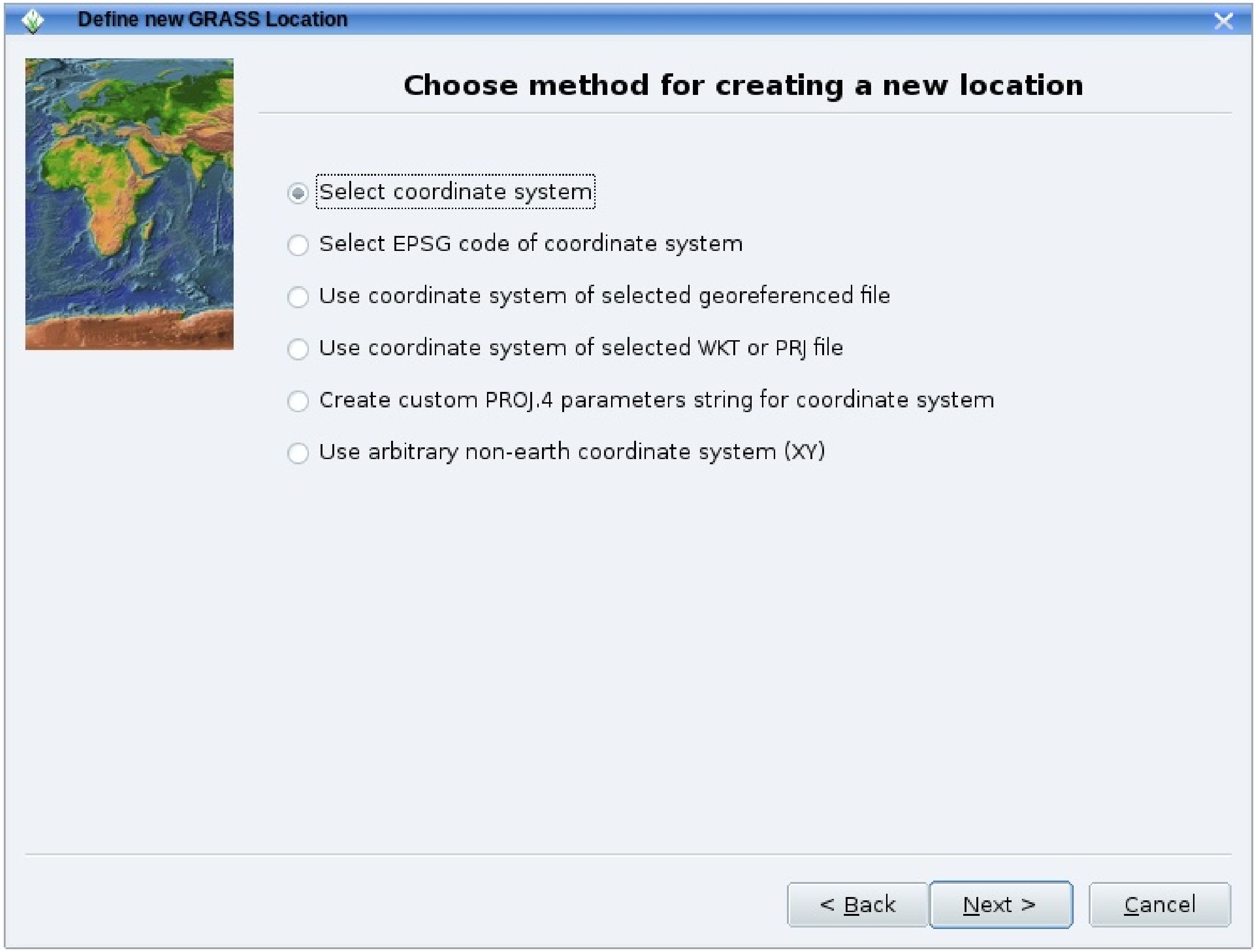
https://www.ohloh.net/p/grass_gis

New GRASS GIS User interface

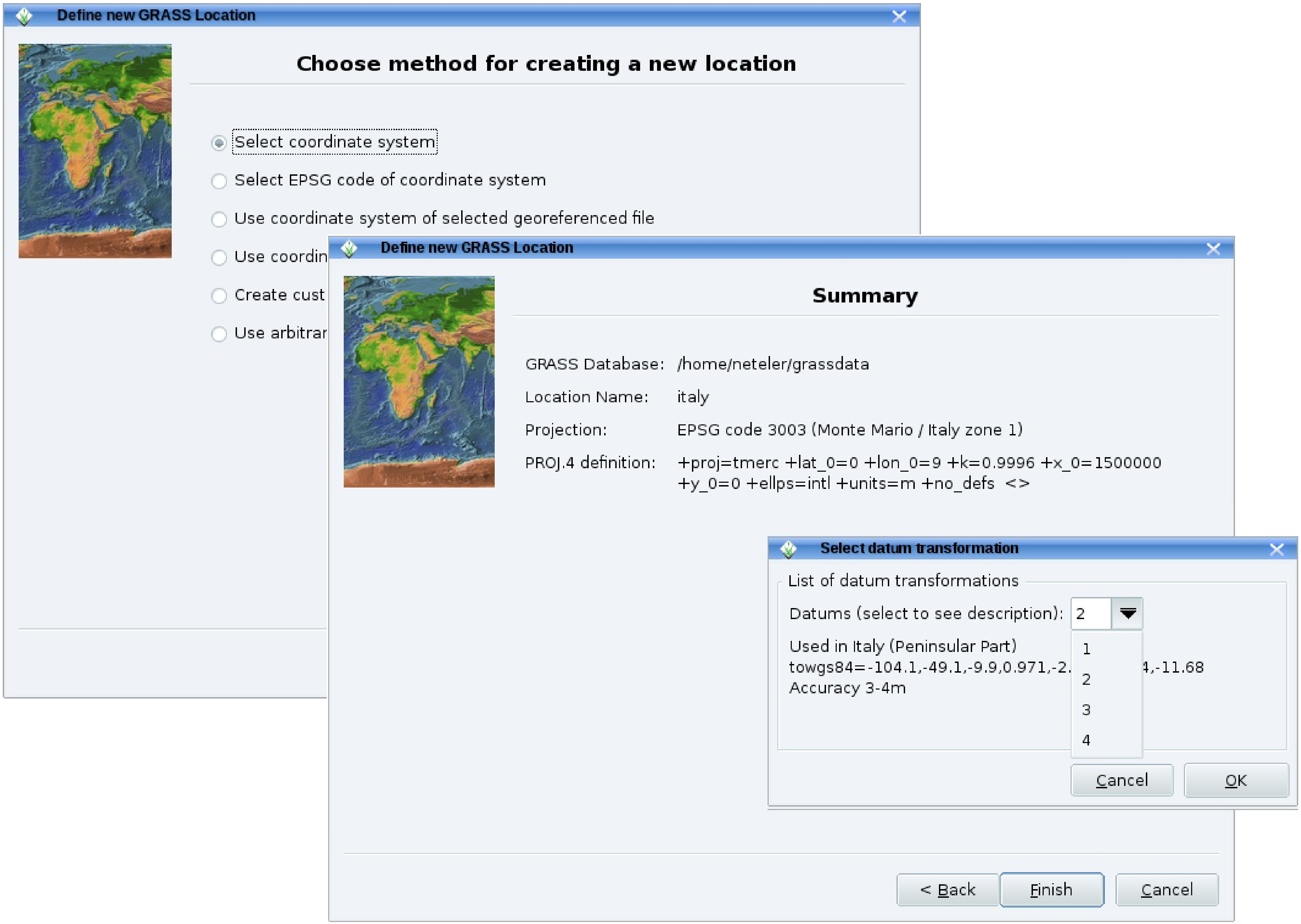


http://grass.osgeo.org

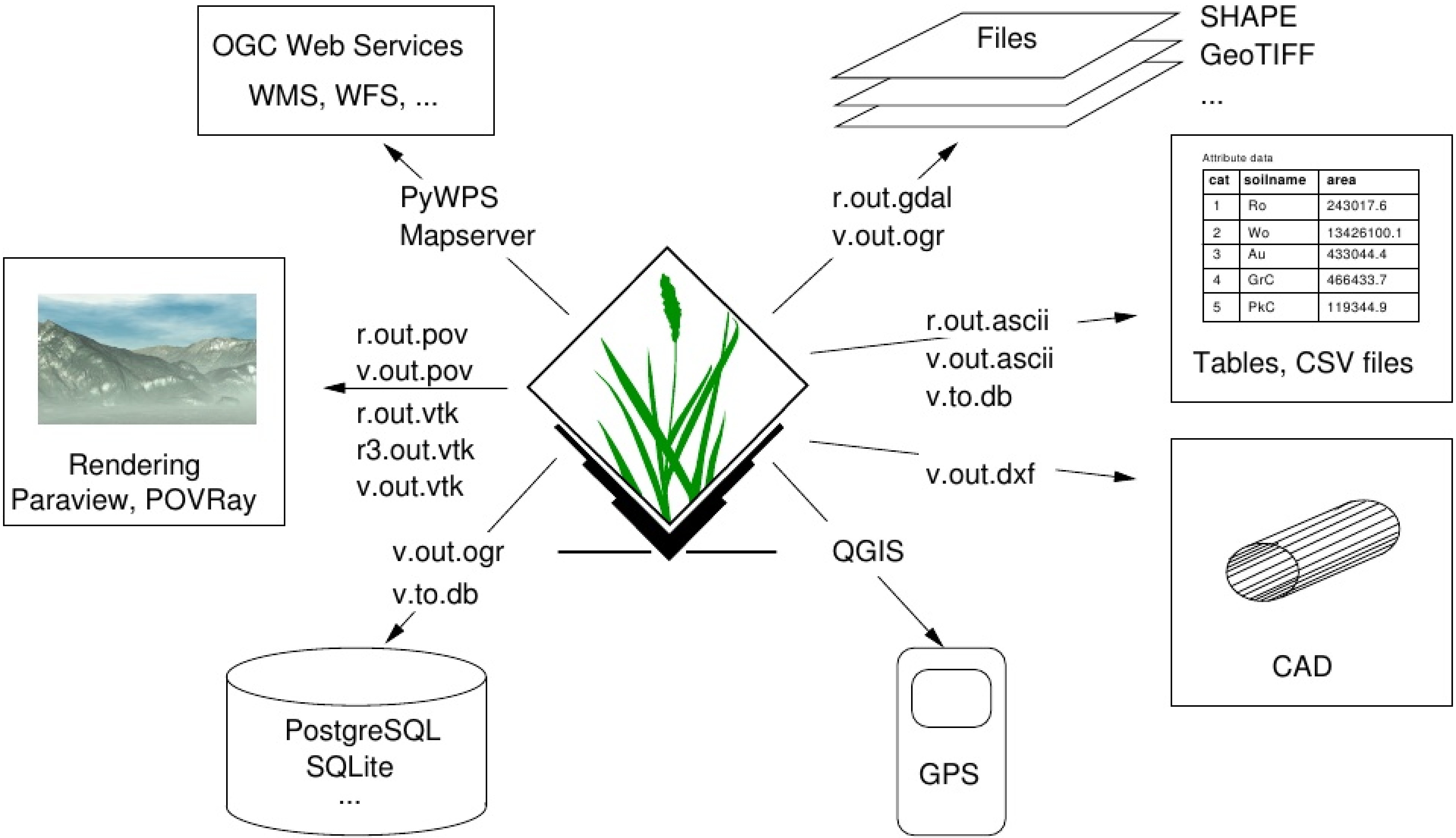
GRASS: Project database (Location) wizard



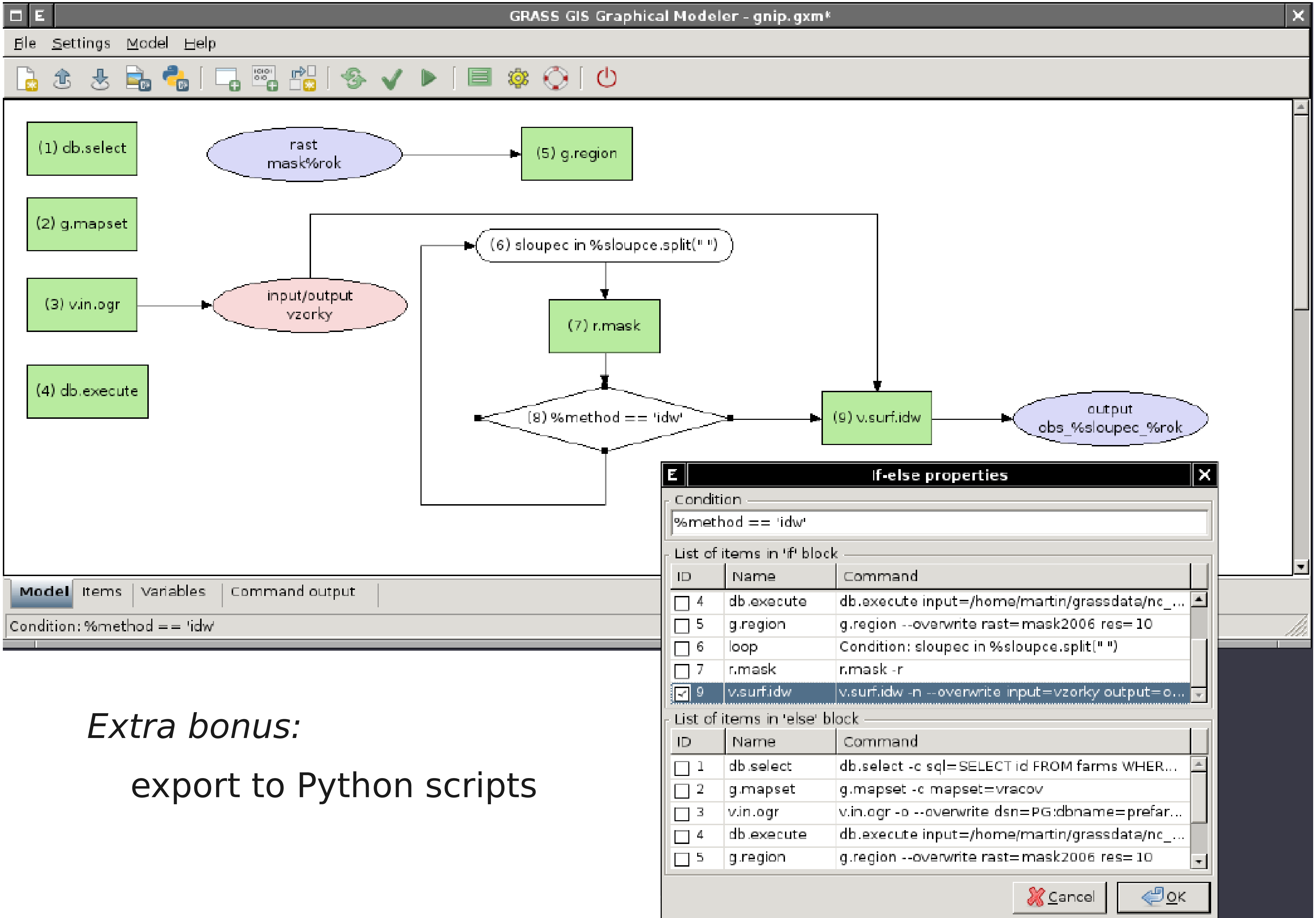
GRASS: Project database (Location) wizard



GRASS GIS: Interoperability



GRASS: New Geospatial Modeller

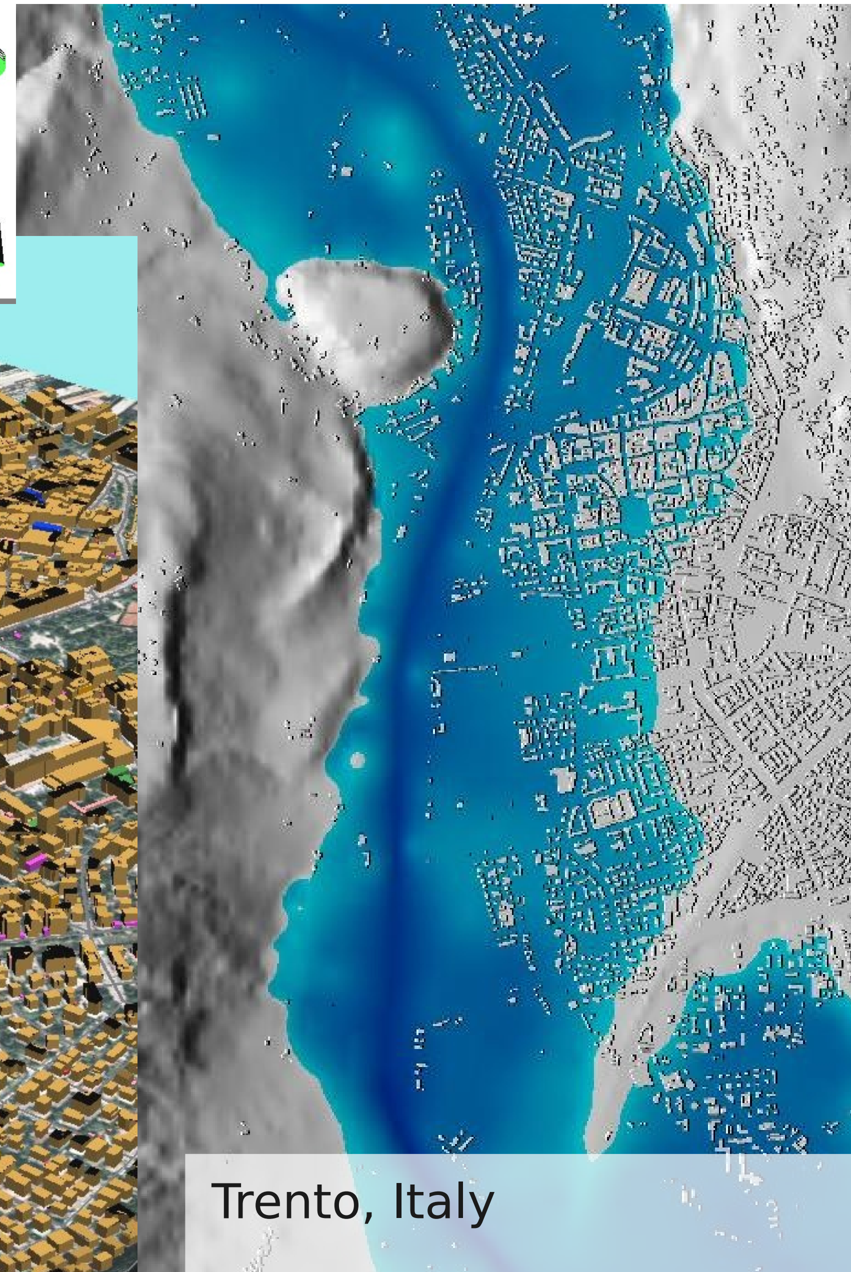


Extra bonus:

export to Python scripts

Raster and 3D vector

Elevation model combined with extruded 3D buildings; also true 3D vector supported



Optional: KML export for virtual globes

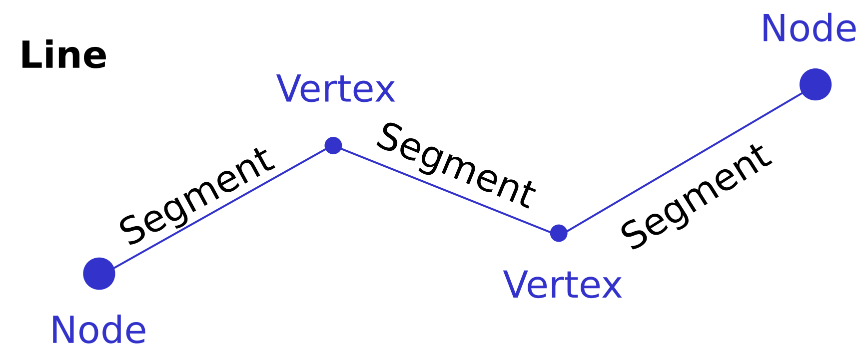
GRASS Topological 2D/3D Vector model

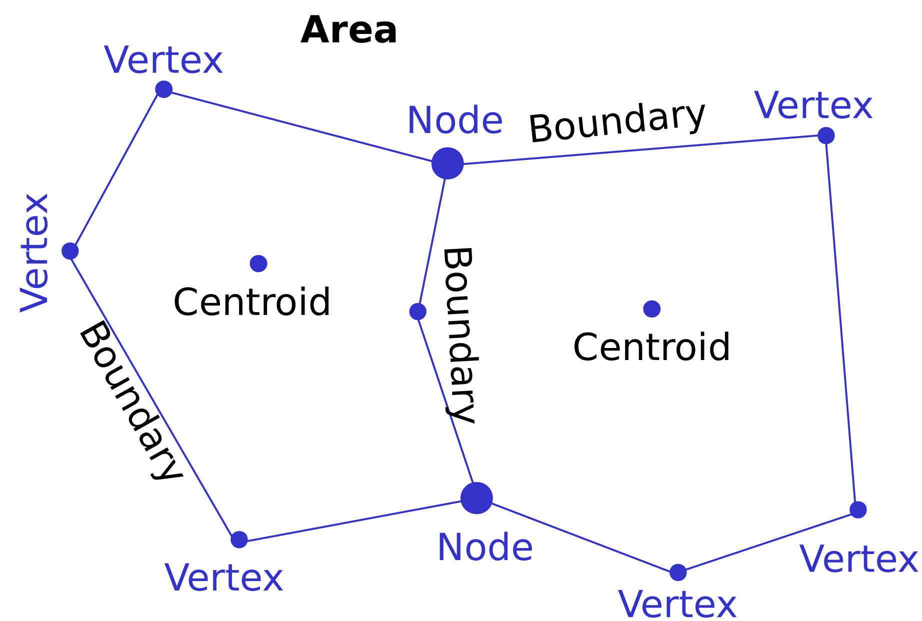
Vector geometry types

- Point
- Centroid
- Line
- Boundary
- Area (boundary + centroid)
- face (3D area)
- [kernel (3D centroid)]
- [volumes (faces + kernel)]

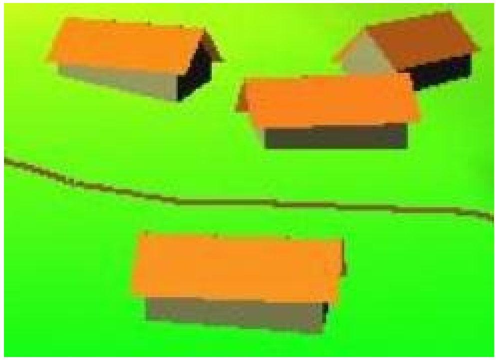
Geometry is **true** 3D when: x, y, z

not in all GIS!





Faces



Use of Spatial Index

Vector Topology

Non-topological vectors

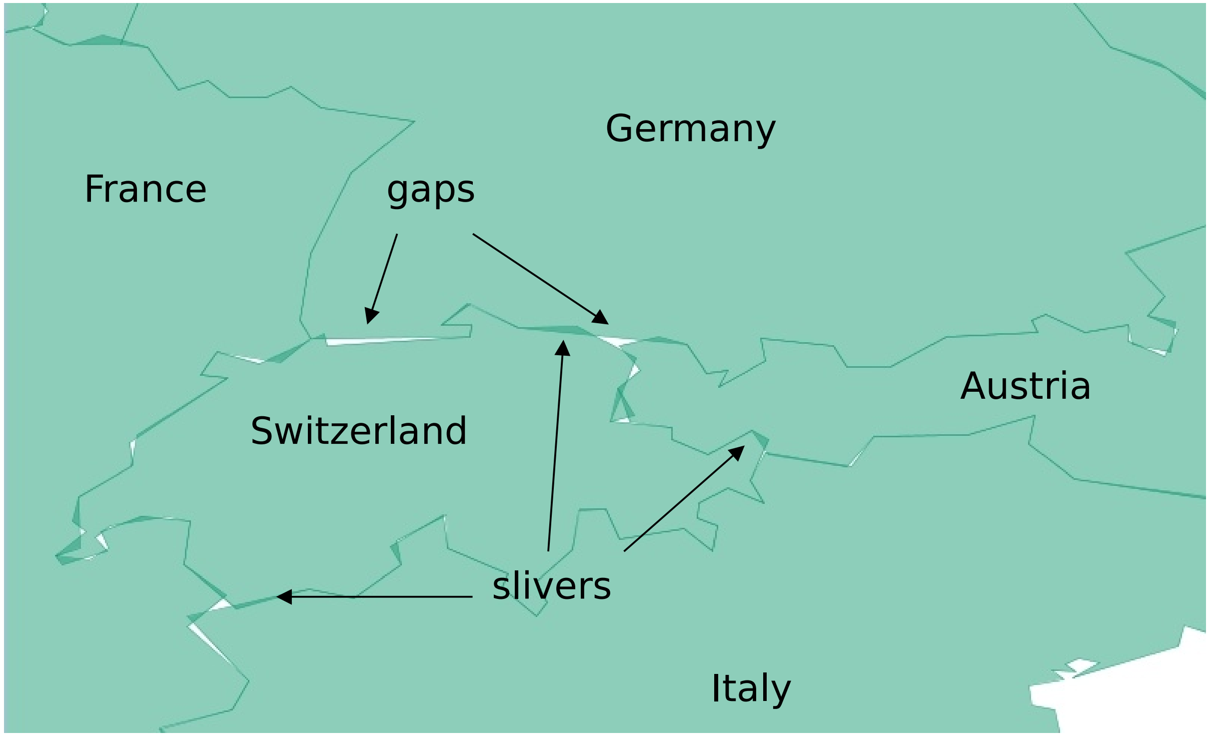
E.g. OGC Simple Features, ESRI shapefiles

Geometry types: points, lines, polygons

-> replicated boundaries for adjacent areas

Faster computations, but extra work for maintenance

Non-topological polygons generalized



Vector Topology

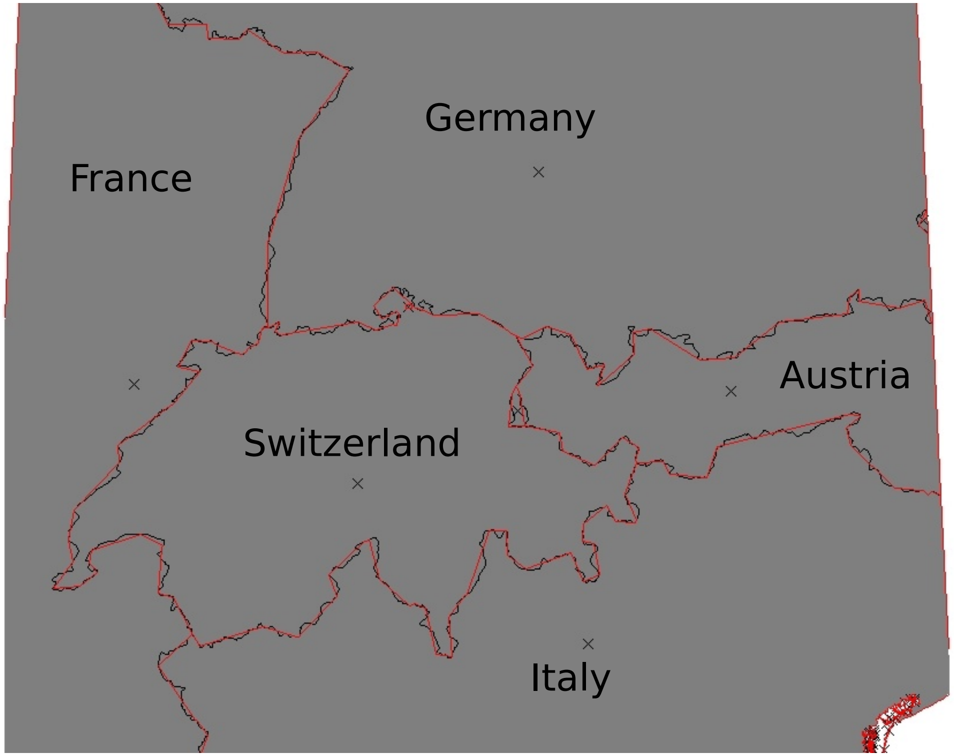
True vector Topology

Areas are constructed from boundaries

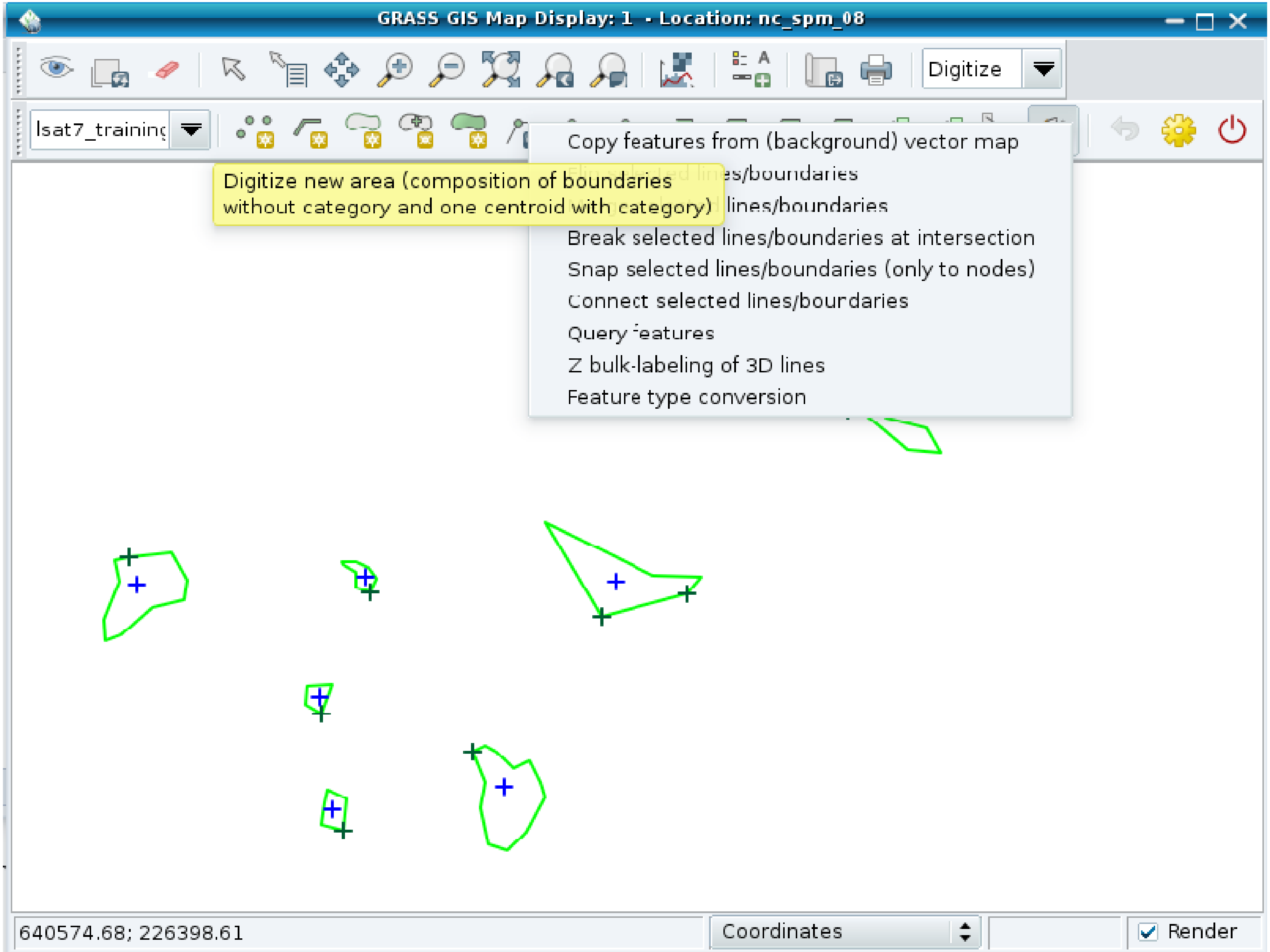
Boundaries are shared between adjacent areas

Slower computations, but less (nearly no manual) maintenance

Topological
boundaries generalized



GRASS Topological Vector Digitizer

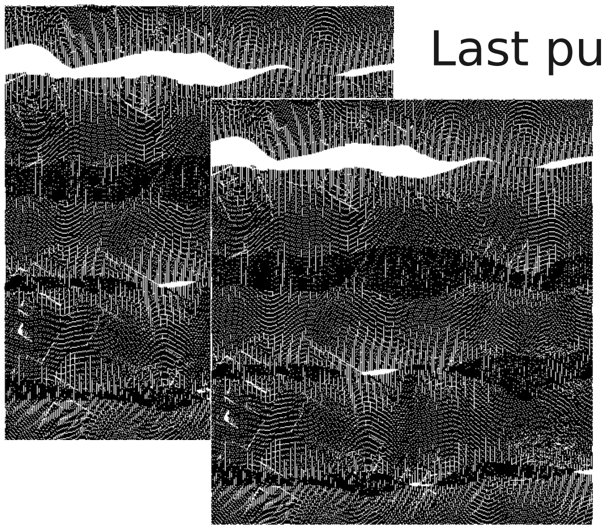


Processing of LiDAR data: laser scanning of the terrain

Lidar

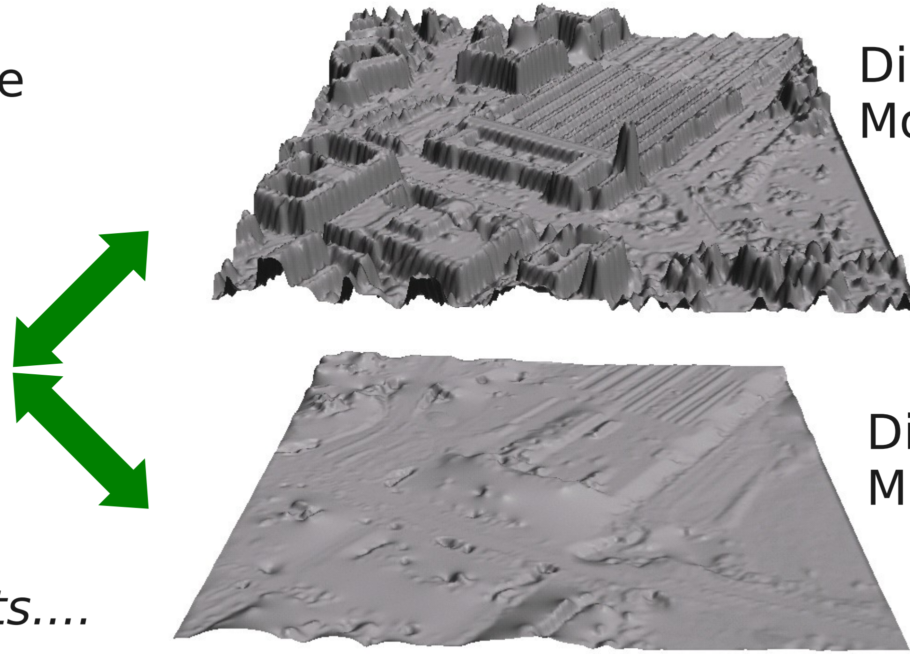
First pulse

Last pulse



Processing 500 Million points....

M. Brovelli and R. Antolín
H. Mitasova



Digital Surface Model (DSM)

Digital Terrain Model (DTM)

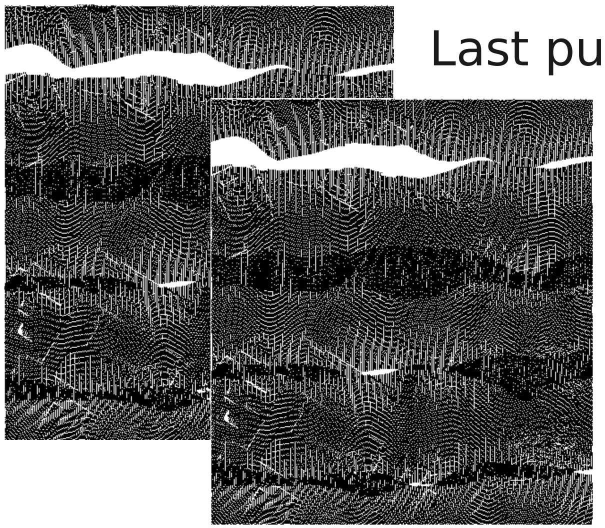
Processing of LiDAR data: laser scanning of the terrain

M. Brovelli and R. Antolín
H. Mitasova

Lidar

First pulse

Last pulse



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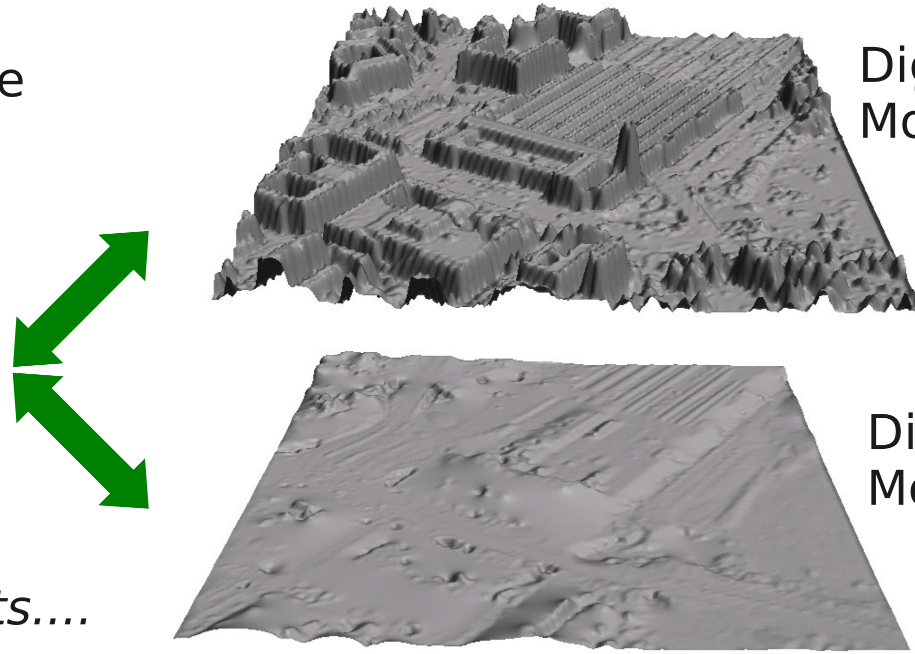
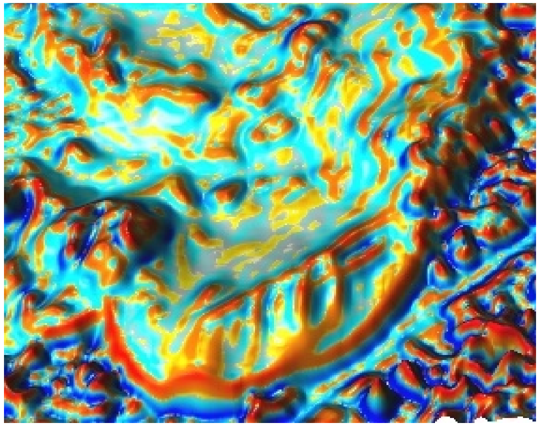
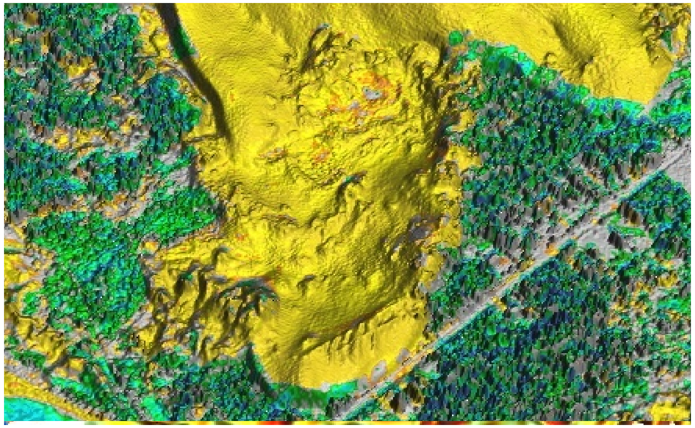
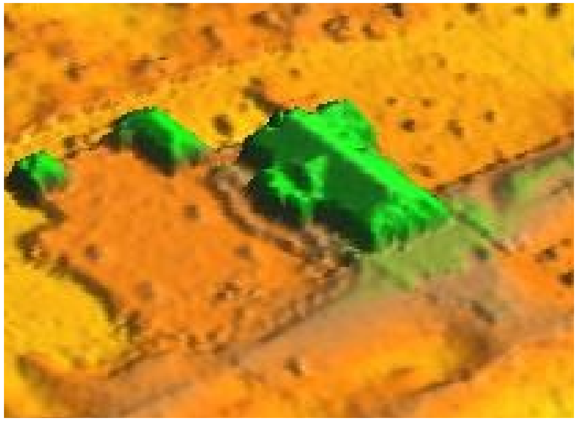


Digital Surface Model (DSM)

Digital Terrain Model (DTM)







Processing of LiDAR data: laser scanning of the terrain

New in GRASS 7: direct import of LiDAR LAS files

libLAS

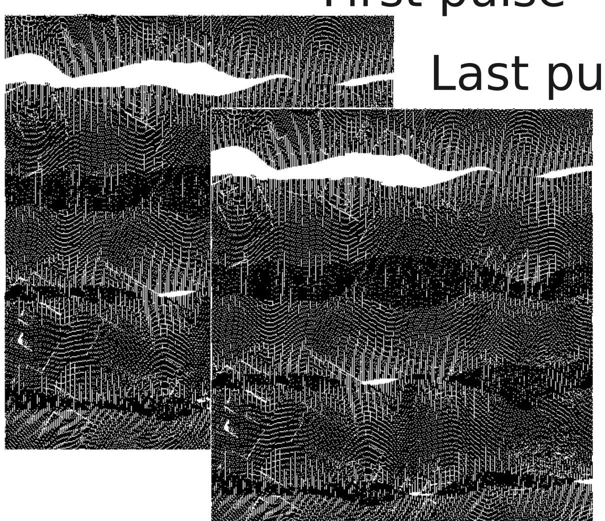
Output as vector points:

v.in.lidar

Lidar

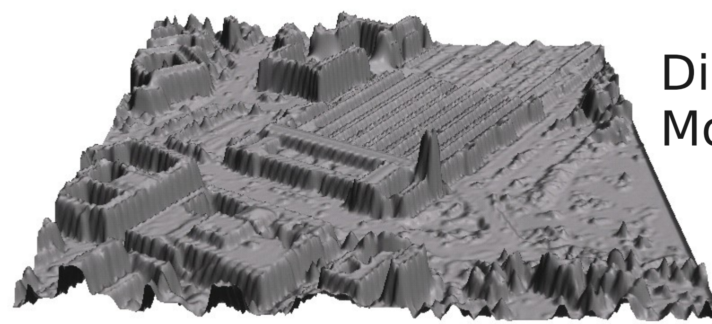
First pulse

Last pulse

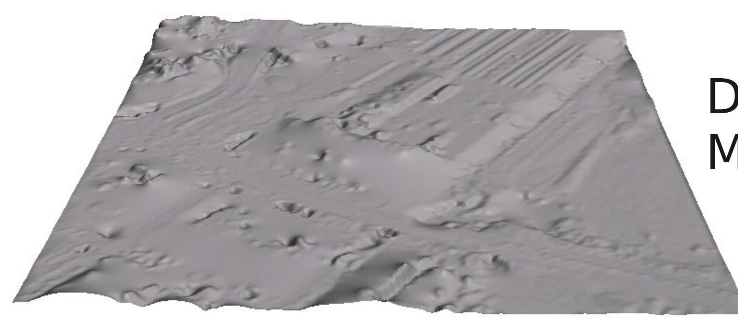


Output as raster map:

r.in.lidar

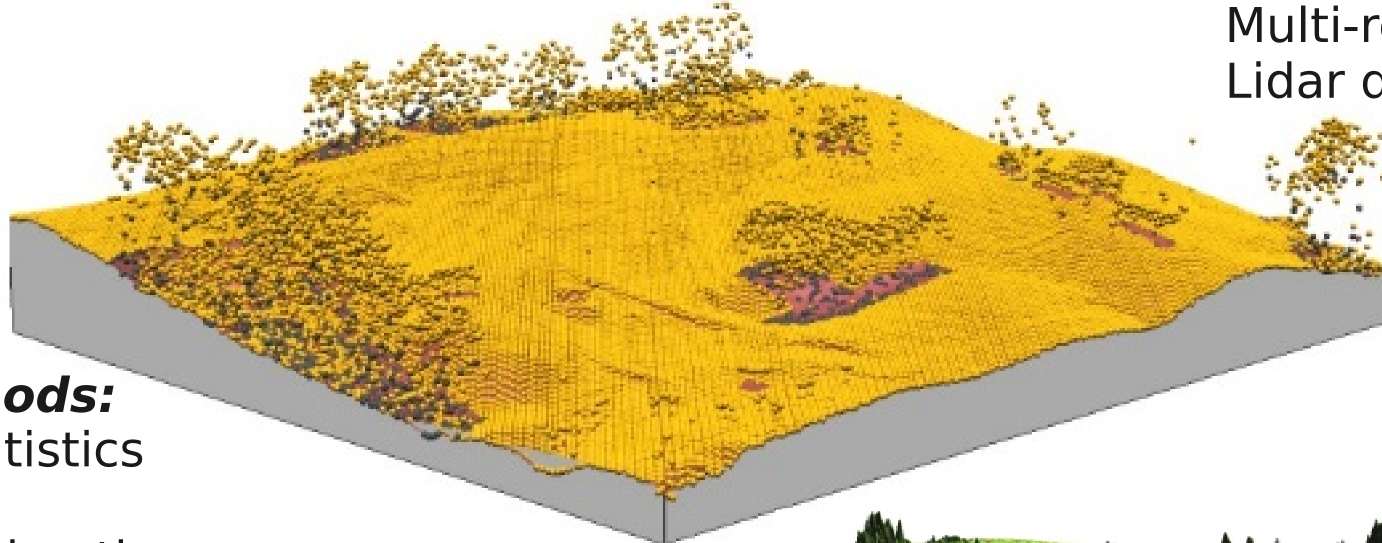


Digital Surface Model (DSM)



Digital Terrain Model (DTM)

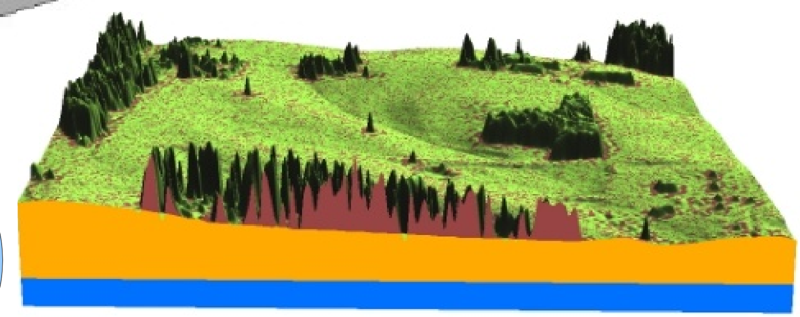
LiDAR data analysis in GRASS GIS

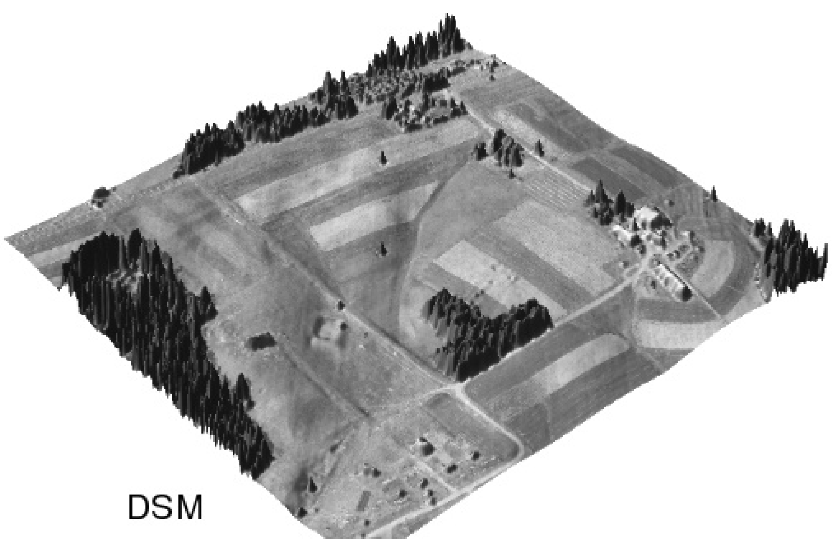


Multi-return
Lidar data

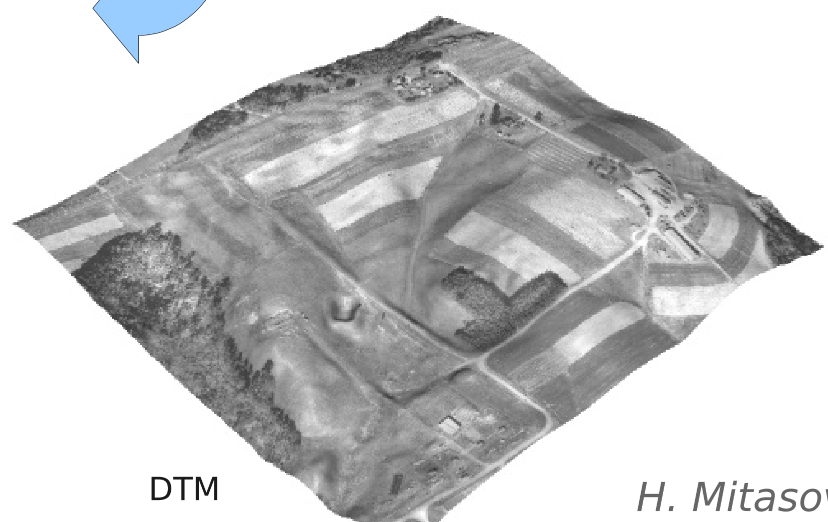
Available Methods:
- cell based statistics
- binning
- spatial approximation
- smoothing

Use cases:
- topographic analysis
- Feature extraction (DTM/DSM)





DSM



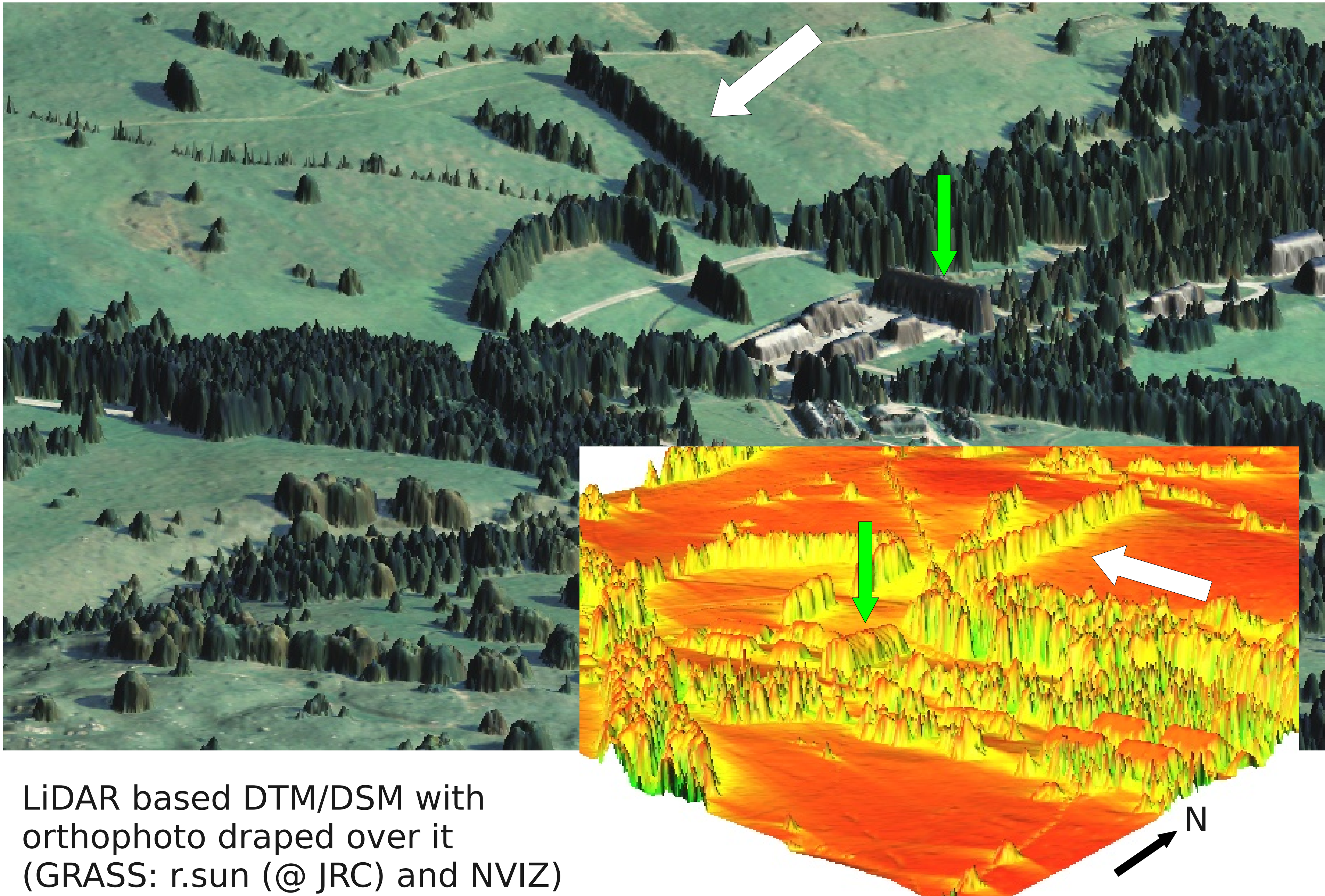
DTM

H. Mitasova, NCSU
M. Brovelli, PdM, Como

LiDAR data in action: Visualization and solar energy

LiDAR based DTM/DSM with
orthophoto draped over it
(GRASS: r.sun (@ JRC) and NVIZ)

LiDAR data in action: Visualization and solar energy



LiDAR based DTM/DSM with orthophoto draped over it (GRASS: r.sun (@ JRC) and NVIZ)

Support for massive

spatial datasets

in GRASS GIS

Support for massive datasets

What is massive?

Massive is relative to

- Hardware ressources
- Software capabilities
- Operating system capabilities

Limiting factors

- RAM
- Processing time
- Disk space
- Largest supported file size

Support for massive datasets

What is massive?

Massive is relative to

- Hardware ressources
- Software capabilities
- Operating system capabilities

Limiting factors

- ⚡ RAM
- ⚡ Processing time
- ✔ Disk space
- ✔ Largest supported file size

Data processing concepts

Raster

Only few processes need to load the full raster at once

- Scattered (random) access
- Sweep-lines
- Sorting and searching

Vector

Loading the full vector map to memory is probably never necessary

BUT: processing time can be long, support datastructures need to be loaded

Data processing concepts

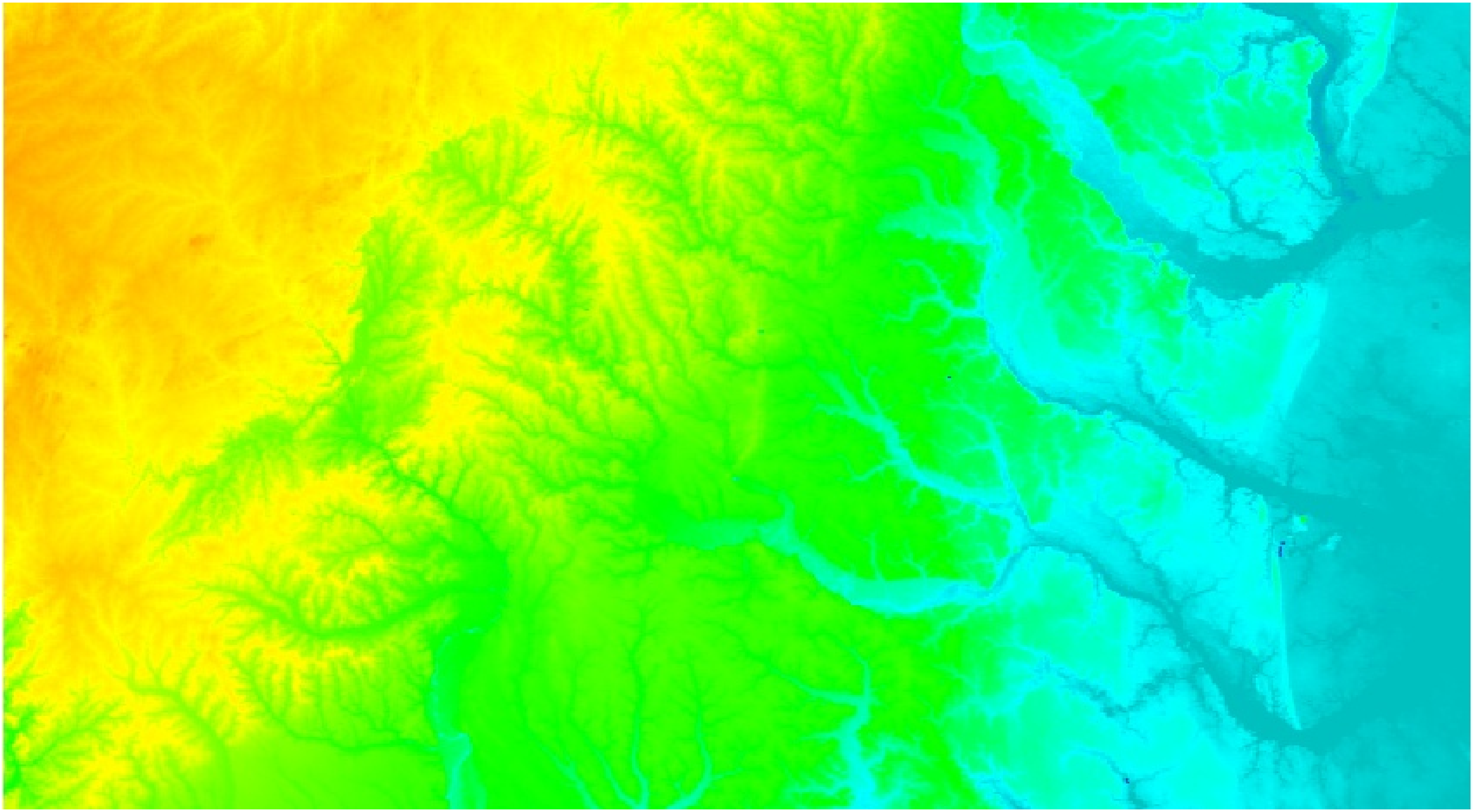
Raster

Scattered (random) access ➔ never happens

Sweep-lines: e.g. hydrology, cost surfaces

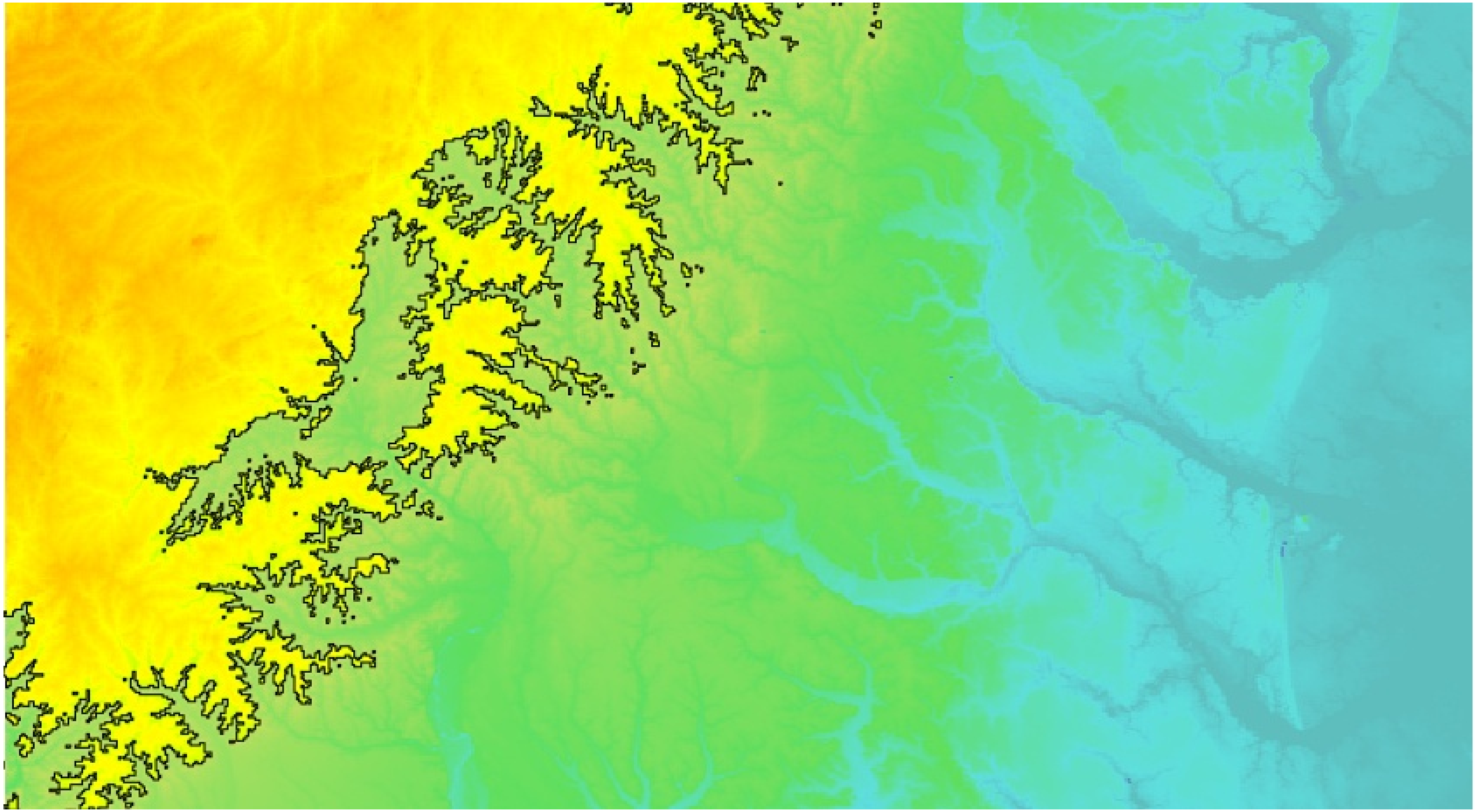
Raster sweep line

DEM: North Carolina, elev_state_500m



Raster sweep line

DEM: North Carolina, elev_state_500m



Data processing concepts

Raster

Scattered (random) access ➔ never happens

Sweep-lines: e.g. hydrology, cost surfaces

➔ Fast sorting and searching

Support for massive datasets

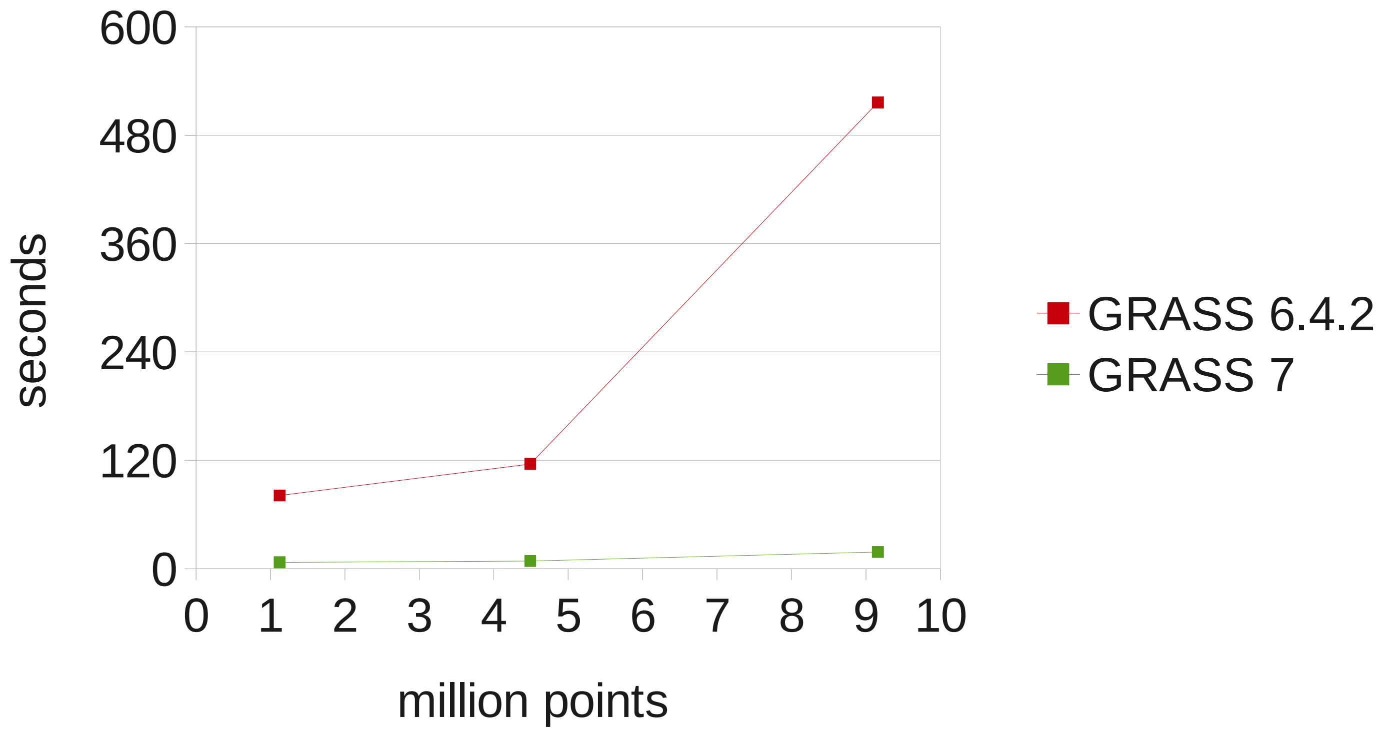
Solutions

- **NEVER** load the full raster to memory
- Tiling
- External memory
- Fast sorting and searching
- Large File Support (LFS), files > 2 GB

... available in GRASS GIS

Support for massive datasets

Cost surfaces: *r.cost*



Hydrological modelling (for massive data)

J. Jasiewicz, M. Metz / Computers & Geosciences ▮ (▮▮▮▮) ▮▮▮–▮▮▮

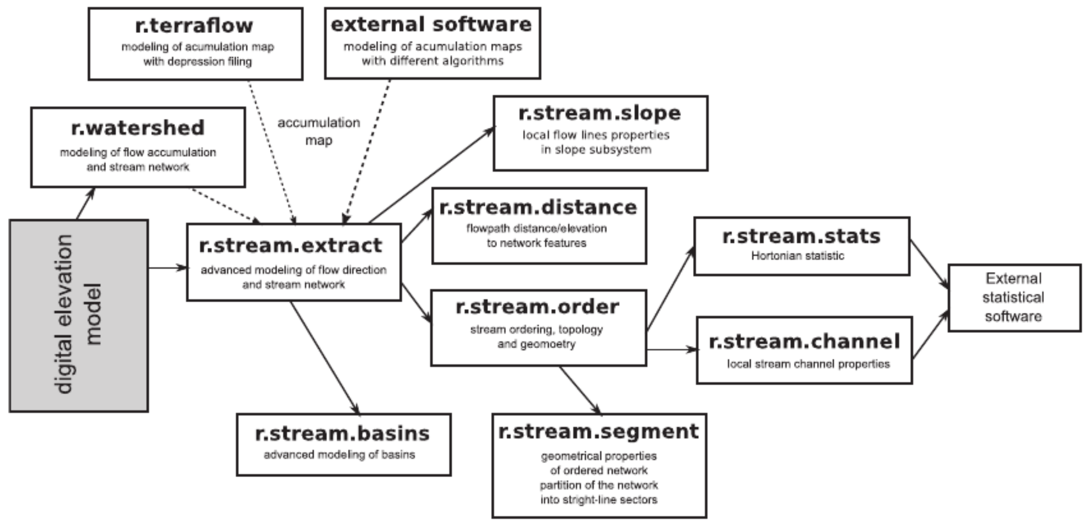
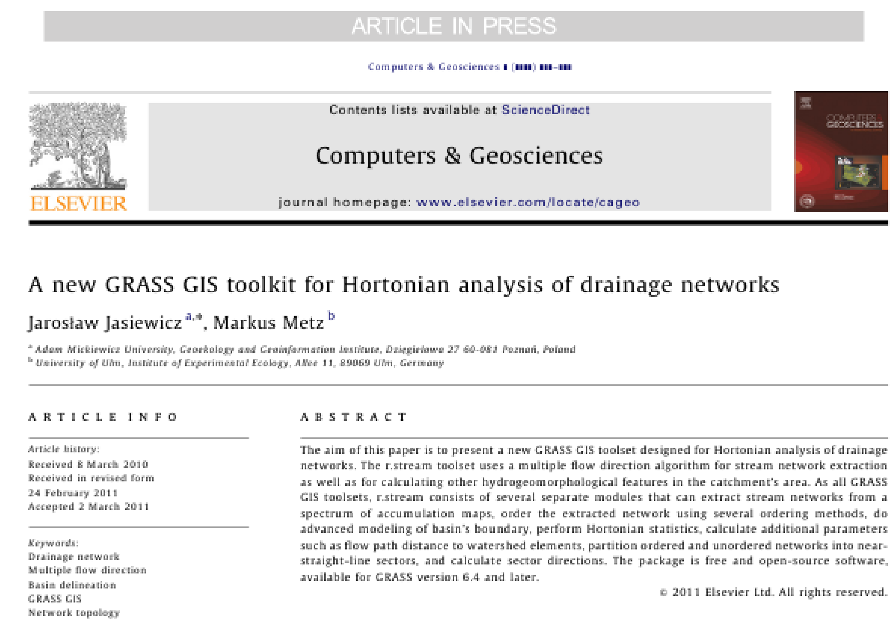


Fig. 2. The structure of the r.stream toolset and data flow between particular modules and external software.



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ELSEVIER

A new GRASS GIS toolkit for Hortonian analysis of drainage networks

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Multiple flow direction
Basin delineation
GRASS GIS
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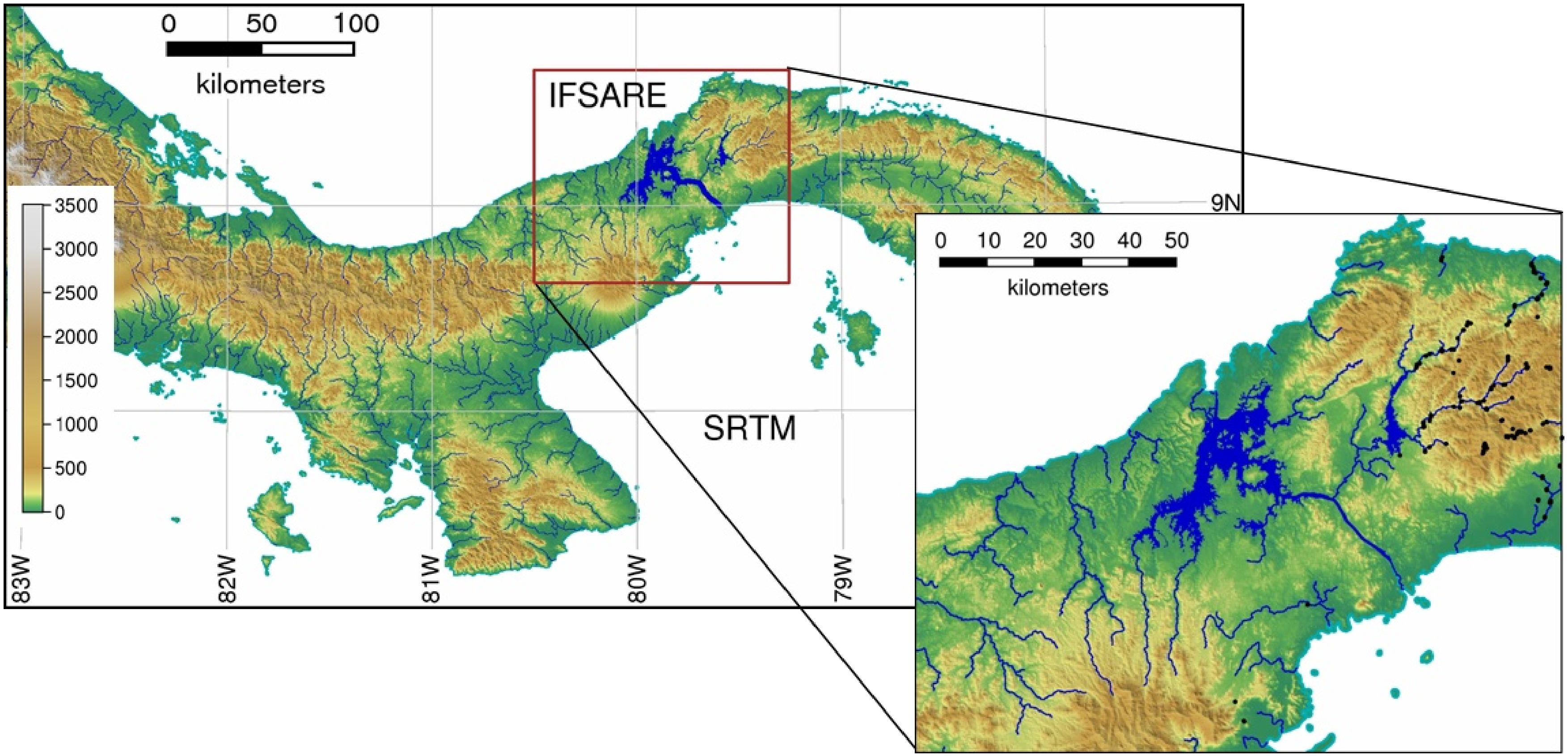
ABSTRACT

The aim of this paper is to present a new GRASS GIS toolset designed for Hortonian analysis of drainage networks. The r.stream toolset uses a multiple flow direction algorithm for stream network extraction as well as for calculating other hydrogeomorphological features in the catchment's area. As all GRASS GIS toolsets, r.stream consists of several separate modules that can extract stream networks from a spectrum of accumulation maps, order the extracted network using several ordering methods, do advanced modeling of basin's boundary, perform Hortonian statistics, calculate additional parameters such as flow path distance to watershed elements, partition ordered and unordered networks into near-straight-line sectors, and calculate sector directions. The package is free and open-source software, available for GRASS version 6.4 and later.

Hydrological modelling (for massive data)

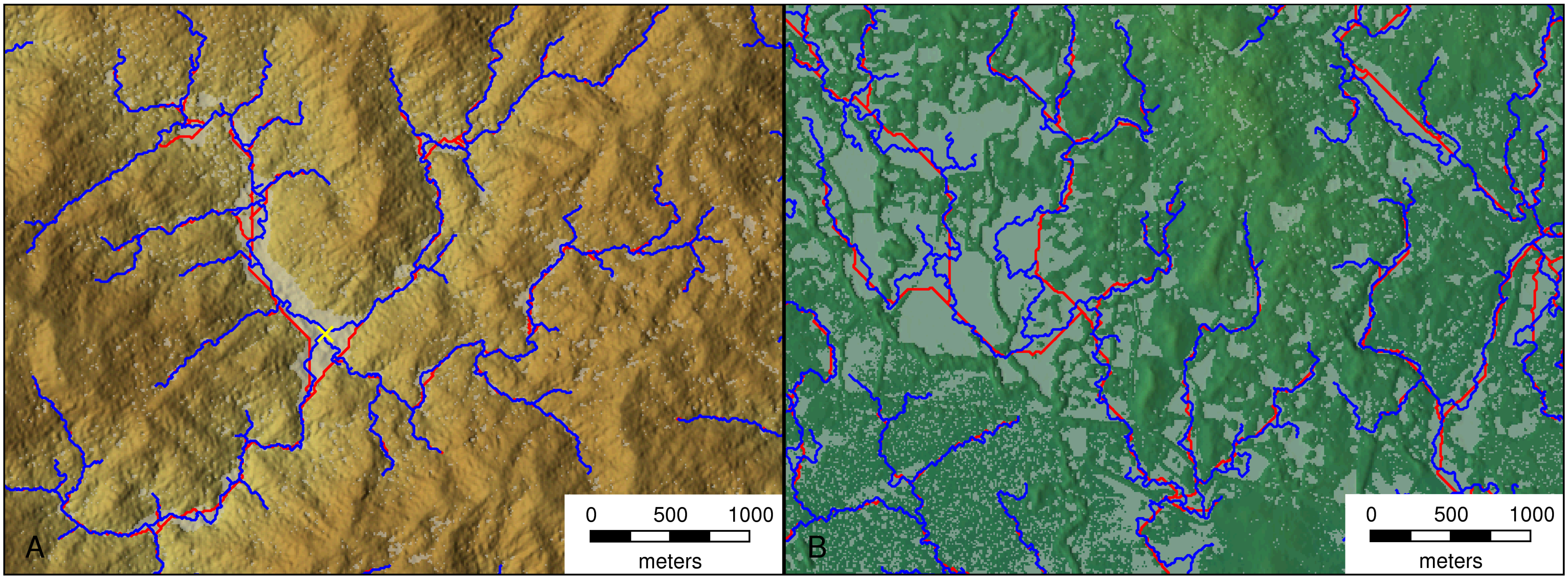
Stream network extraction around the Panama channel



Metz et al. 2011, Hydrology and Earth System Sciences

Hydrological modelling (for massive data)

Stream network extraction around the Panama channel



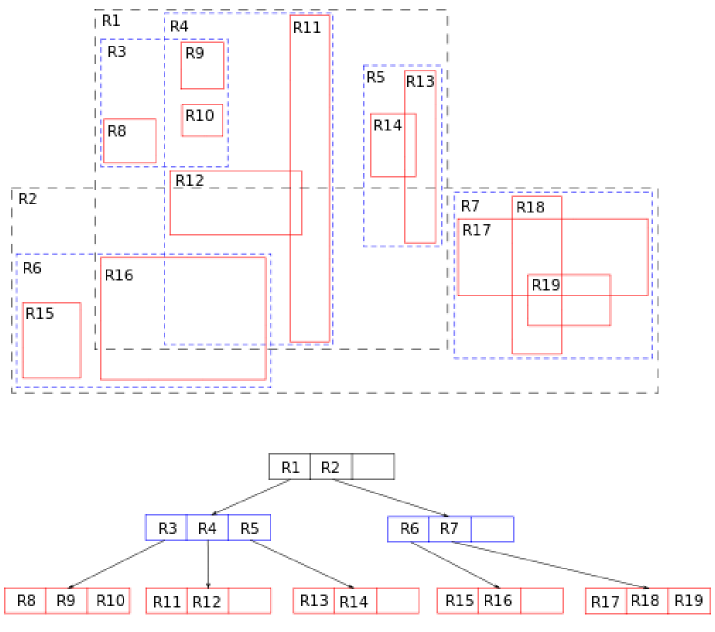
r.watershed   Sink filling (most commonly used preprocessing)

Metz et al. 2011, Hydrology and Earth System Sciences

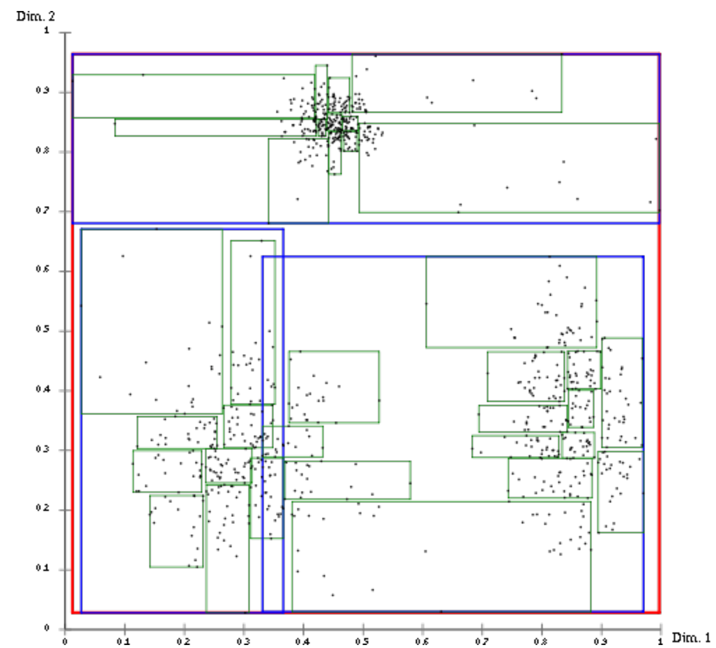
Vector Topology in GRASS 7

New spatial index, always available in file

GRASS 6.x: built on demand in memory ➔ too slow, too much memory



R-Tree



R*-Tree

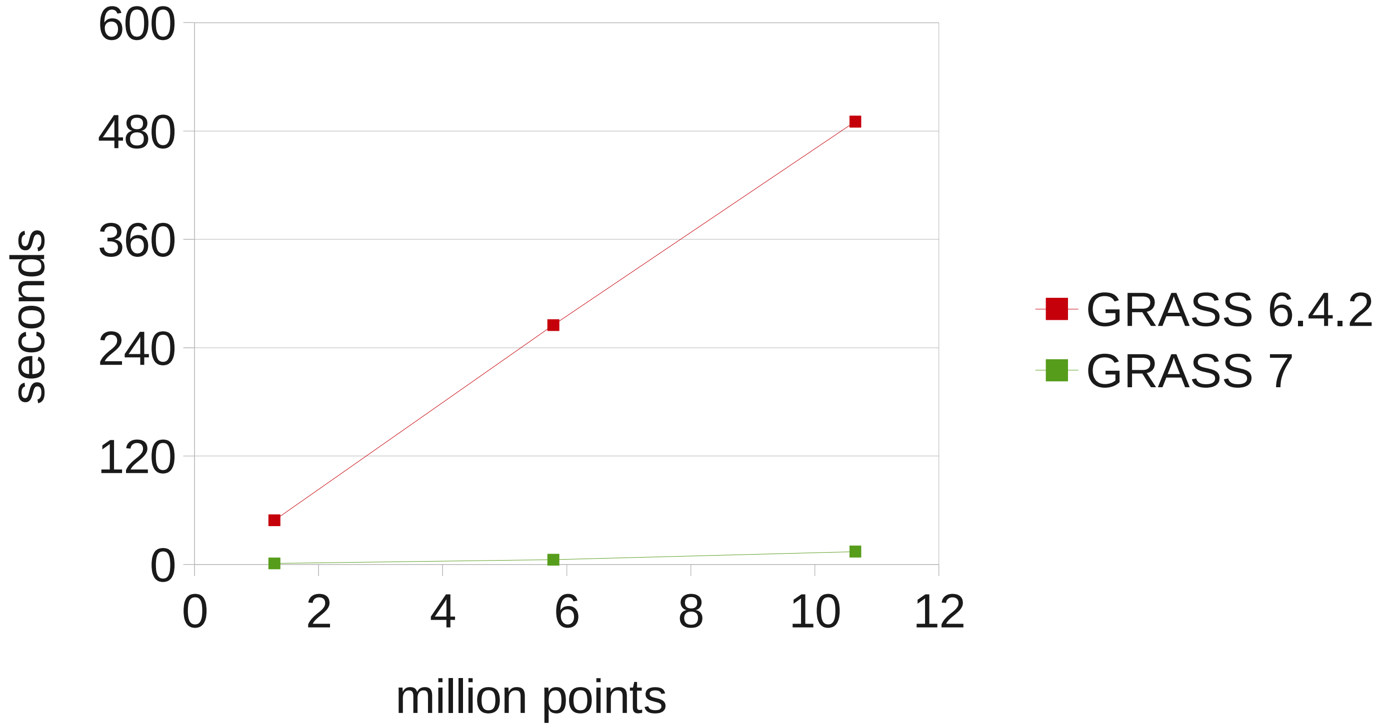
Vector Topology in GRASS 7

Spatial index example

Query of vector point maps

GUI: click on vector map, what is there?

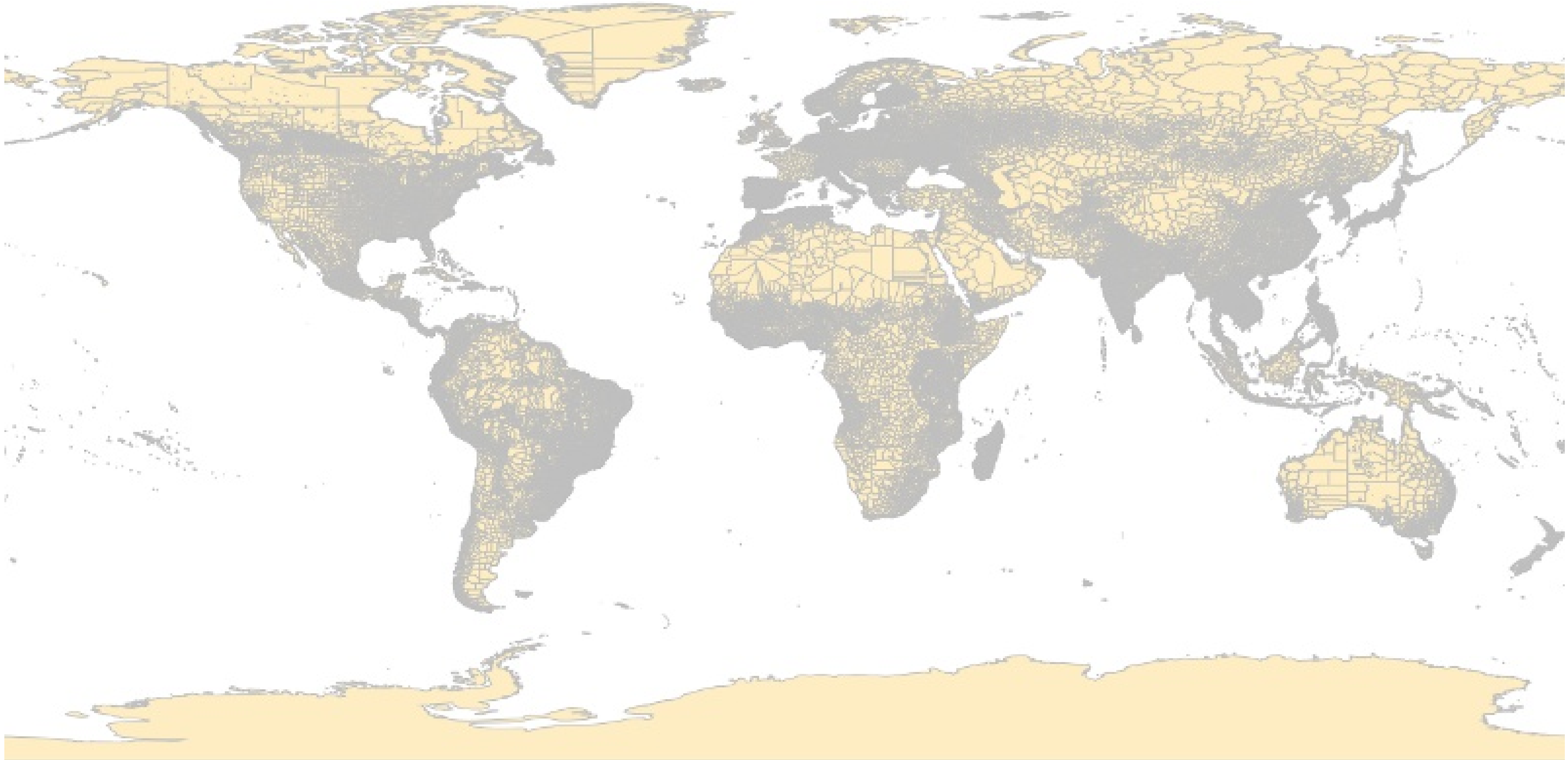
CLI: v.what east_north=east,north



Vector Topology in GRASS 7

Topological cleaning, vector import example

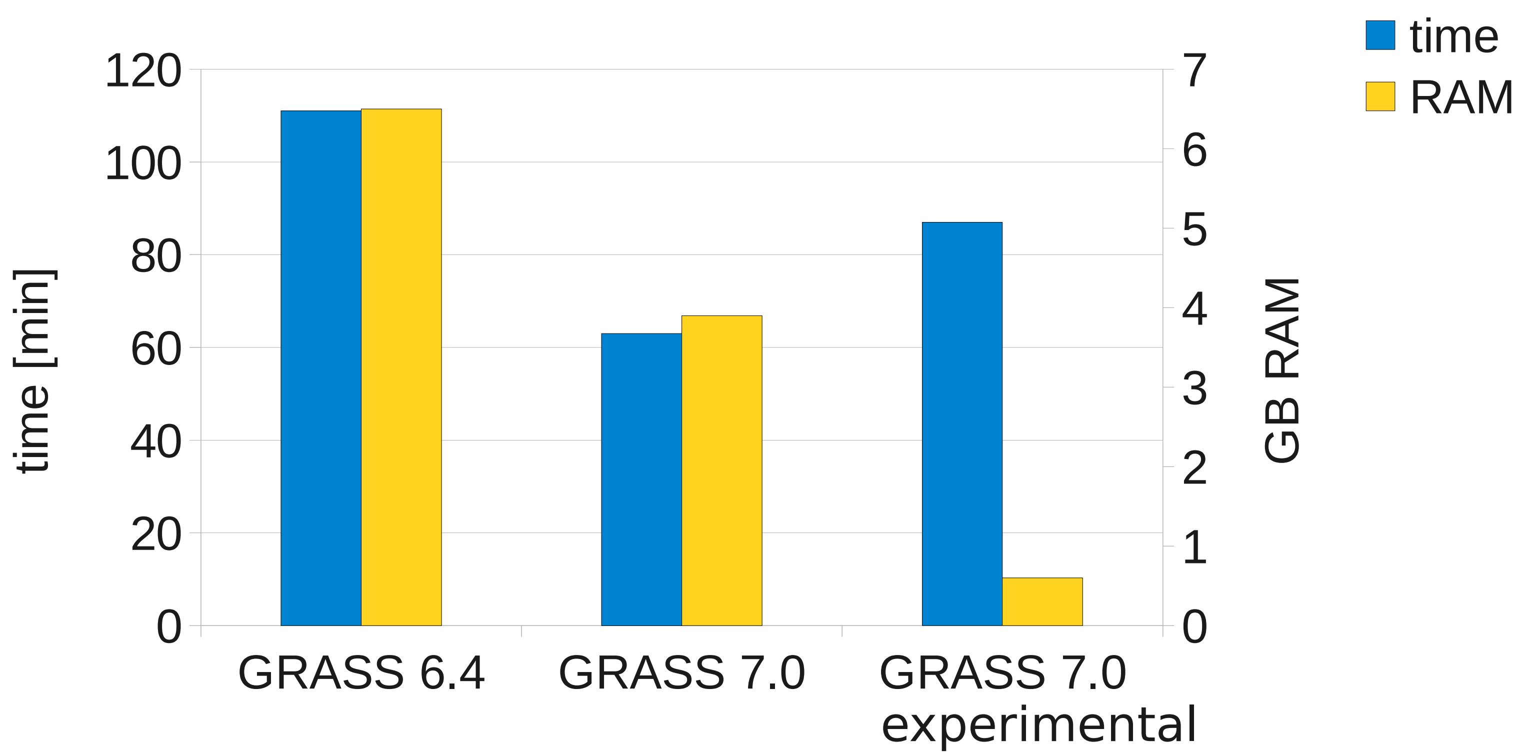
Global Administrative Database (GADM), all three levels, global



Vector Topology in GRASS 7

Topological cleaning, vector import example

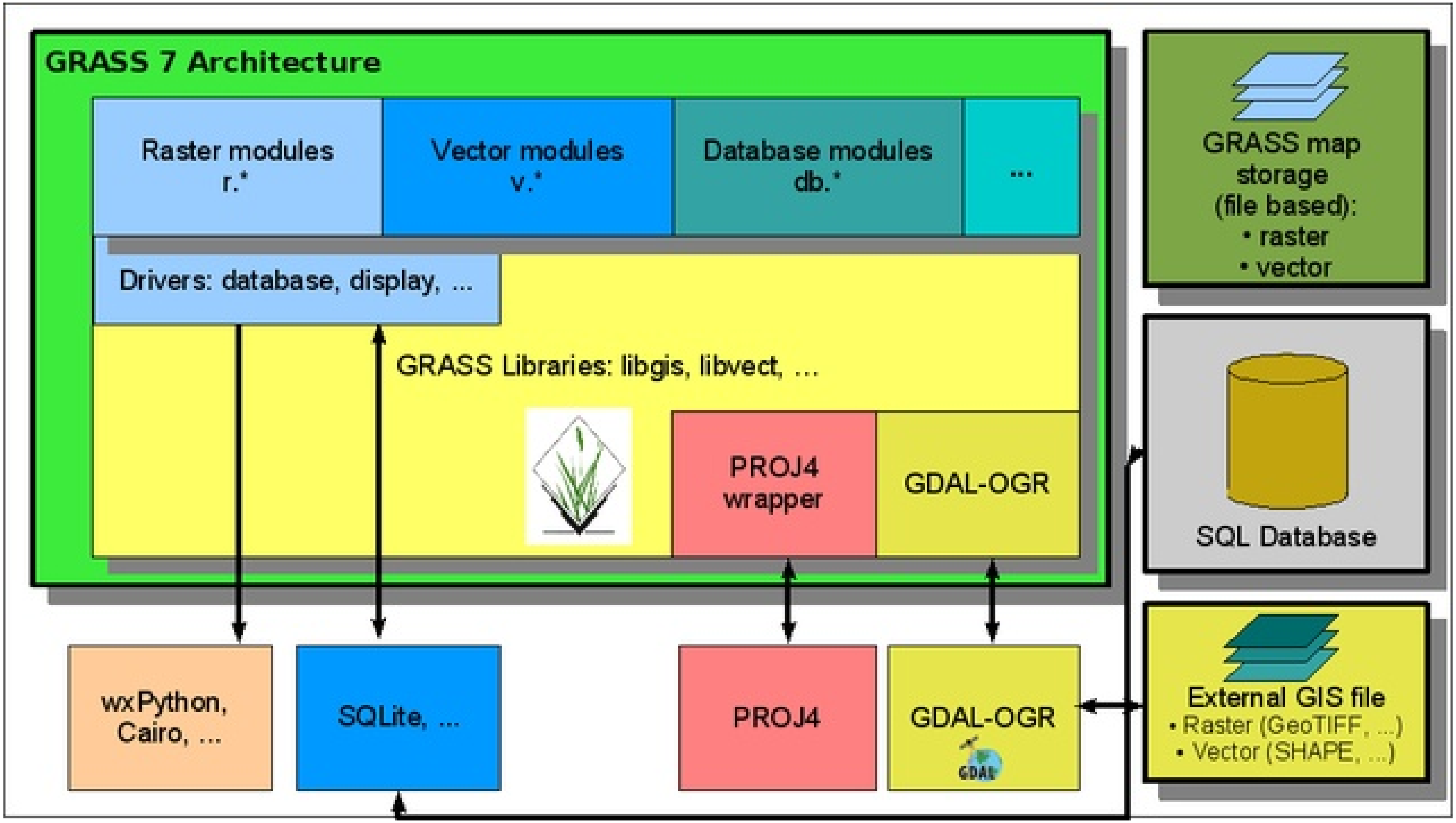
Global Administrative Database (GADM), all three levels, global



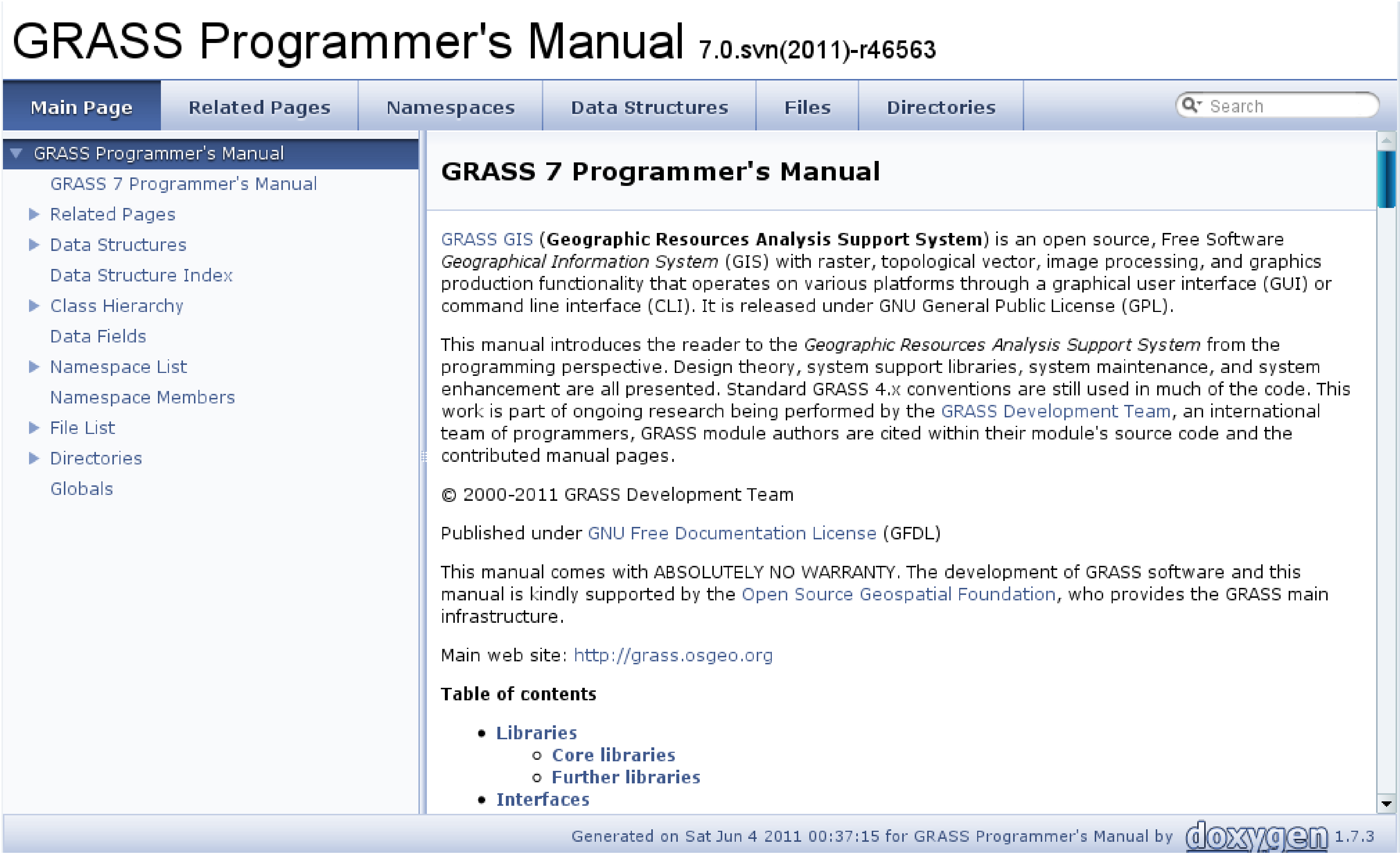
GRASS GIS as Open Source GIS backbone:

Connecting to other software packages

GRASS GIS Architecture



Modular architecture
Task oriented
Integrated with other specialized libraries



http://grass.osgeo.org/programming7/

Doxygen generated programmer's manual

GRASS and Python

Parser part (for GUI autocreation and command line support):

```
#%Module
#% description: Drapes a color raster over a shaded relief map using d.his
#%End
#%option
#% key: reliefmap
#% type: string
#% gisprompt: old,cell,raster
#% description: Name of shaded relief or aspect map
#% required : yes
#%end
#%option
#% key: drapemap
#% type: string
#% gisprompt: old,cell,raster
#% description: Name of raster to drape over relief map
#% required : yes
#%end
```

Script part:

```
import sys
from grass.script import core as grass

def main():
    drape_map = options['drapemap']
    relief_map = options['reliefmap']
    brighten = options['brighten']
    ret = grass.run_command("d.his", h_map = drape_map,  i_map = relief_map, brighten = brighten)
    sys.exit(ret)

if __name__ == "__main__":
    options, flags = grass.parser()
    main()
```

GRASS and Java

Source path: svn/ trunk/ Modules/ Java/ v_sample_rast.java Edit file

```java
/*
 * Program: vtkGRASSBridge
 * COPYRIGHT: (C) 2011 by Soeren Gebbert, soerengebbert@googlemail.com
 *
 * This program is free software; you can redistribute it and/or modify
 * it under the terms of the GNU General Public License as published by
 * the Free Software Foundation; version 2 of the License.
 *
 * This program is distributed in the hope that it will be useful,
 * but WITHOUT ANY WARRANTY; without even the implied warranty of
 * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
 * GNU General Public License for more details.
 */

import vtk.*;

public class v_sample_rast {

    static {
        System.loadLibrary("vtkCommonJava");
        System.loadLibrary("vtkGRASSBridgeIOJava");
        System.loadLibrary("vtkGRASSBridgeRasterJava");
        System.loadLibrary("vtkGRASSBridgeVectorJava");
        System.loadLibrary("vtkGRASSBridgeCommonJava");
    }

    public static void main(String[] args) {
        // Initiate GRASS
```

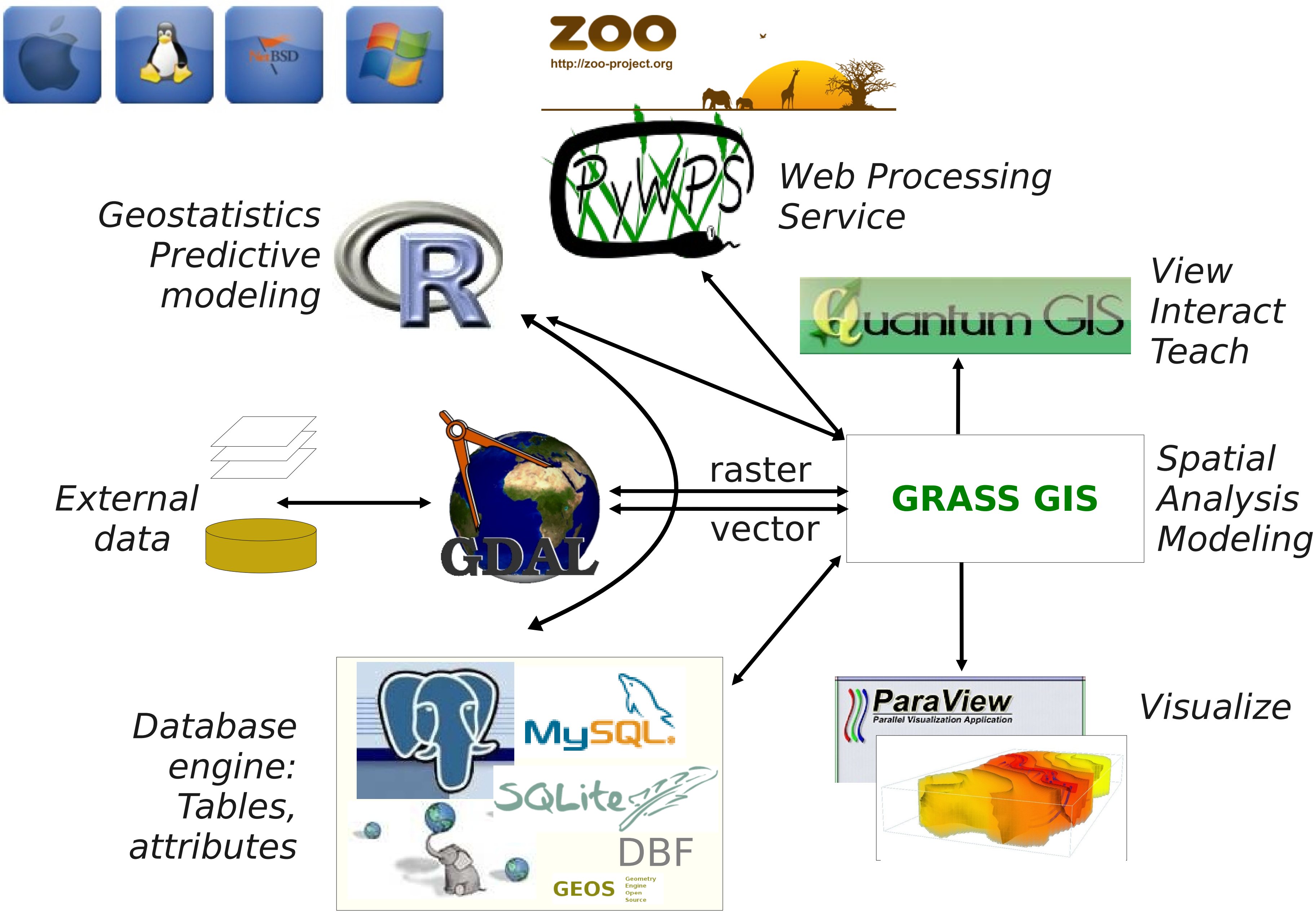
http://code.google.com/p/vtk-grass-bridge/
source/browse/trunk/Modules/Java/v_sample_rast.java

What you can do with Open Source GIS....

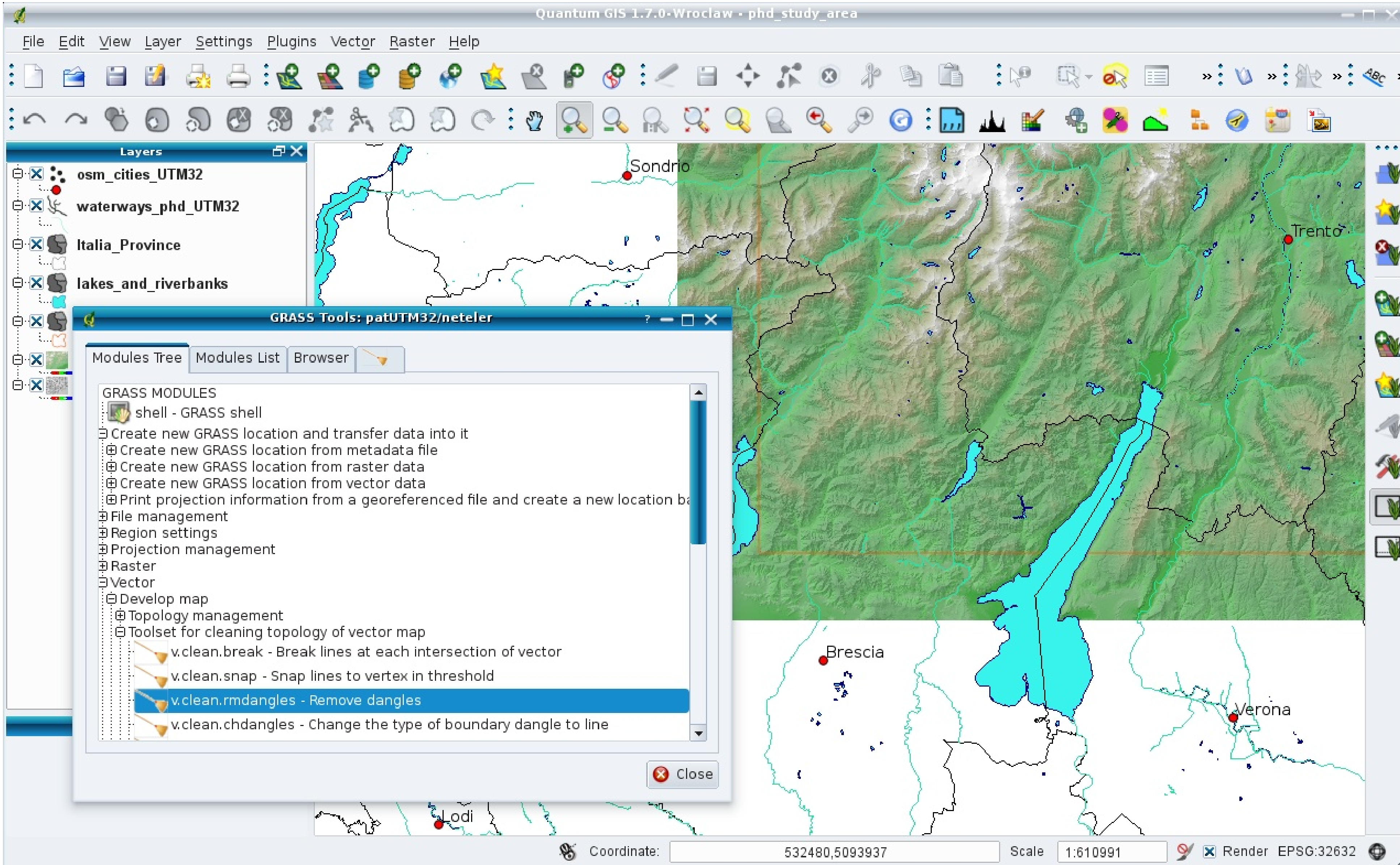
GRASS GIS

Spatial
Analysis
Modeling

What you can do with Open Source GIS....



GRASS and QGIS Integration: Toolbox



http://grass.osgeo.org/wiki/QGIS_GRASS_Cookbook

SEXTANTE – GRASS Integration: How it works

By Victor Olaya

- Each call to a GRASS command is wrapped as a SEXTANTE algorithm
- These calls can be used in any of the graphical components of SEXTANTE
- Each user-seen algorithm involves calling several GRASS commands:
  - Importing data into GRASS into an „on-the-fly“ session
  - Processing of data
  - Exporting and opening results in the GIS app (gvSIG etc)

```
v.edit --interface-description
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE task SYSTEM "grass-interface.dtd">
<task name="v.edit">
        <description>
                Edits a vector map, allows adding, deleting and modifying selected vector features.
        </description>
        <keywords>
                vector, editing, geometry
        </keywords>
        <parameter name="map" type="string" required="yes" multiple="no">
                <description>
                        Name of vector map to edit
                </description>
```

Help

SEXTANTE
- Basic concepts
  - Introduction
  - SEXTANTE toolbox
  - Batch processing
  - Models
  - Command line
  - History
  - Installing grass...
- GRASS
  - Raster (r.*)
  - Vector (v.*)
- Algorithms
  - Basic hydrological analysis
  - Basic tools for raster layers
  - Buffers
  - Calculus tools for raster layer
  - Cost, distances and routes
  - Focal statistics
  - Fuzzy logic
  - Geomorphometry and terrain analysis
  - Geostatistics
  - Image processing
  - Indices and other hydrological parameters
  - Local statistics
  - Location/allocation
  - Pattern analysis
  - Profiles
  - Raster categories analysis
  - Raster creation tools
  - Rasterization and interpolation
  - Raster layer analysis
  - Reclassify raster layers
  - Statistical methods
  - Table tools
  - Tools for line layers
  - Tools for point layers
  - Tools for polygon layers
  - Tools for vector layers
  - Topology
  - Vectorization
  - Vegetation indices
  - Visibility and lighting

SEXTANTE

NAME

v.extrude - Extrudes flat vector object to 3D with defined height.

KEYWORDS

vector, geometry, 3D

SYNOPSIS

v.extrude
v.extrude help
v.extrude [**-t**] **input**=*name* **output**=*name* [**zshift**=*float*] [**elevation**=*name*] [**height**=*float*] [**hcolumn**=*name*] [**type**=*string*[,*string*,...]] [**layer**=*integer*] [**--overwrite**] [**--verbose**] [**--quiet**]

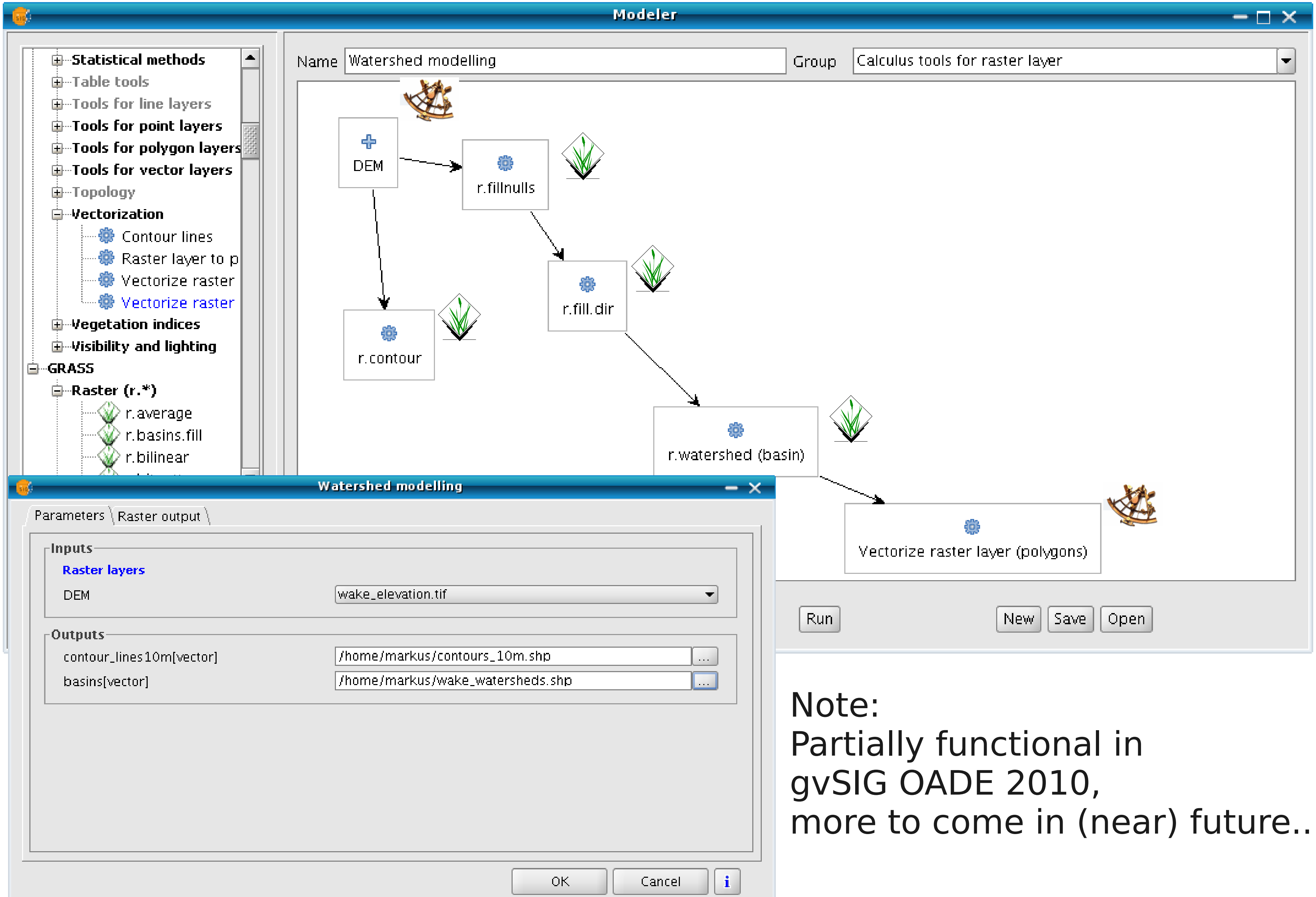
Flags:

-t
  Trace elevation
--overwrite
  Allow output files to overwrite existing files
--verbose
  Verbose module output
--quiet
  Quiet module output

Parameters:

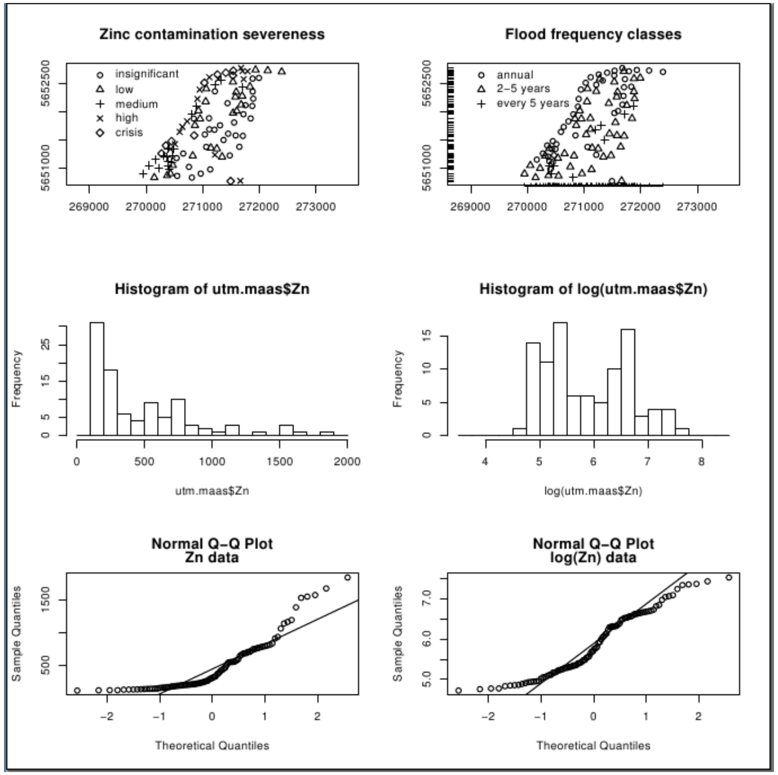
input=*name*
  Name of input 2D vector map
output=*name*
  Name of resulting 3D vector map
zshift=*float*
  Shifting value for z coordinates
  Default: *0*
elevation=*name*
  Elevation raster for height extraction
height=*float*

SEXTANTE – GRASS Integration: Modeller



Note:
Partially functional in
gvSIG OADE 2010,
more to come in (near) future...

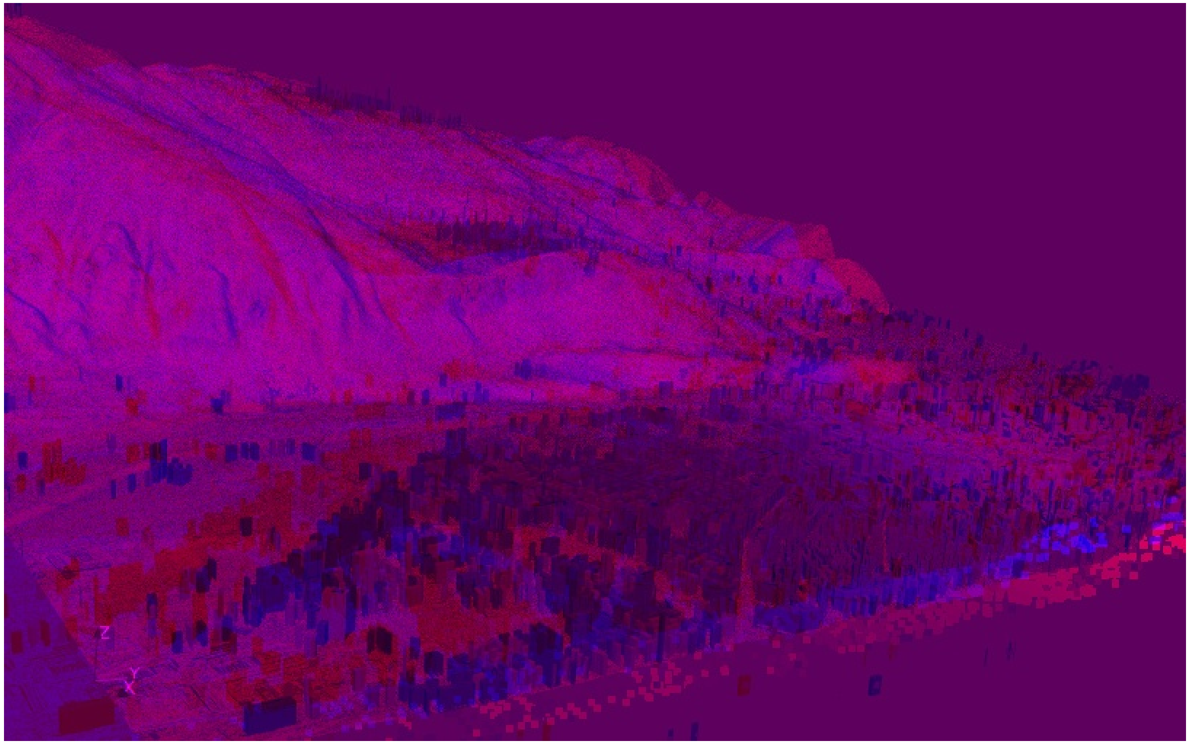
GRASS and R Integration

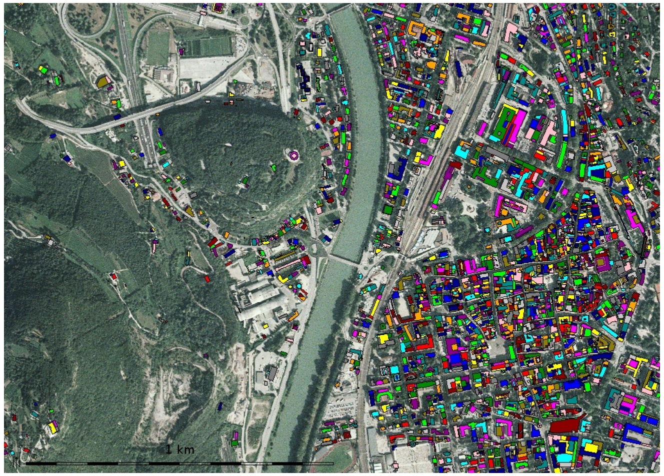



```
GRASS 6.4.2svn (patUTM32):~/papers > R

R version 2.10.0 (2009-10-26)
...

> library(spgrass6)
Loading required package: sp
Loading required package: rgdal
Geospatial Data Abstraction Library
   extensions to R successfully loaded
Loaded GDAL runtime: GDAL 1.7.3, released 2010/11/10
Path to GDAL shared files: /usr/local/share/gdal
Loaded PROJ.4 runtime: Rel. 4.7.1, 23 September 2009
Path to PROJ.4 shared files: (autodetected)
Loading required package: XML
GRASS GIS interface loaded with GRASS version: 6.4.2svn
and location: patUTM32
> myrast <- readRAST6(c("geology", "elevation"), cat=c(TRUE, FALSE))
> myvect <- readVECT6("roads")
...
> writeRAST6(myrast, "elev_filt", zcol="elev")
...
```

http://grass.osgeo.org/wiki/R_statistics

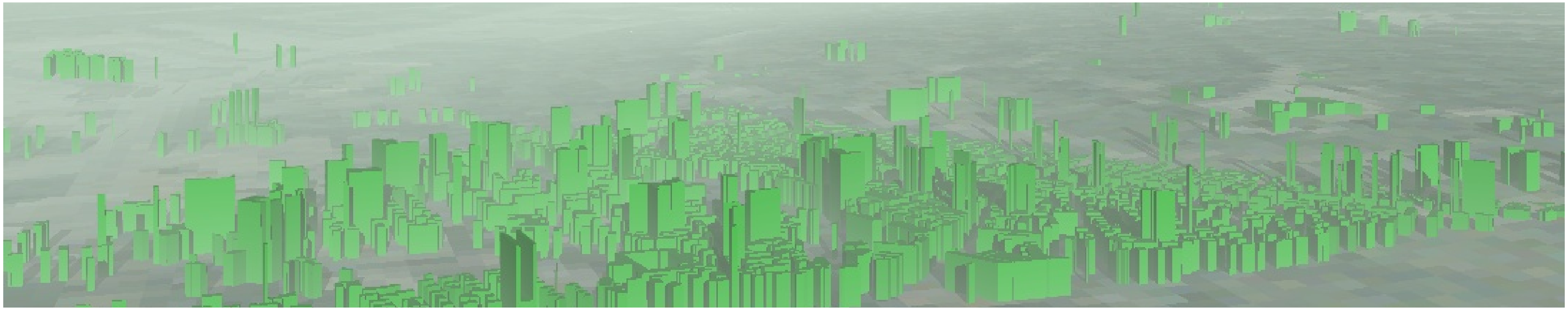
Visualization: GRASS data export to Paraview and Povray





Stereo rendering in
Paraview (www.paraview.org)

Povray rendering (www.povray.org): adding clouds and haze



Furthermore: OpenSceneGraph, Ratman, ...

Web Processing Service – WPS

What is **Web Processing Service** (WPS)?

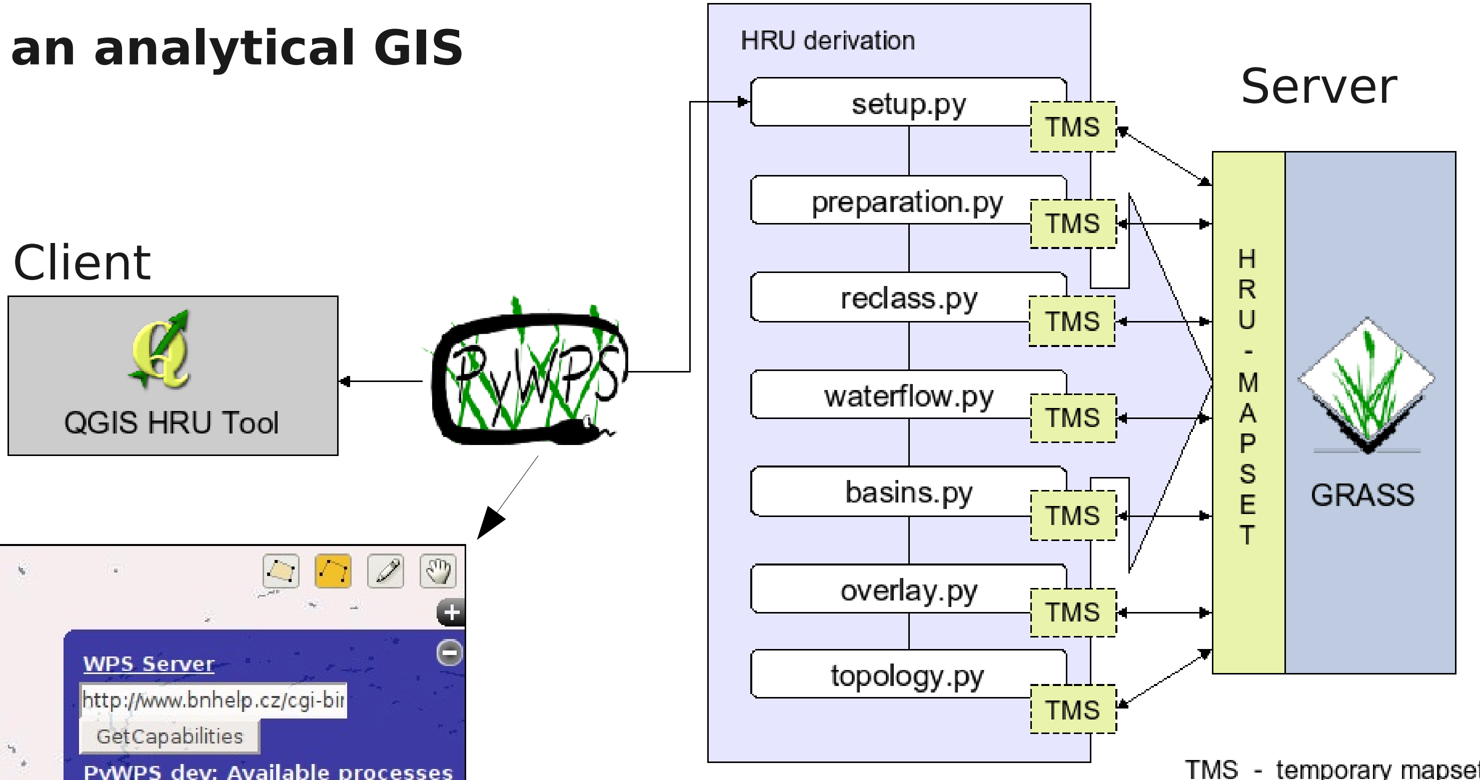
- OGC standard
- useful for creating Web services for invoking geospatial analysis
- Data processing

There are three requests to work with WPS

- GetCapabilities: return description and metadata about the WPS server
- DescribeService: return description and metadata about a single service
- Execute: run the process and return the output of a service

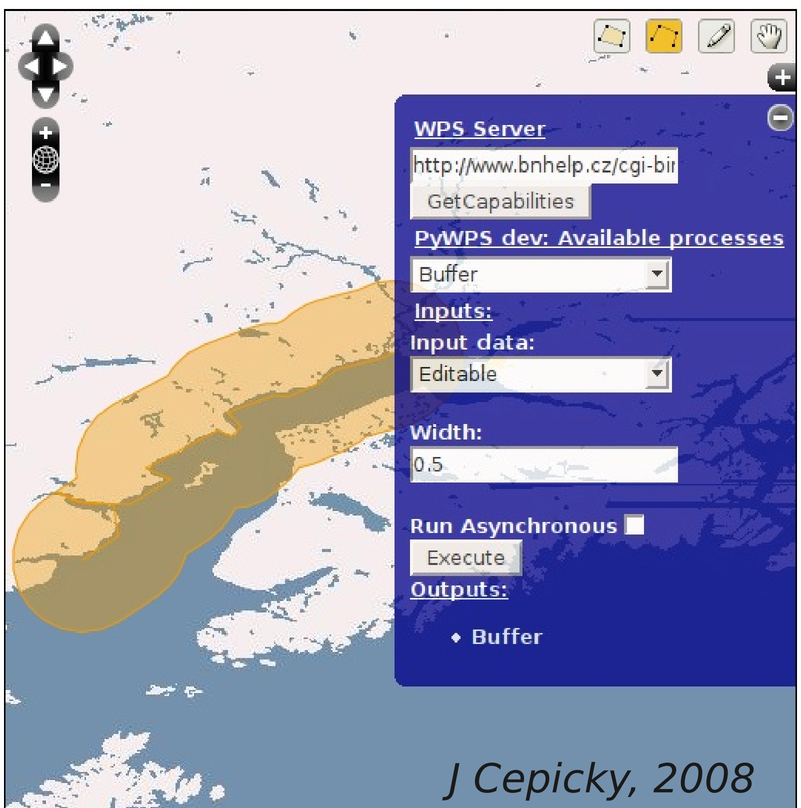
Web Processing Service – WPS

Controlling an analytical GIS from Web



Ch. Schwartze, Geoinformatics FCE CTU 2008

Web



Current Server implementations

- PyWPS: Python
- 52N WPS: Java
- vtkGRASSBridge: VTK, C, C++, Py, Java
- ZOO project - various languages
- ...

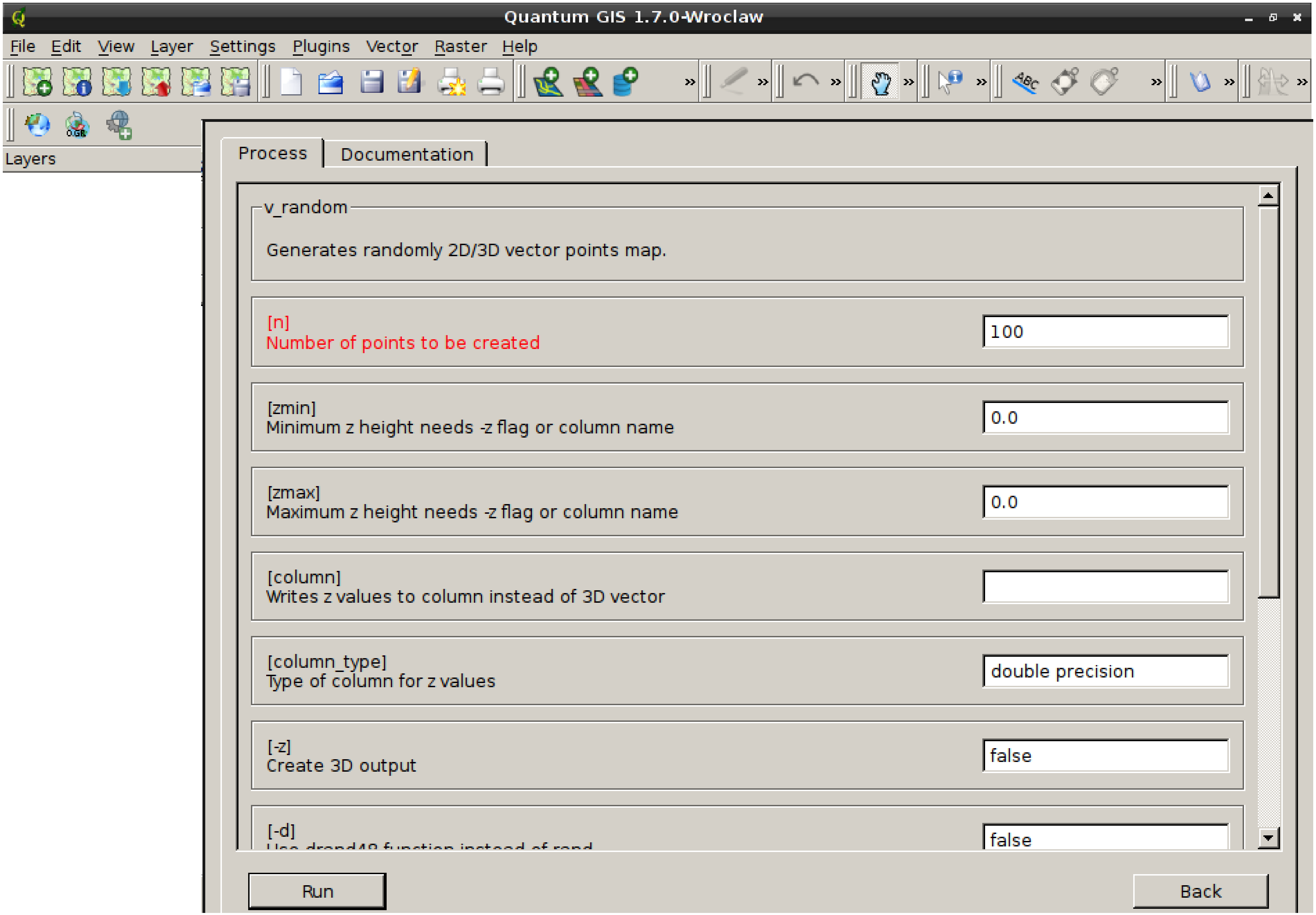
http://grass.osgeo.org/wiki/WPS

GRASS 7 WPS Support

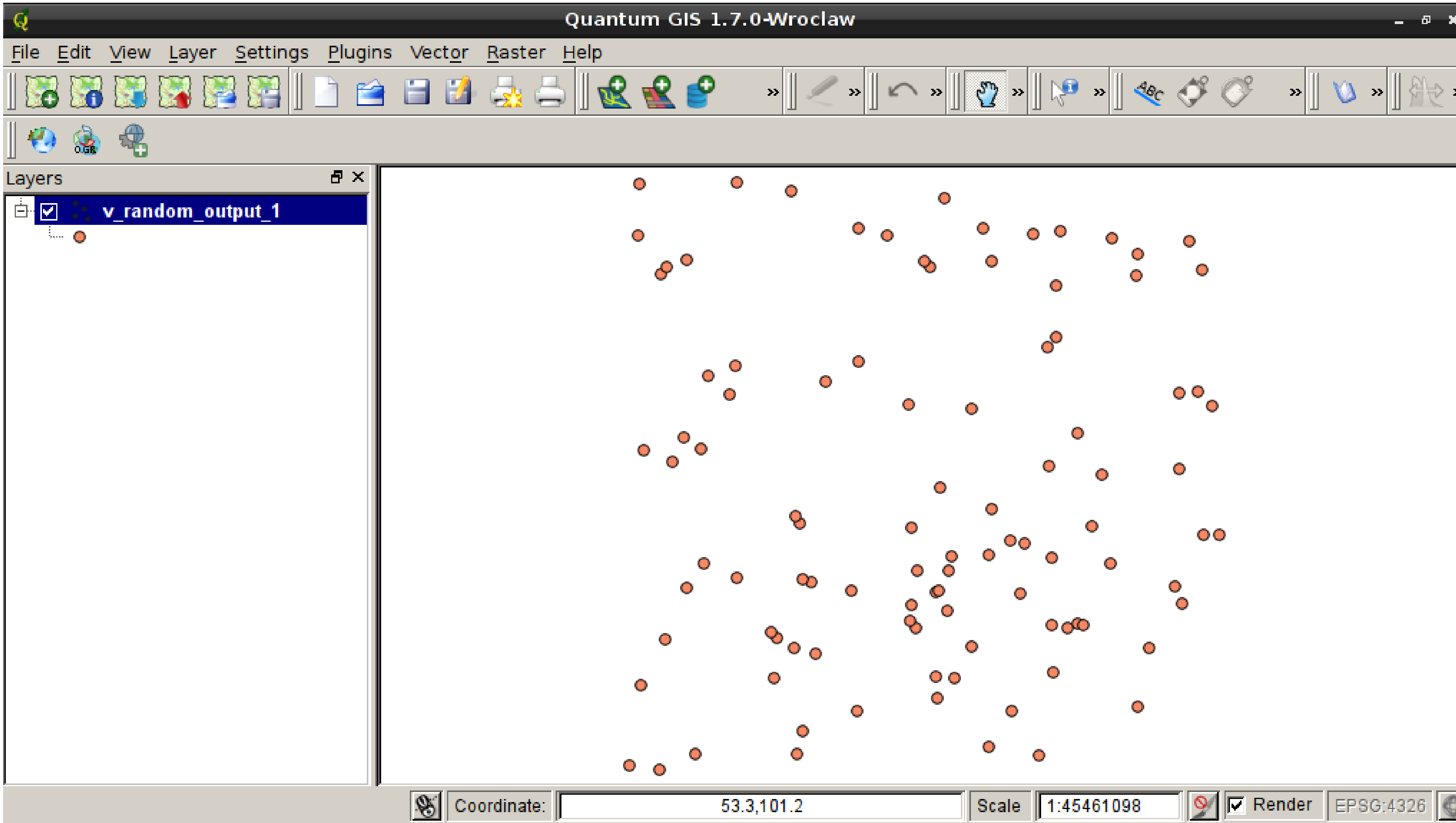
```
r.grow --wps-process-description
```


```
<?xml version="1.0" encoding="UTF-8"?>
<wps:ProcessDescriptions xmlns:wps="http://www.opengis.net/wps/1.0.0"
xmlns:ows="http://www.opengis.net/ows/1.1"
xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.opengis.net/wps/1.0.0
 http://schemas.opengis.net/wps/1.0.0/wpsDescribeProcess_response.xsd"
 service="WPS" version="1.0.0" xml:lang="en-US">
        <ProcessDescription wps:processVersion="1" storeSupported="true" statusSupported="true">
                <ows:Identifier>r.grow</ows:Identifier>
                <ows:Title>Generates a raster map layer with contiguous areas grown by one cell.</ows:Title>
                <ows:Abstract>The manual page of this module is available here: http://grass.osgeo.org/grass70/manuals/html70_use
                <ows:Metadata xlink:title="raster" />
                <DataInputs>
                        <Input minOccurs="1" maxOccurs="1">
                                <ows:Identifier>input</ows:Identifier>
                                <ows:Title>Name of input raster map</ows:Title>
                                <ComplexData maximumMegabytes="2048">
                                        <Default>
                                                <Format>
                                                        <MimeType>image/tiff</MimeType>
                                                </Format>
                                        </Default>
                                        <Supported>
                                                <Format>
                                                        <MimeType>image/tiff</MimeType>
                                                </Format>
                                                <Format>
                                                        <MimeType>image/geotiff</MimeType>
                                                </Format>
                                                <Format>
                                                        <MimeType>application/geotiff</MimeType>
```

ZOO-GRASS WPS Server – QGIS WPS Client



ZOO-GRASS WPS Server – QGIS WPS Client



A gentle introduction to OSGeo:

Open Source Geospatial Foundation

Open Source GIS brought to you by...

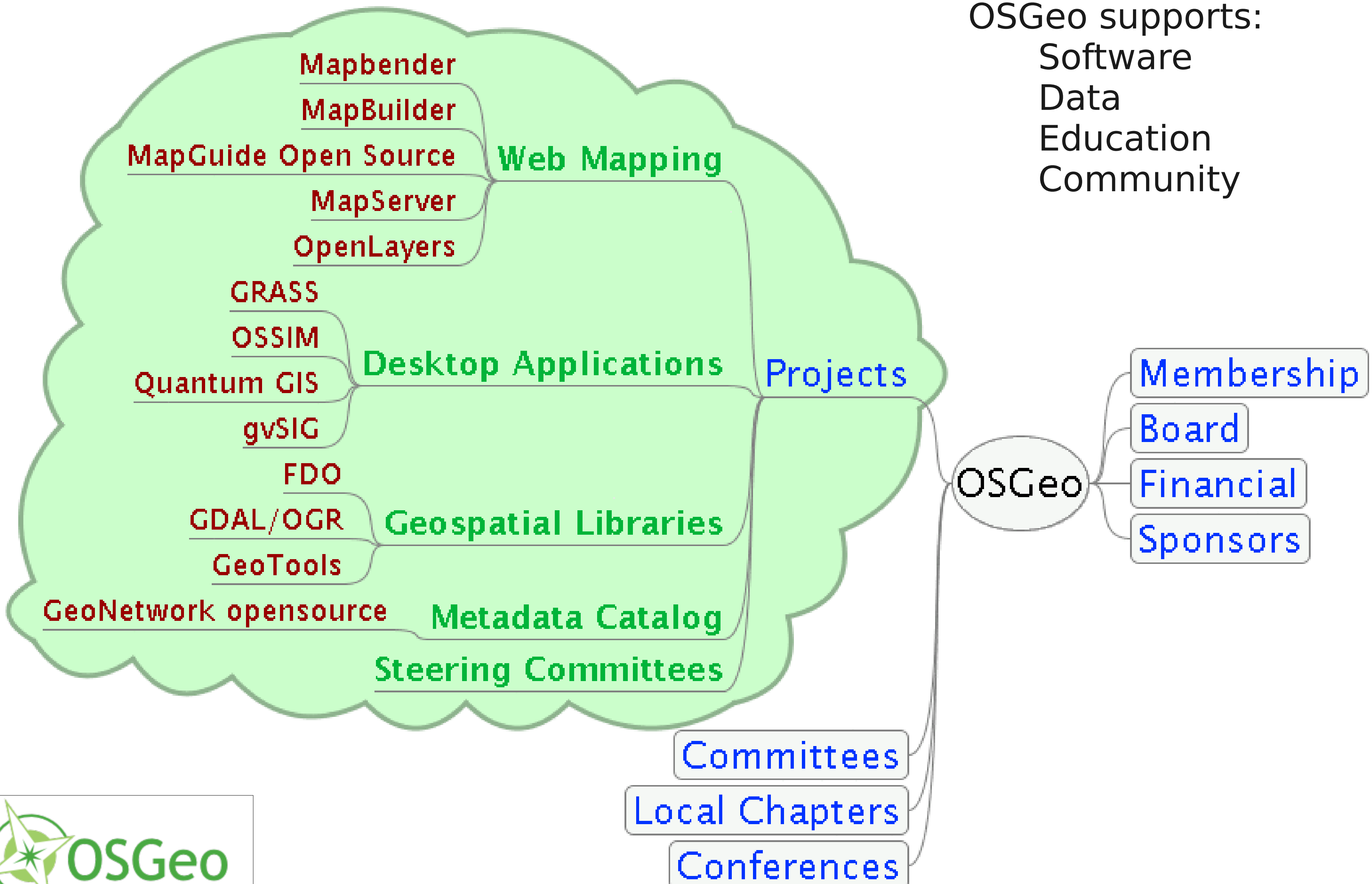
... **the OSGeo community**: more than 17,000 unique subscribers in 150 topic oriented mailing lists

Open Source Geospatial Foundation

http://www.osgeo.org

OSGeo supports:

- Software
- Data
- Education
- Community



FOSS4G answers to proprietary software

Proprietary vs Open Source/Free Software		
Component	**Proprietary**	**Open Source**
Metadata Catalog	CubeWerx WRS	GeoNetwork
Dedicated Viewer	ArcReader	gvSIG, QGIS, uDig
Cartography	ArcMap/ArcGIS	GMT, GRASS, JGRASS
Analysis	ArcINFO/ArcGIS, ERDAS, ENVI	GRASS, OSSIM, SAGA, ILWIS
Handheld	ArcPad	gvSIG mobile
Web Viewer	ArcIMS	Openlayers, Mapbuilder, Mapbender, Mapfish
WMS, WFS	ArcIMS	Mapserver, Geoserver, Mapguide OS
Spatial Database	Oracle Spatial, ArcSDE	PostGIS, (MySQL, SQLite)
Virtual Globe	Google Earth, Virtual Earth	OSSIM Planet, NASA WorldWind, Ratman
Libraries	FME	GDAL, FDO

For a more detailed comparison, see e.g., http://www.spatialserver.net/osgis/

Community: recruiting new developers through incentives

Payment: 5000 USD per student (3 months of time)

http://wiki.osgeo.org/wiki/Google_Summer_of_Code_2011

google-summer-of-code-2008-osgeo

Code samples from students working with OSGeo - Open Source Geospatial Foundation for Google Summer of Code 2008.

Search projects

Project Home | Downloads | Wiki | Issues | Source

Search Current downloads for Search

1 - 13 of 13

Filename	Summary + Labels	Uploaded	Size	DownloadCount
Christopher_DeMars.tar.gz	Christopher DeMars' code for OpenJUMP	Sep 2008	4.0 MB	48
Martin_Pavlovsky.tar.gz	Reimplementation of v.voronoi and v.delaunay modules in the Vector library of GRASS GIS using more efficient algorithms	Sep 2008	13.9 KB	39
Etienne_Dube.tar.gz	Spatialytics - Geo-BI dashboards	Sep 2008	11.3 MB	77
RosenIvanov_Matev.tar	Buffer Generation Module in GRASS	Sep 2008	196 KB	11
Martin_Landa.tar.gz	2.5/3D visualization tool for wxPython GRASS GUI	Sep 2008	497 KB	32
marius_suta.tar.gz	GeoWebCache Improvements - REST API	Sep 2008	335 KB	50
Erik_Hazzard.tar.gz	OLArchitect : OpenLayers web based map creation toolkit	Sep 2008	476 KB	64
Christian_Mueller.tar.gz	Image mosacing/pyramidal geotools plugin	Sep 2008	623 KB	53
Petr_Pridal.tar.gz	GDAL2Tiles Improvement	Sep 2008	836 KB	49
josef_bezdek.tar	uDig - Digital Elevation Model	Sep 2008	8.6 MB	15
Anne_Ghisla.tar.gz	Home-range analyses in QGIS using R through Python	Sep 2008	90.5 KB	39
len_kne.tar	Mapbender Administration Modules	Sep 2008	30.5 KB	3
SiddharthPrakash_Singh.tar.gz	Automated Update Routine for Mapbender Featured	Sep 2008	16.5 KB	79

1 - 13 of 13

http://code.google.com/p/google-summer-of-code-2008-osgeo/

OSGeo Geodata Committee & Data

Go to OSGeo Main site

Neteler | my talk | my preferences | my watchlist | my contributions | log out

page | discussion | edit | history | delete | move | protect | watch | refresh | latex/pdf

OSGeo

navigation

- Main Page
- Community portal
- Current events
- Recent changes
- Random page
- Help

search

Geodata Repository

The notes on the Talk:Geodata_Repository Talk page for this page describe the background to this effort

A full list of suggestions for public domain data sets that are nice-to-haves is maintained at Geodata Discovery Working Group.

Contents [hide]

On Offer ! [edit]

Short explanation of available datasets (to be extended - the number of datasets as well as their explanation ;-):

Name	Description	# of layers
VMap0	Selected subsets of Vector Smart Map Level 0 polygons, lines and points, starting with a selection that has proven to be useful for creating FlightGear Scenery from it. Added a 'geonameid' column for joining urban areas with GeoNames (see below). Current details explained at the World Custom Scenery Project, will get synced some day.	33 (DETAIL)
VMap1	First attempt of a selection that would be "nice to have" for FlightGear from Vector Smart Map Level 1 - and certainly for other purposes as well. Added a 'geonameid' column for joining urban areas with GeoNames. Details similar to VMap0.	58 (DETAIL)
AptNav	Geometric average of runway center locations plus runway/taxiway shapes as used by the FlightGear and X-Plane flight simulators; data taken from Robin Peel's Airport Database. Locations converted to OGC-style POINT geometries. Use 'icao' column for searching. • This import is currently tied to the state of the FlightGear 1.0.0 Base Package release.	1 (DETAIL)
GSHHS	Global Self-consistent, Hierarchical, High-resolution Shoreline Database 1.6 shorelines.	4 (DETAIL)
PGS	NGA Prototype Global Shoreline.	1 (DETAIL)
SWBD	SRTMv2 Water Body Data.	1 (DETAIL)

http://wiki.osgeo.org/wiki/Geodata_Repository

OSGeo Education: Courses Gallery
“enable people to teach“

http://www.osgeo.org/educational_content

2011: 60 Tutorials and courses

OSGeo Foundation

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OSGeo Community

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- Member Area
- News
- Events
- Wiki
- Mailing Lists
- Blogs
- Books
- IRC
- Service Providers
- Journal
- Sol Katz Award
- Local Chapters
- Spotlights
- Gallery

Language

- English
- Български
- 简体中文
- Deutsch
- Nederlands
- Français

OSGeo Educational Content Inventory

Search the listing by entering filter criteria. Click here to Reset your criteria.
Add your own course material here or monitor content using this RSS feed.

Title	Software	Language	Keyword	
		<All> Abkhazian Afar Afrikaans Akan Albanian Amharic Arabic		Submit

Title		Author(s)	Date added
Using GDAL – Geospatial Data Abstraction Library – from a high-level programming language Perl	Materials for a workshop that was held in OSGIS 2009 UK. Contains a hand-out, slides, and data.	Ari Jolma	2009-06-29 07:37
SigLibres - French-language moodle course site on FOSSGIS	Eclectic, and sometimes only in draft state, collection of French-language training material on FOSSGIS developed for a local training course, mostly using GRASS.	Moritz Lennert	2009-05-18 07:25
Руководство пользователя gvSIG 1.1	Перевод официального руководства gvSIG 1.1	GIS-Lab.info (see link for full list)	2009-04-20 23:33
Начало работы с GeoServer	Описание начала работы с GeoServer, использующее материалы с официального сайта	Dmitry Kolesov	2009-04-20 23:30

OSGeo Projects

Web Mapping
- deegree
- Mapbender
- MapBuilder
- MapGuide Open Source
- MapServer
- OpenLayers

Desktop Applications
- GRASS GIS
- OSSIM
- Quantum GIS
- gvSIG

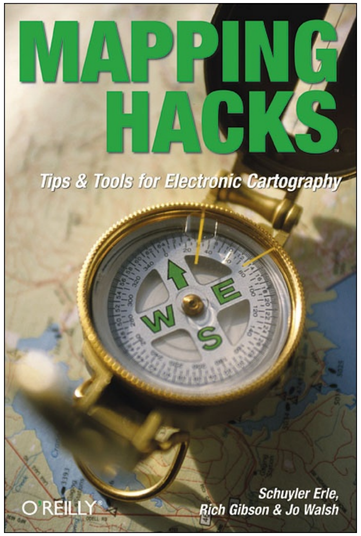
Geospatial Libraries
- FDO
- GDAL/OGR
- GEOS
- GeoTools
- MetaCRS

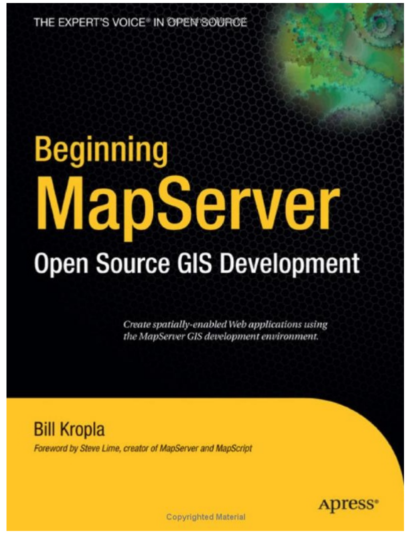
Metadata Catalog
- GeoNetwork

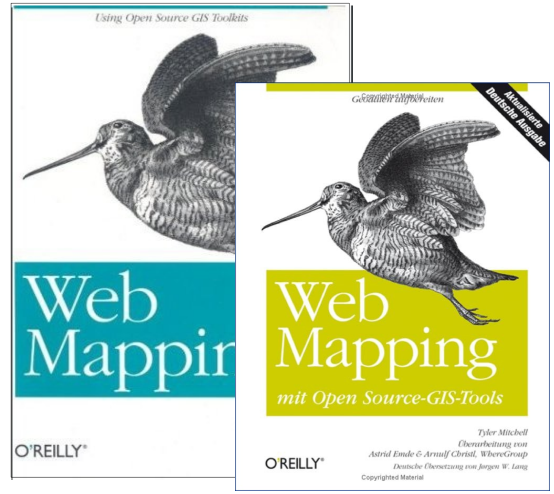
FOSS4G bookshelf: read more!

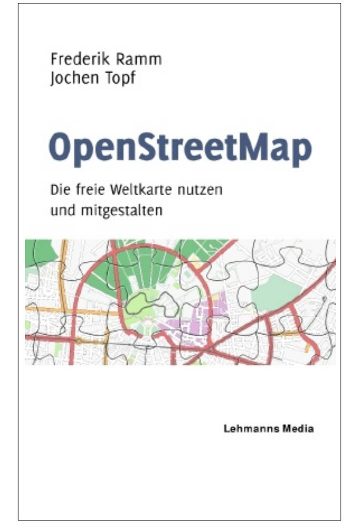
2005

http://wiki.osgeo.org/wiki/Library



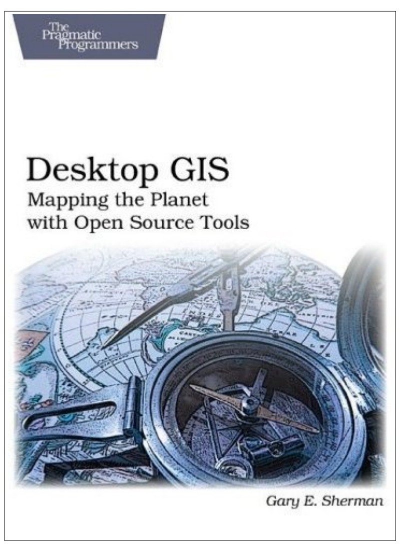




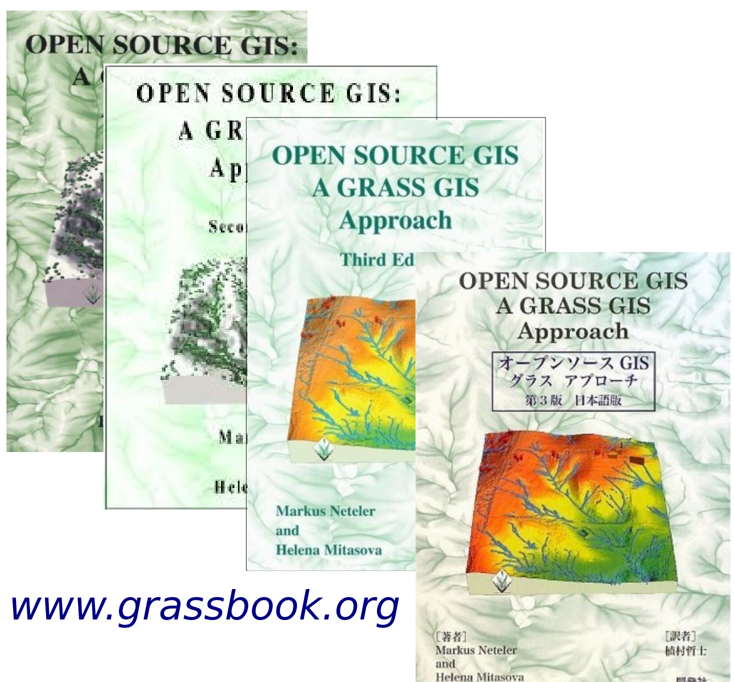


www.mappinghacks.com

www.spatialguru.com



2008

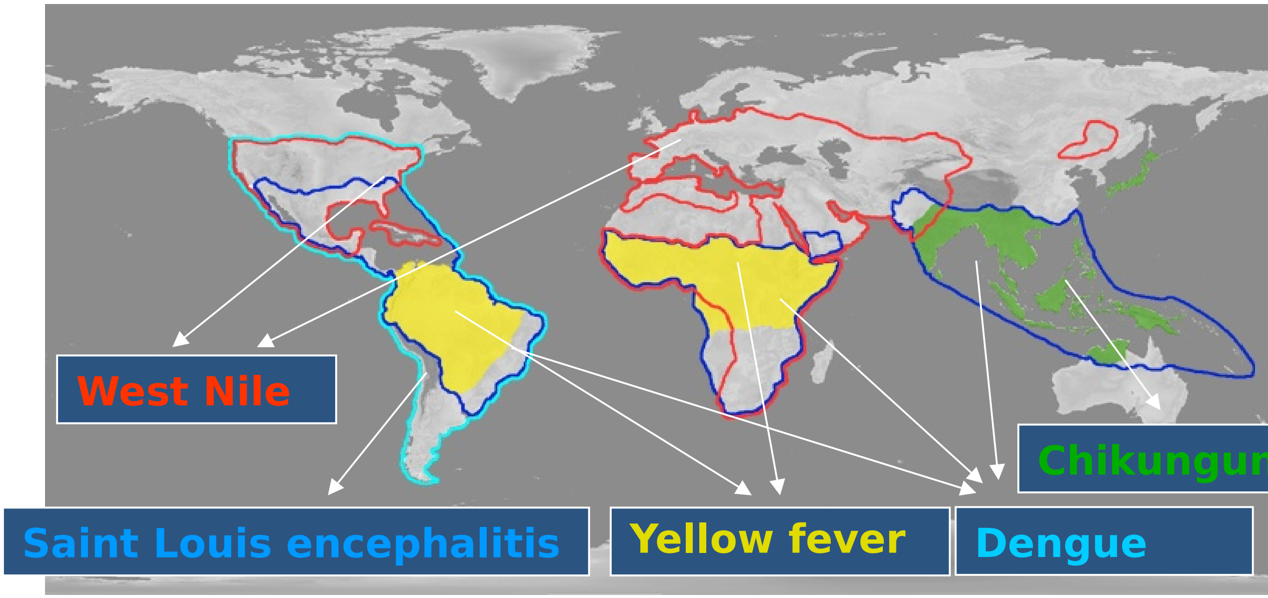


www.grassbook.org

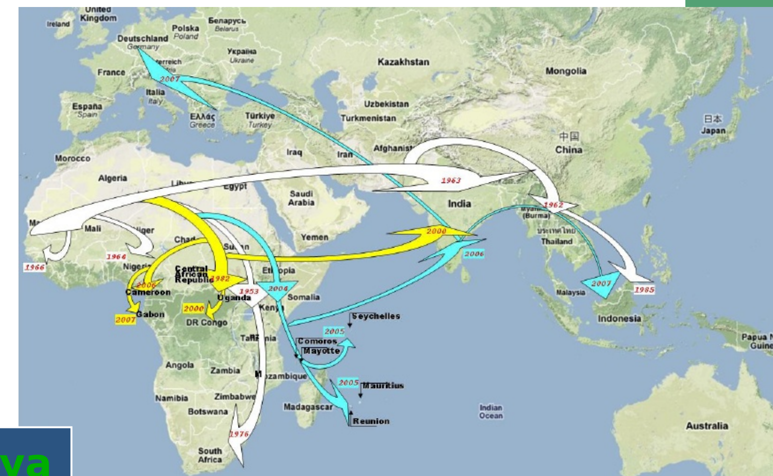
2009

GRASS GIS applications in public health and eco-epidemiology

Spread of the tiger mosquito (*Aedes albopictus*): infectious disease vector

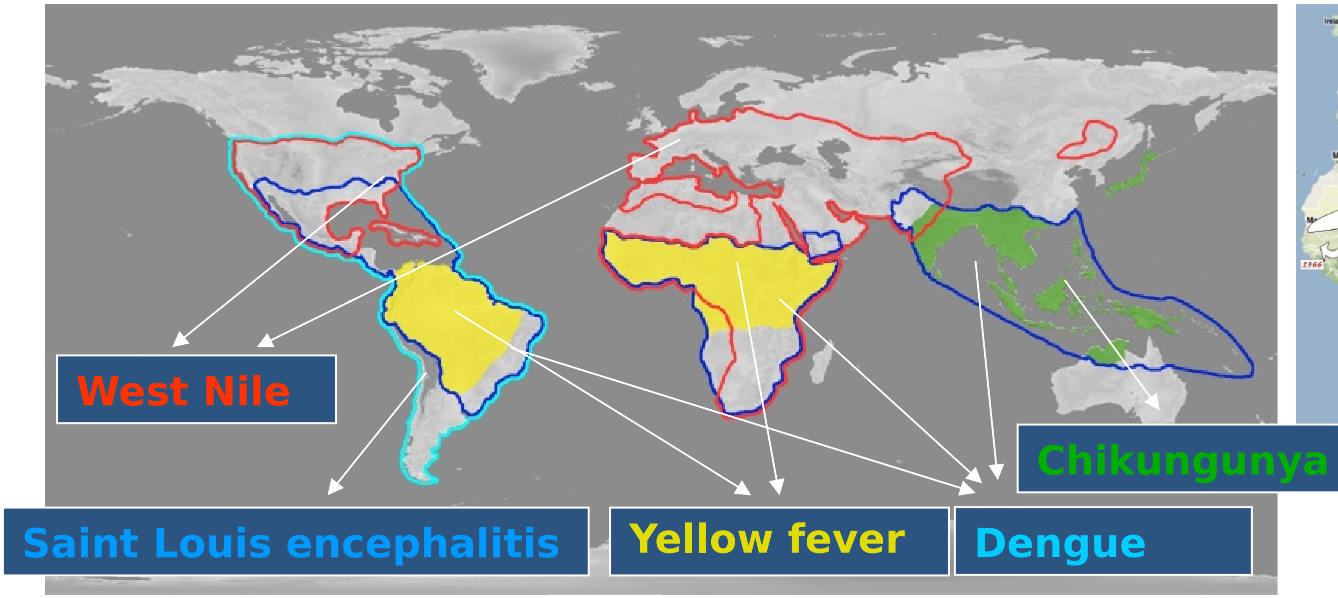


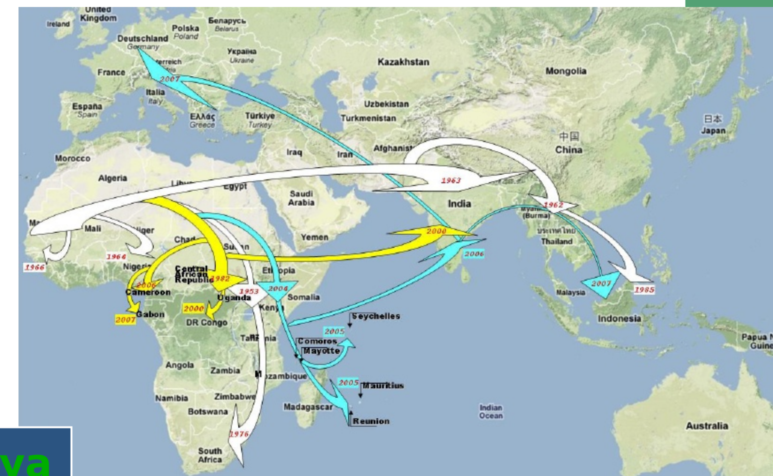
Roiz 2009



De Llamballerie et al., 2008: Chikungunya

Spread of the tiger mosquito (*Aedes albopictus*): infectious disease vector





De Llamballerie et al., 2008: Chikungunya

Roiz 2009

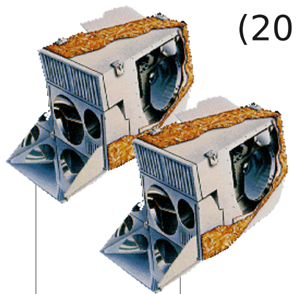
- Tiger mosquito: Disease vector
- Spreads in Europe and elsewhere
- Small containers, used tires and lucky bamboo plants are relevant breeding sites
- >200 cases of Chikungunya in northern Italy in 2007 (CHIKv imported by India traveler and was then spread by *Ae. Albopictus*)

LST Applications: Tiger mosquito survival

***Aedes albopictus* survival maps from reconstructed Daily MODIS Land Surface Temperature maps**

Terra-MODIS LST
(2000-today)

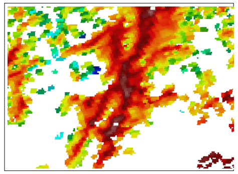
Aqua-MODIS
LST
(2002-today)

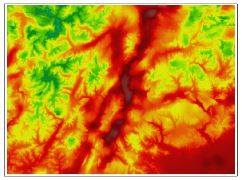


GIS based
MODIS LST
reconstruction

Daily LST maps

01:30
10:30
13:30
22:30
solar
time





GIS based map analysis

January temperature thresholds (2001-2009)

Annual temperature thresholds (2001..2009)

Growing Degree Days (2003..2009)

Neteler, Roiz, Castellani, Rizzoli, in review.

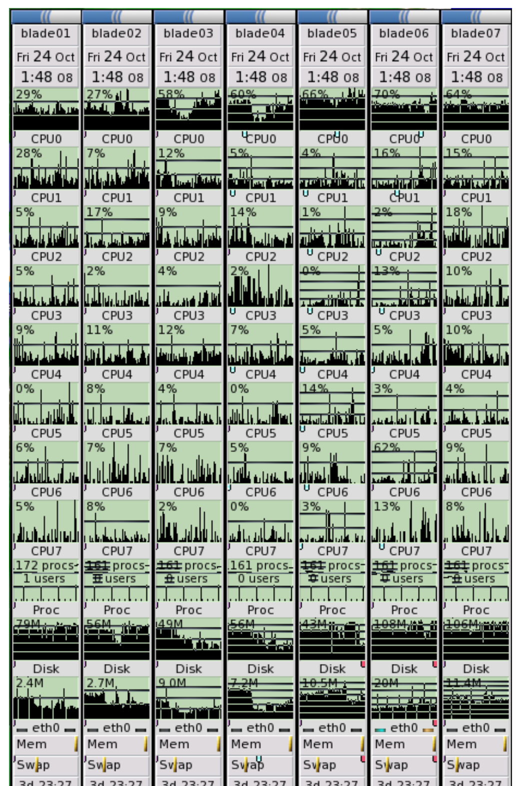
Parallelised GIS Processing

Infrastructure: FEM-GIS Cluster

- 12 single-blades and 2 double-blades
- In total 300 nodes with 600 Gb RAM
- Circa 2 Tflops/s
- Linux operating system, blades headless

- **GRASS GIS and R-stats**
- Queue system for job management (Grid Engine)

- Processing of all 11,000 maps in parallel: one map per node
- Computational time: 3 weeks with LST-algorithm V1.1



LST Applications: Tiger mosquito survival today...

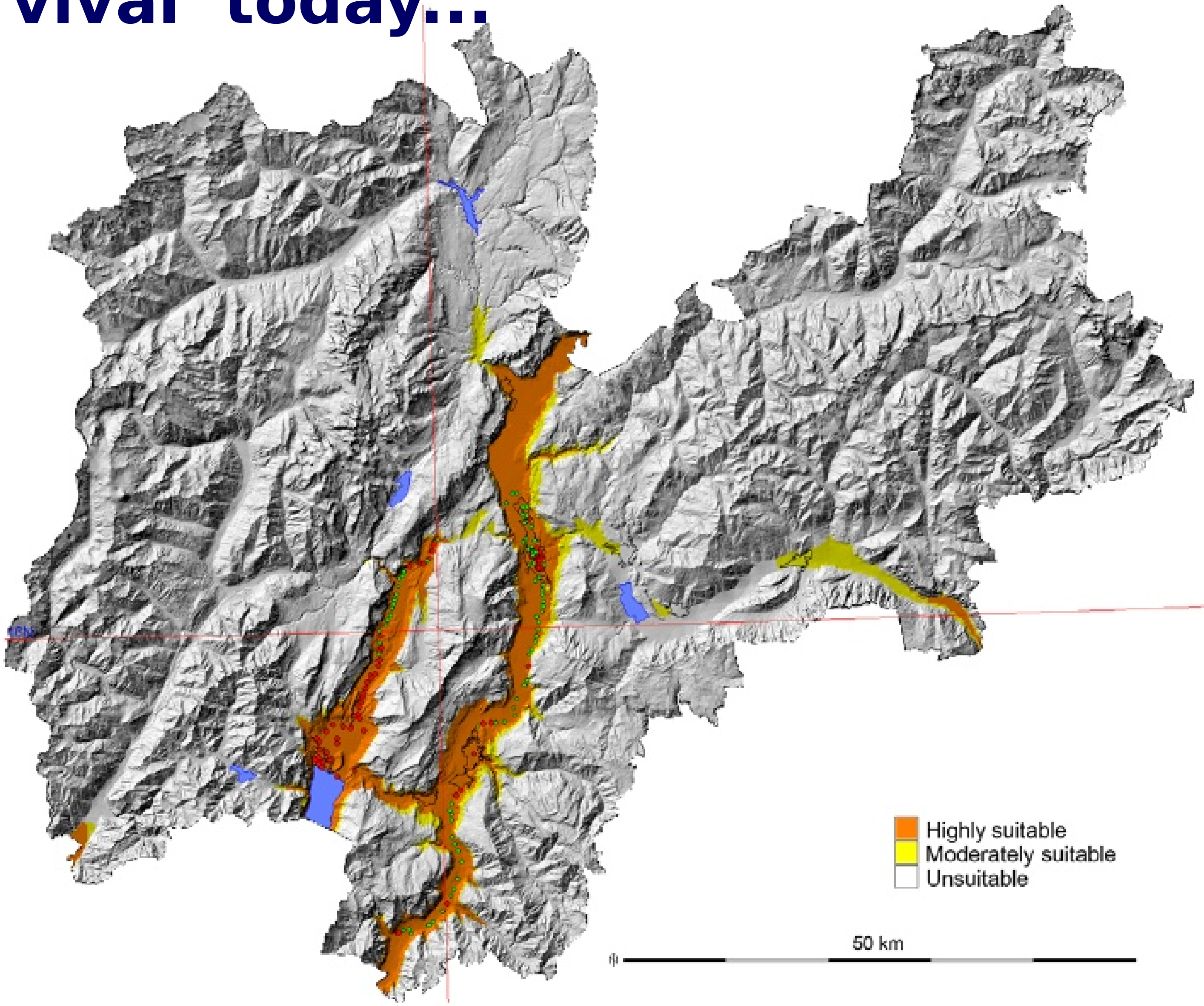


Figure 3. Potential and current distributional areas of *Ae. albopictus*. Overlap of both indicators (JanT^{mean} LST$>=0°C$ and AnnT^{mean} LST $>=11°C$) were plotted for the period 2001–09 and integrated in a final map with 3 categories (see methods). Red spots represent the presence and green spots the absence of *Ae. albopictus*.

Roiz D., Neteler M., Castellani C., Arnoldi D., Rizzoli A., 2011: Climatic Factors Driving Invasion of the Tiger Mosquito (Aedes albopictus) into New Areas of Trentino, Northern Italy. PLoS ONE. 6(4): e14800

LST Applications: Tiger mosquito survival today...

LST Applications: Tiger mosquito survival in 2050 (A2 scenario)

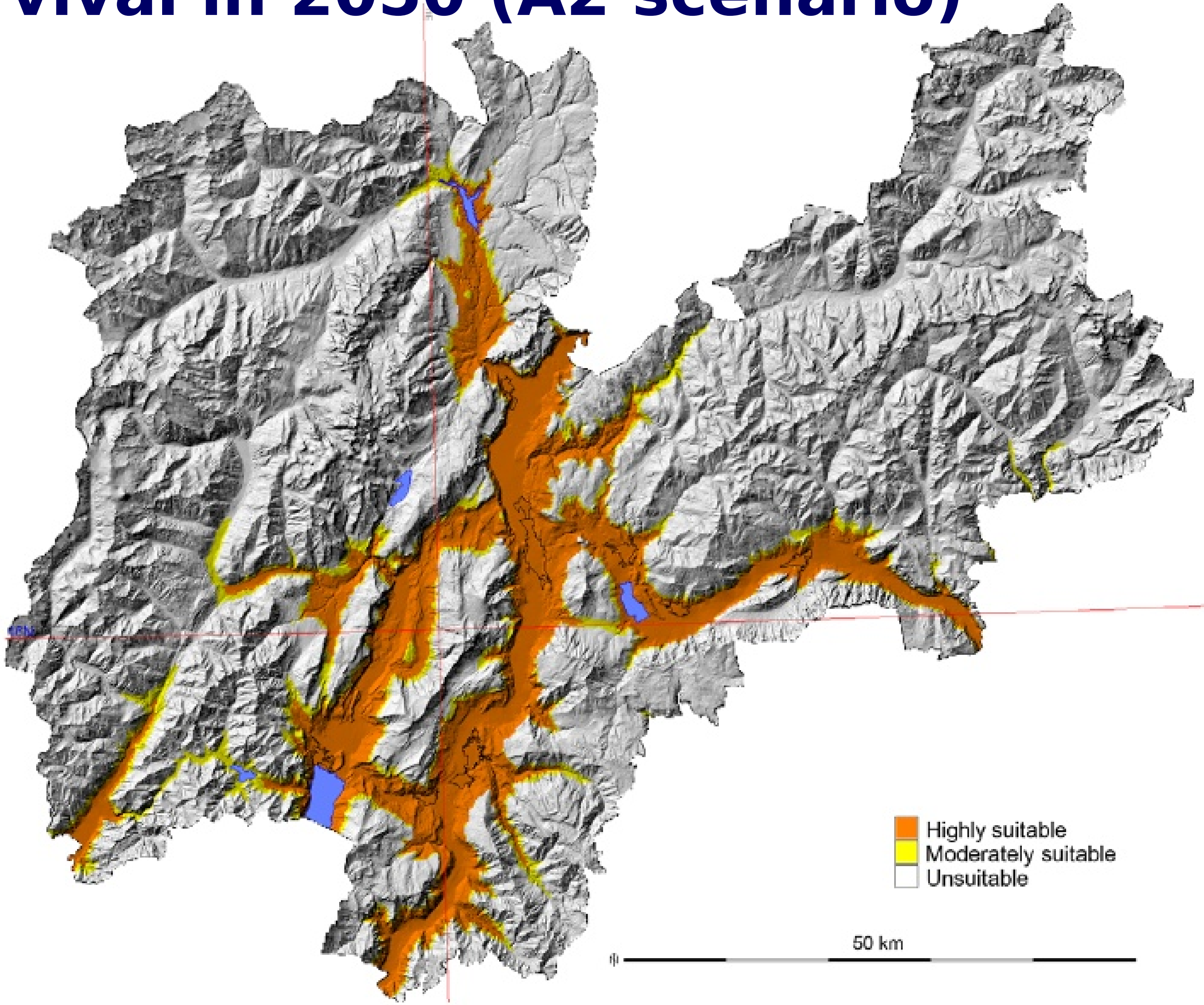
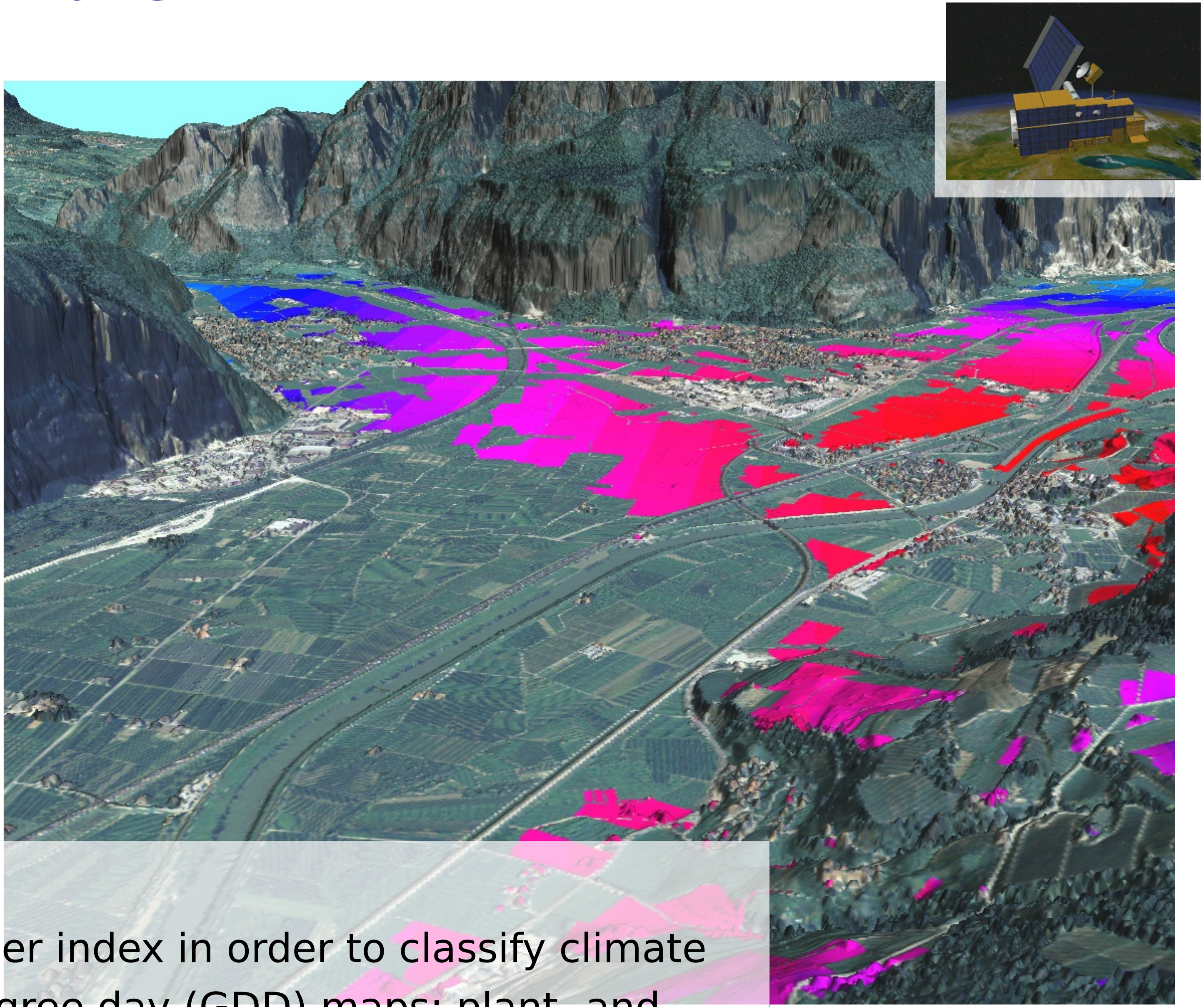


Figure 4. Potential distribution ***of Ae. albopictus*** **in an A2 scenario for 2050 (see text).** Overlap of both indicators (JanT^{mean} LST +1.5°C and AnnT^{mean} LST +1°C) were plotted for the study period and integrated in a final map with 3 categories (see methods).
doi:10.1371/journal.pone.0014800.g004

Roiz D., Neteler M., Castellani C., Arnoldi D., Rizzoli A., 2011: Climatic Factors Driving Invasion of the Tiger Mosquito (Aedes albopictus) into New Areas of Trentino, Northern Italy. PLoS ONE. 6(4): e14800

Further MODIS LST Applications in Agriculture



Agriculture:

- Wine: Winkler index in order to classify climate
- Growing degree day (GDD) maps: plant- and insect phenology

Conclusions

- Almost unlimited possibilities with GRASS and other FOSS4G software thanks to rich interfaces
- User levels: from newcomers to power users
- Interoperability with other software packages, also in heterogeneous environments
- Software Quality: peer reviewed code, often with academic background
- GRASS GIS: ready for massive raster/vector data processing

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