

GSA-5859

SISTEMAS DE INFORMAÇÃO GEOGRÁFICA EM SOFTWARE LIVRE

CARLOS HENRIQUE GROHMANN

INSTITUTO DE ENERGIA E AMBIENTE - USP

GRASS

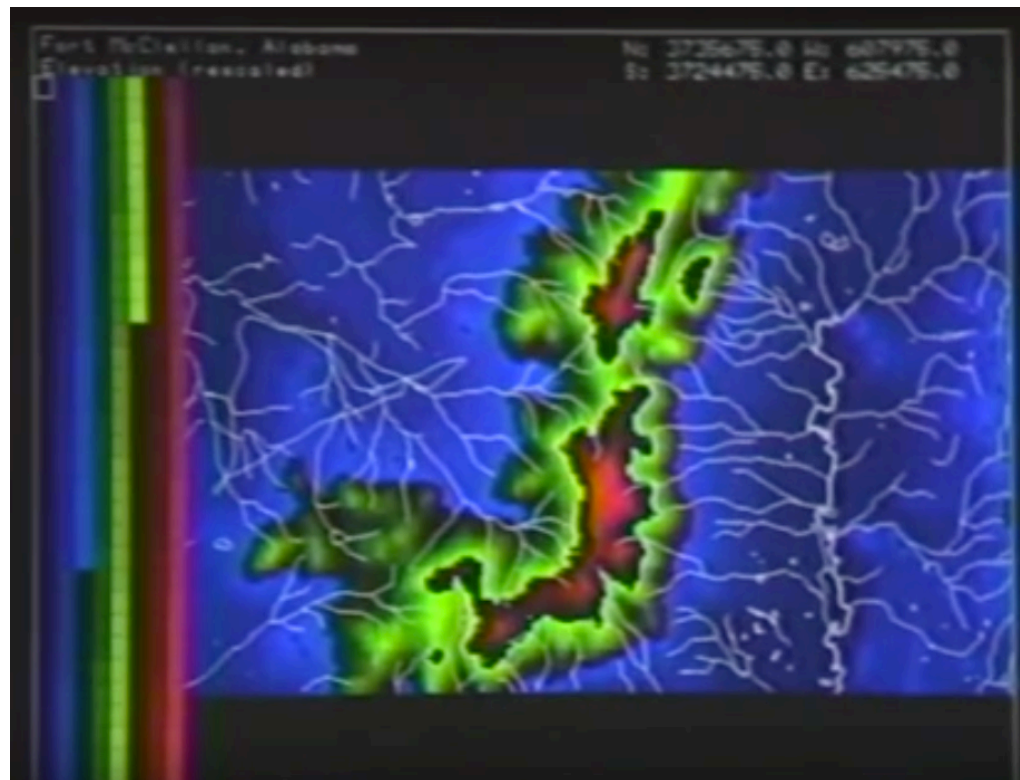
GRASS – HISTÓRICO

- ▶ Geographic Resources Analysis Support System
- ▶ 1982 Fort Hood Information System (FHIS) (Vax11/780)
- ▶ 1983 Installation Geographic Information System (IGIS) (SUN-1)
- ▶ 1984 GRASS (SUN-1 and Masscomp)
- ▶ 1985 GRASS 1.0
- ▶ 1987 GRASS 2.0
- ▶ 1988 GRASS 3.0
- ▶ 1991 GRASS 4.0
- ▶ 1997 GRASS 4.2 Baylor University
- ▶ 1998 GRASS 4.2.1 Markus Neteler, University of Hannover, Germany
- ▶ 1999 GRASS 5.0 Baylor University and Markus Neteler

GRASS – HISTÓRICO

- ▶ 2001 The GRASS Development Team
- ▶ 2002 GRASS 5.0 stable
- ▶ 2004 GRASS 5.4.0
- ▶ 2005 GRASS 6.0
- ▶ 2006 GRASS 6.1
- ▶ 2006/7 GRASS 6.2
- ▶ 2007/8 GRASS 6.3
- ▶ 2008 GRASS 6.4 (+ WinGRASS)
- ▶ 2012 GRASS 6.4.2
- ▶ GRASS 6.5 - bugfix + testing
- ▶ GRASS 7.0 - new stuff

GRASS – HISTÓRICO – VERSÃO 2.0



PLEASE SET GIS SESSION INFORMATION

LOCATION: This is the name of an available geographic location. -spearfish- is the sample data base for which all tutorials are written.

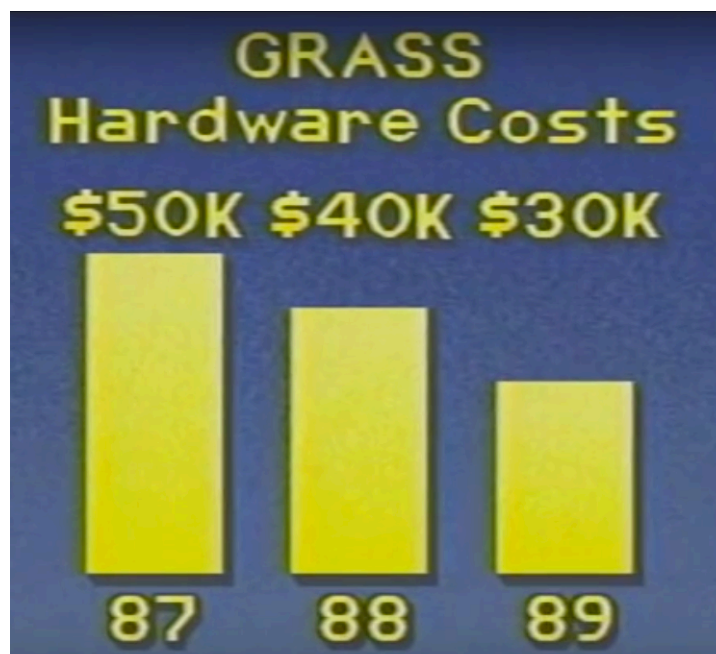
MAPSET: Every GIS session runs under the name of a MAPSET. Associated with each MAPSET is a rectangular COORDINATE WINDOW and a list of any new maps created.

The WINDOW defaults to the entire area of the chosen LOCATION. You may change it later with the command: window

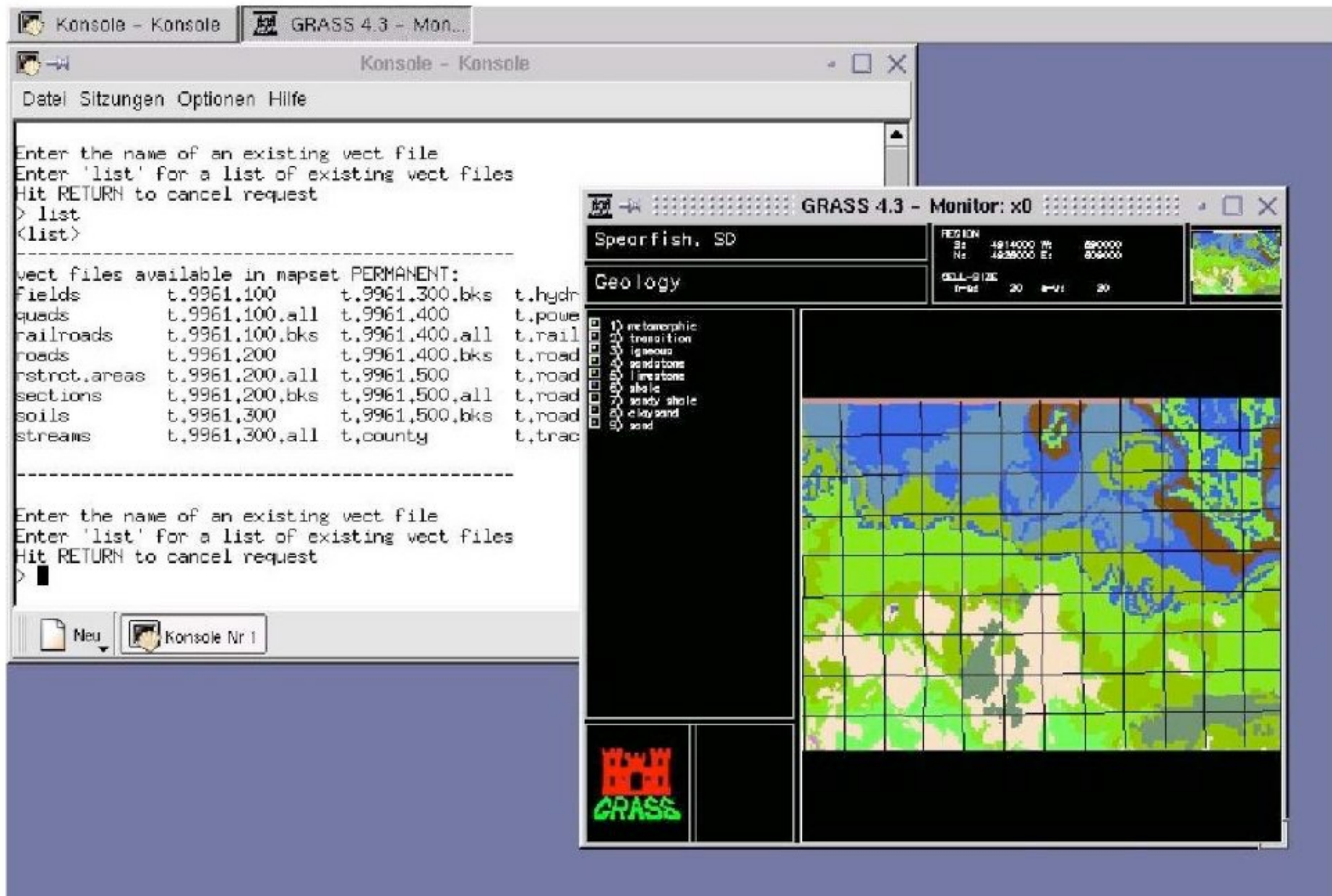
LOCATION:..... hood.....

MAPSET:..... Johnson.....

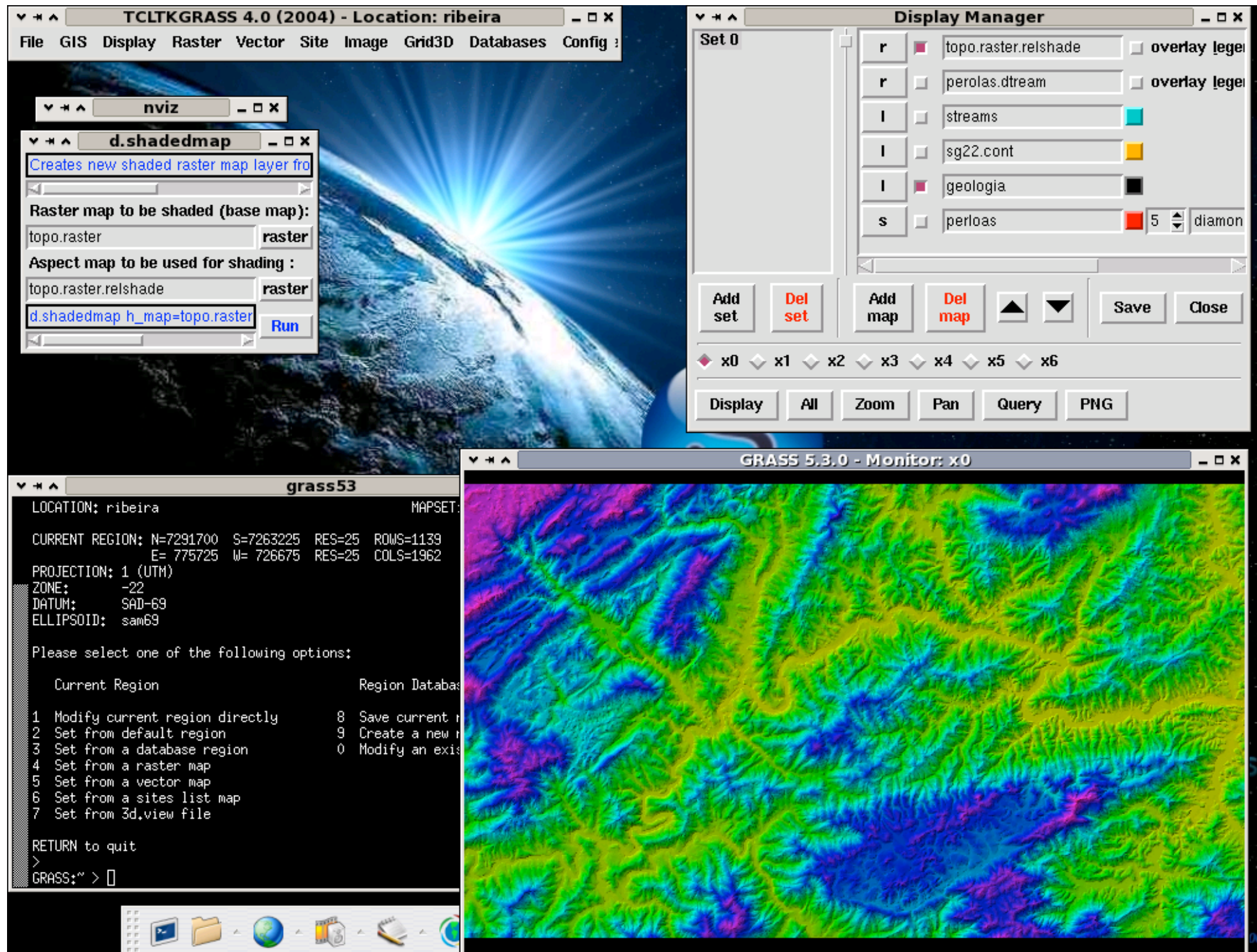
AFTER COMPLETING ALL ANSWERS, HIT (ESC) TO CONTINUE
(OR INTERRUPT TO CANCEL)



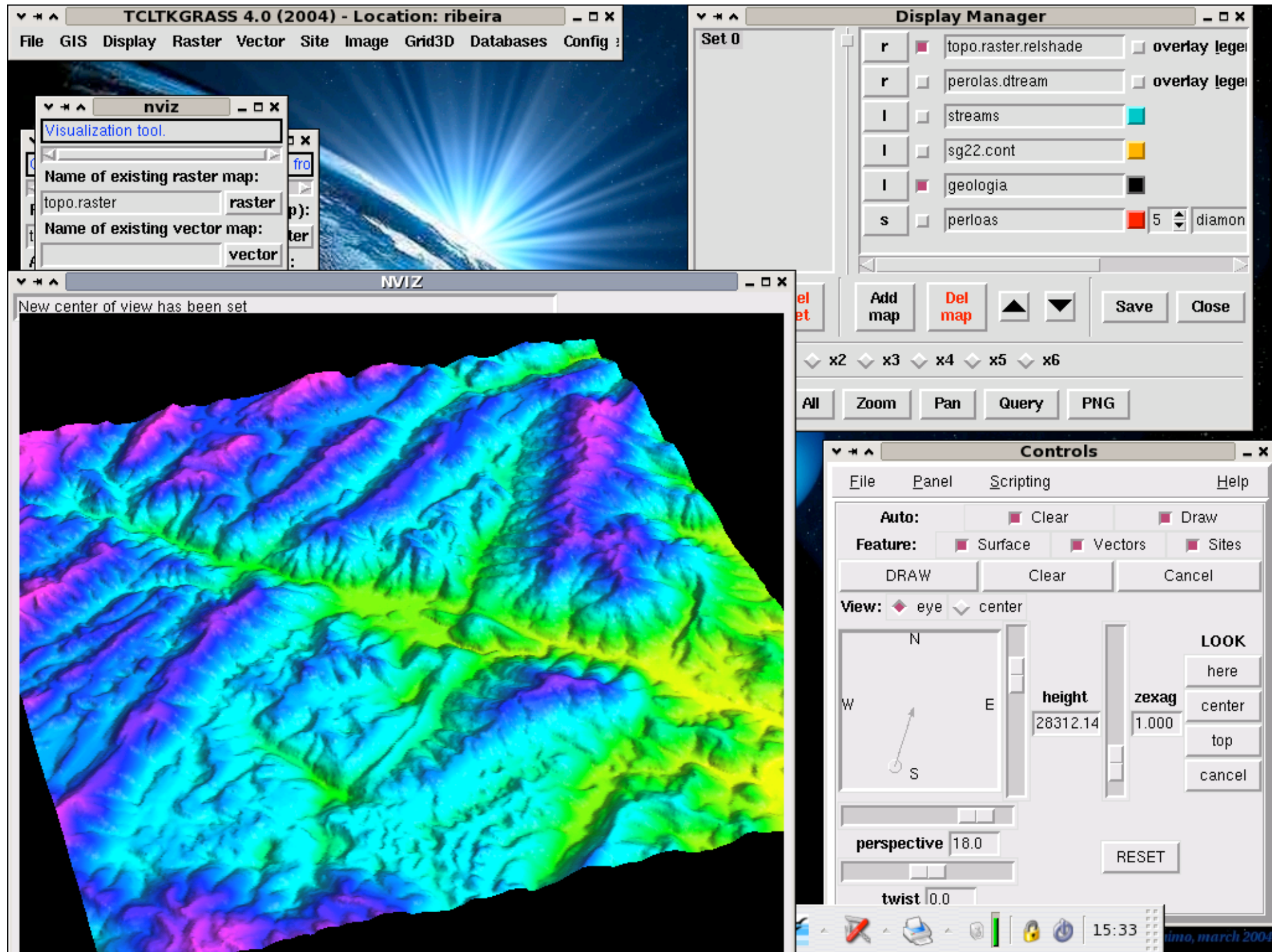
GRASS - HISTÓRICO - VERSÃO 4.3



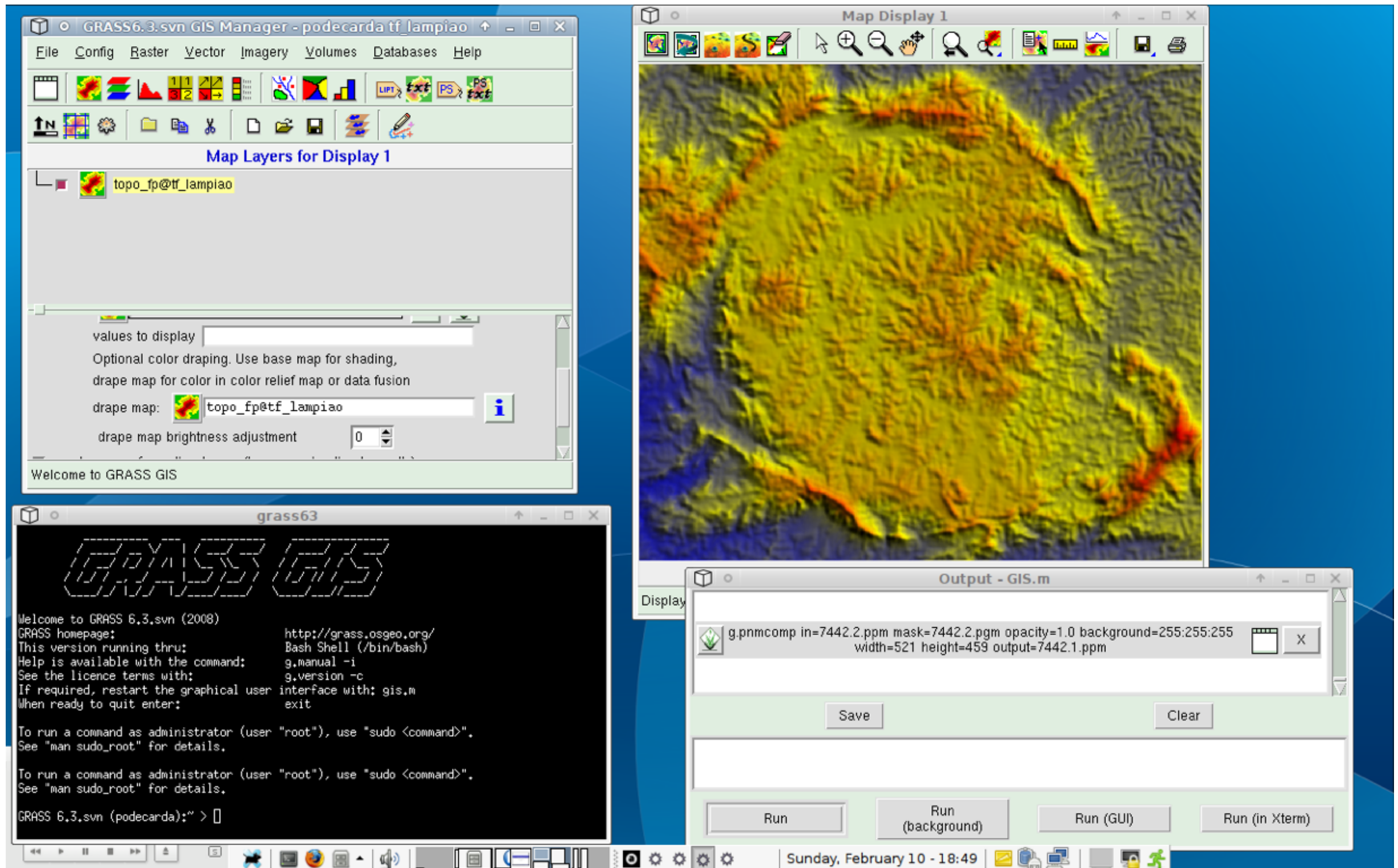
GRASS - HISTÓRICO - VERSÃO 5.3



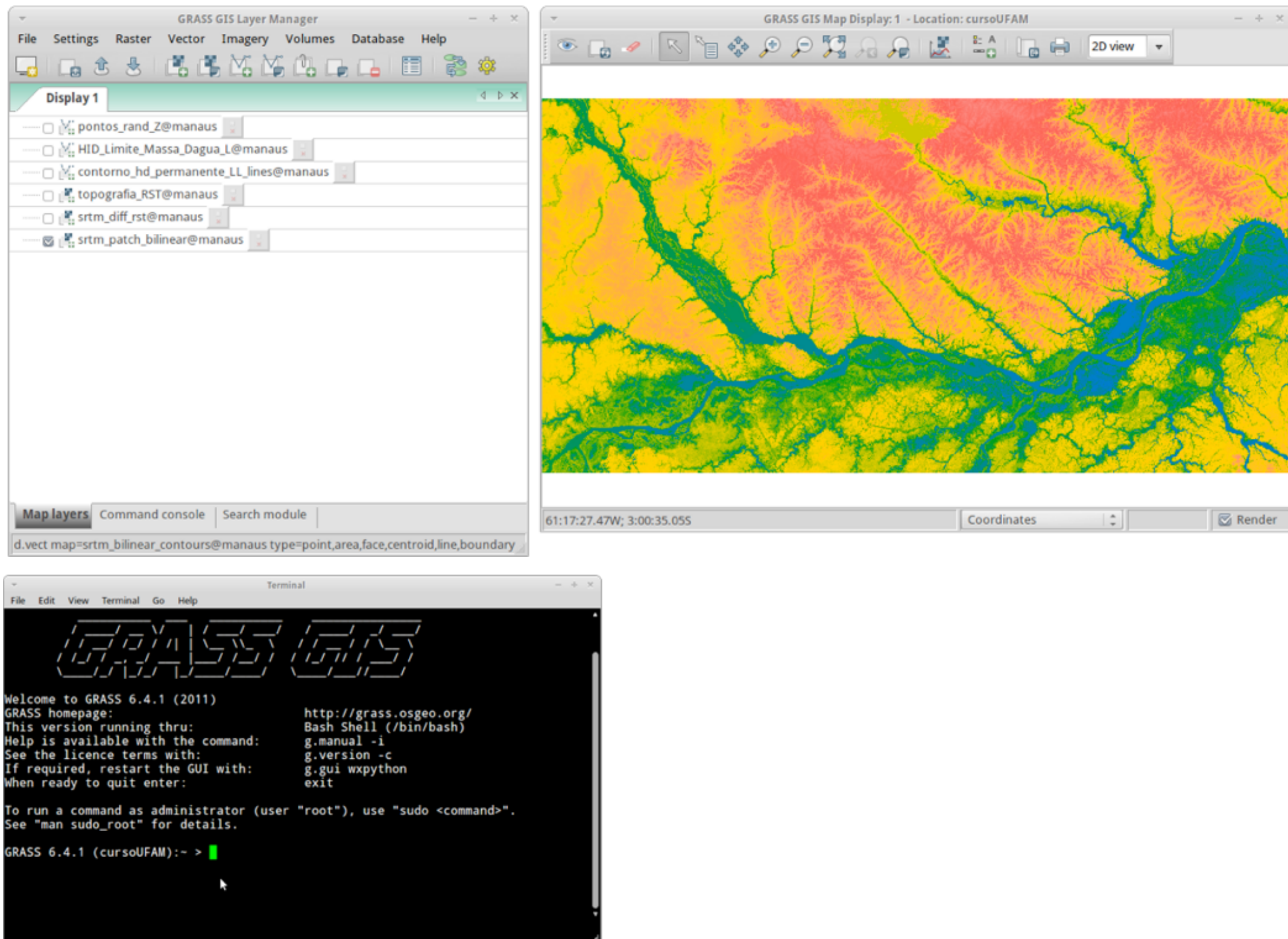
GRASS - HISTÓRICO - VERSÃO 5.3



GRASS - HISTÓRICO - VERSÃO 6.2



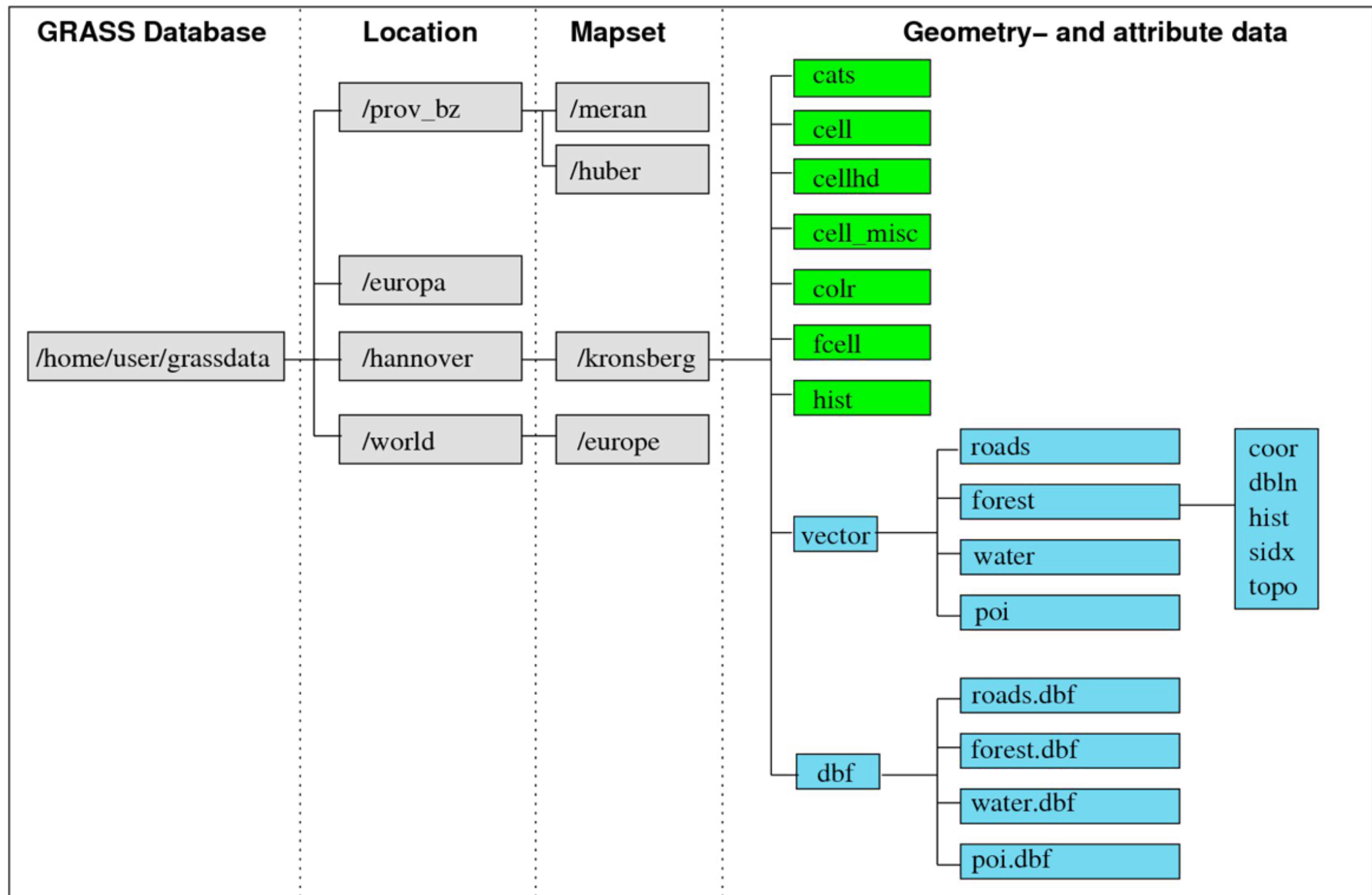
GRASS – HISTÓRICO – VERSÃO 6.4 + 7.0



ORGANIZAÇÃO DOS PROJETOS

- ▶ Hierarquia baseada em **Locations** e **mapsets**
- ▶ A **Location** compreende toda a área de trabalho (p.ex., **America_do_Sul**)
- ▶ O **mapset** é a porção ativa e utilizada para análise, que pode ser do mesmo tamanho ou menor que a location (p.ex., **Sao_Paulo**, **area_mestrado**, etc)
- ▶ Vários mapsets podem ser definidos para a mesma location.
- ▶ Dados de interesse comum (tais como modelos de relevo, imagens de satélite etc) podem ser armazenados em um mapset especial ao qual todos os usuários têm acesso, chamado de PERMANENT, que é criado automaticamente ao se criar uma nova Location

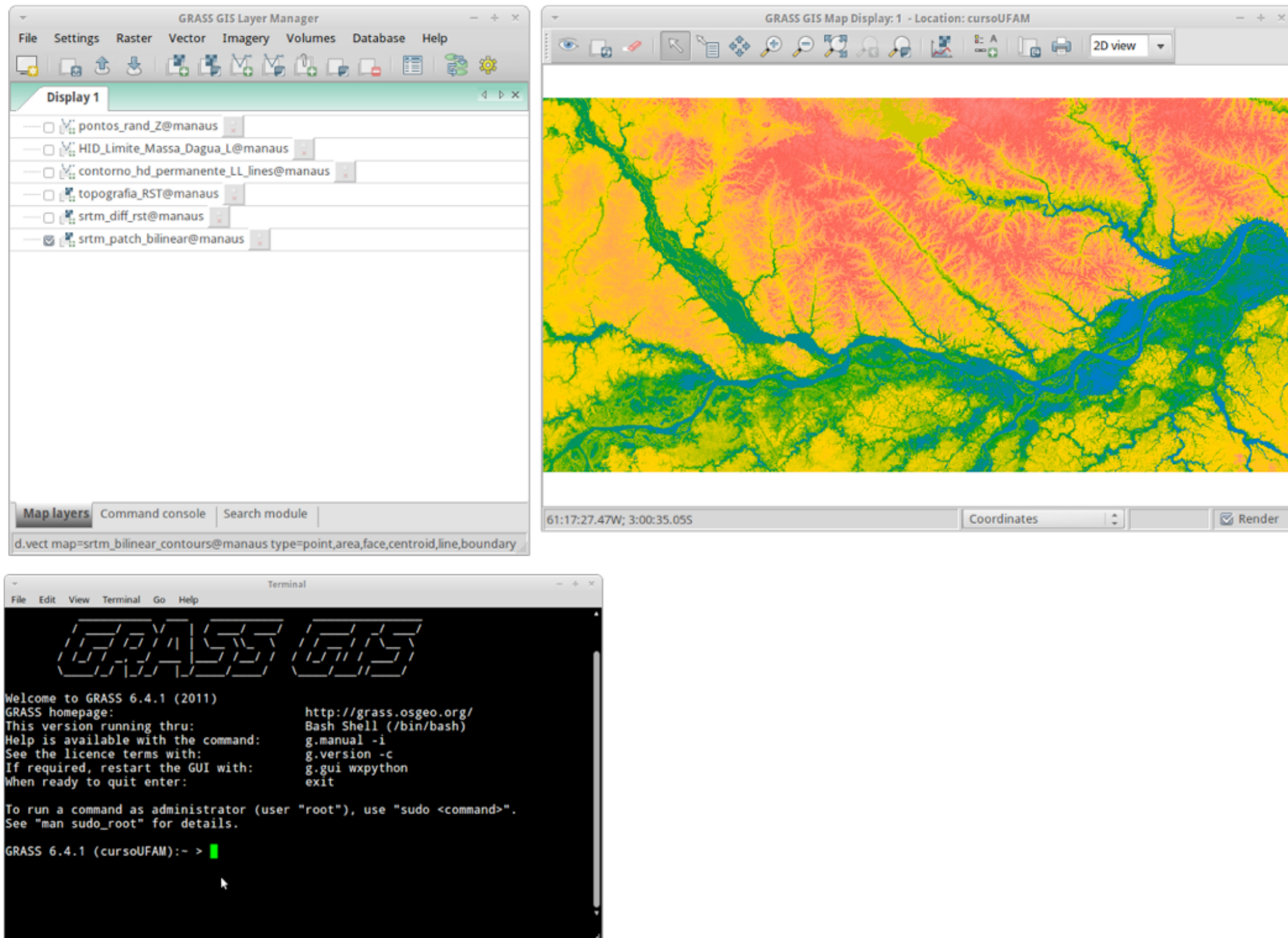
ORGANIZAÇÃO DOS PROJETOS



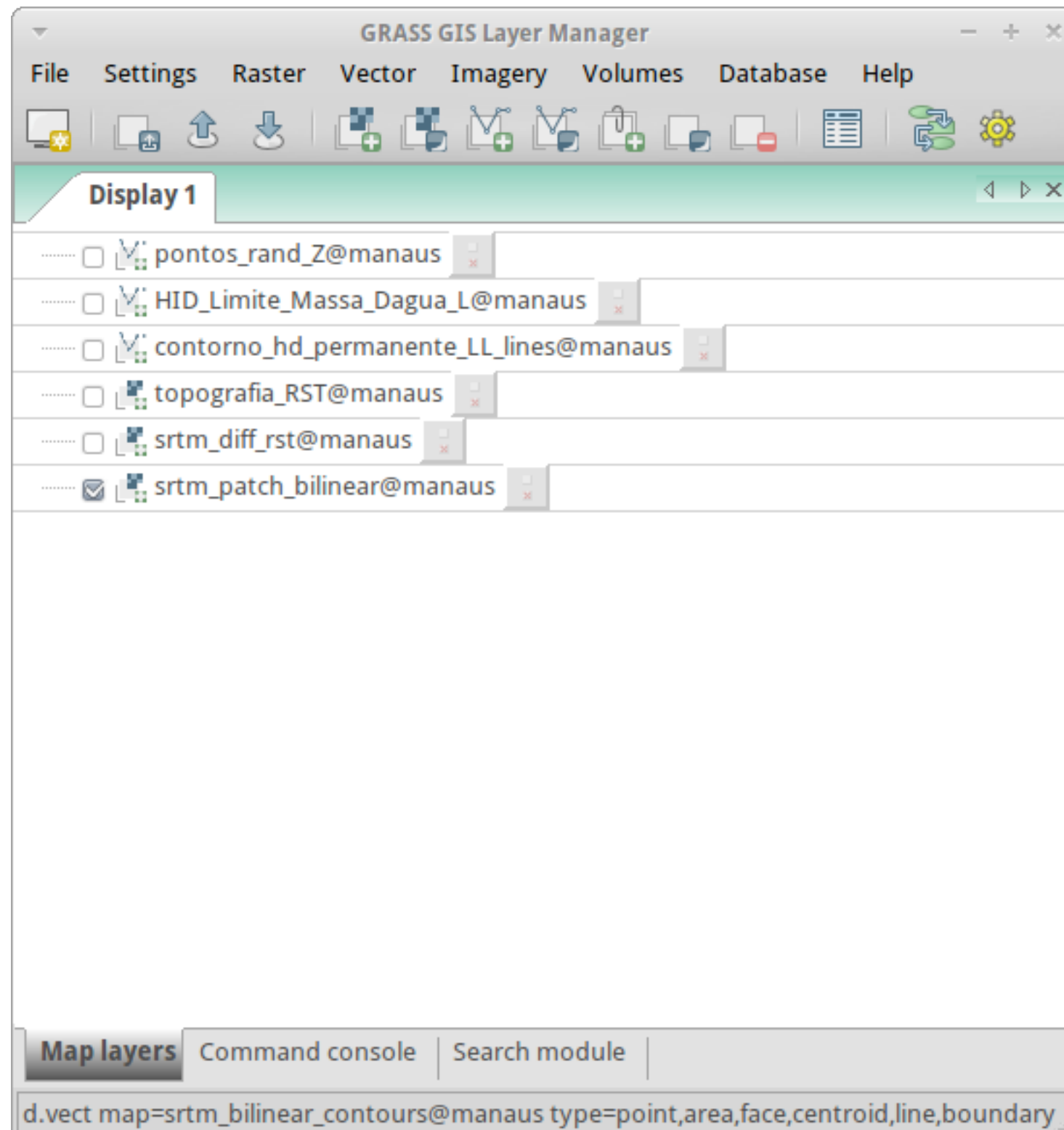
REGION

- ▶ Um conceito importante dentro do GRASS é o de **region**, que define, dentro do mapset, a área de interesse e a resolução espacial dos mapas raster. Tanto a resolução espacial quanto as coordenadas do retângulo envolvente da region podem ser facilmente alteradas sem a necessidade de reinicialização do sistema ou a criação de novos projetos; é possível salvar as configurações da region para acessá-la facilmente quando necessário.
- ▶ É preciso frisar que todas as análises envolvendo mapas raster (análise de terreno, álgebra de mapas, interpolação de superfícies etc) são efetuadas de acordo com as configurações da region ativa, e que esta não necessariamente corresponde com as configurações do Display.

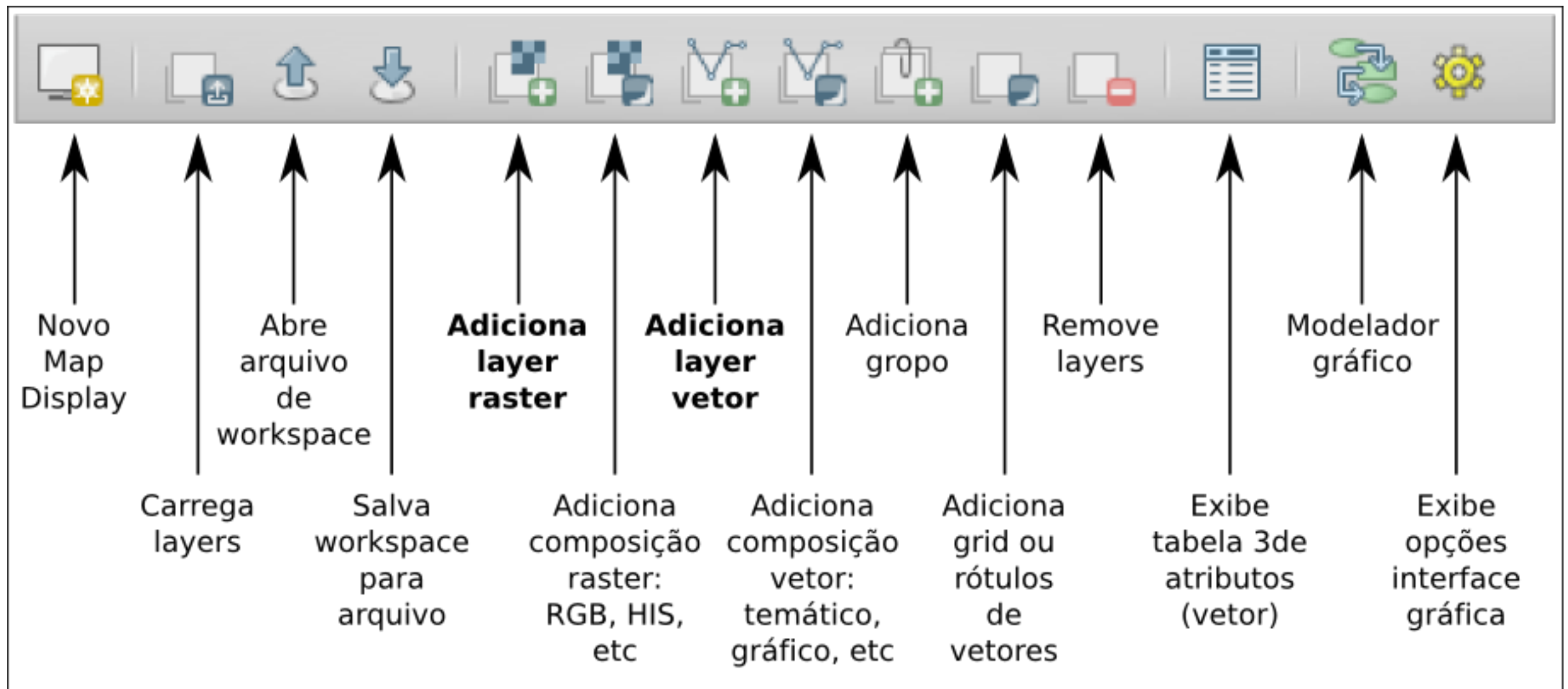
INTERFACE GRÁFICA



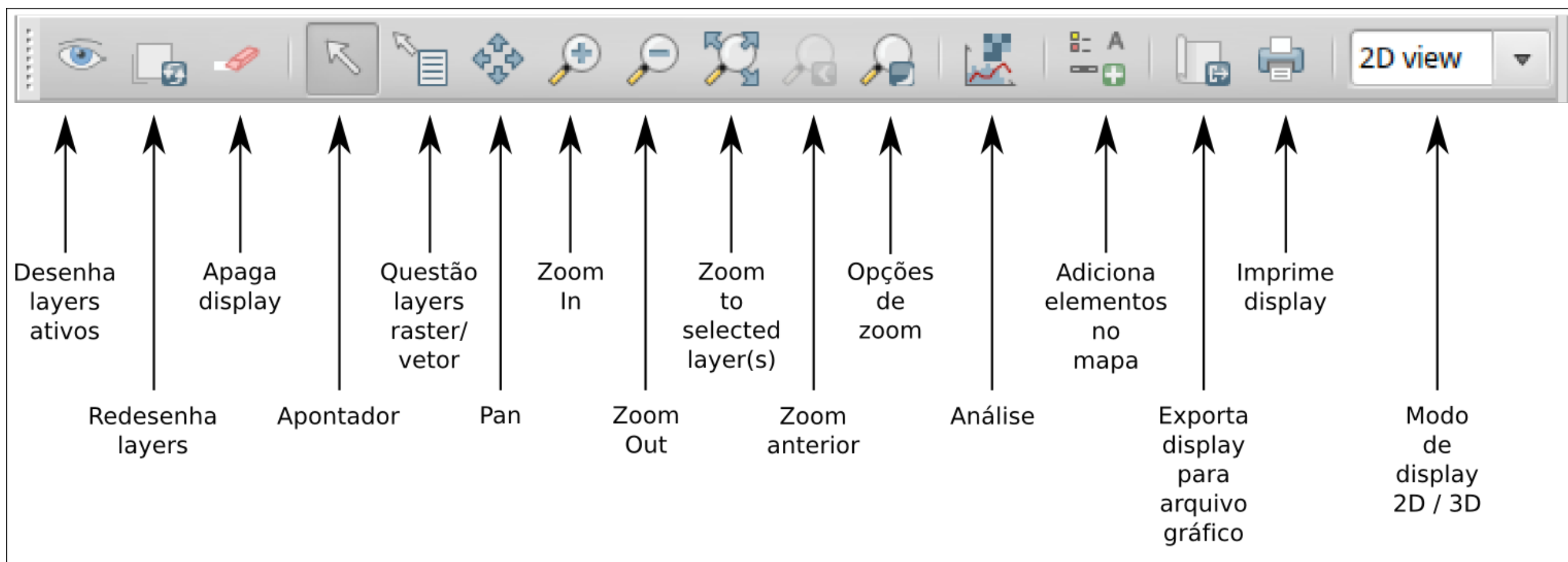
LAYER MANAGER



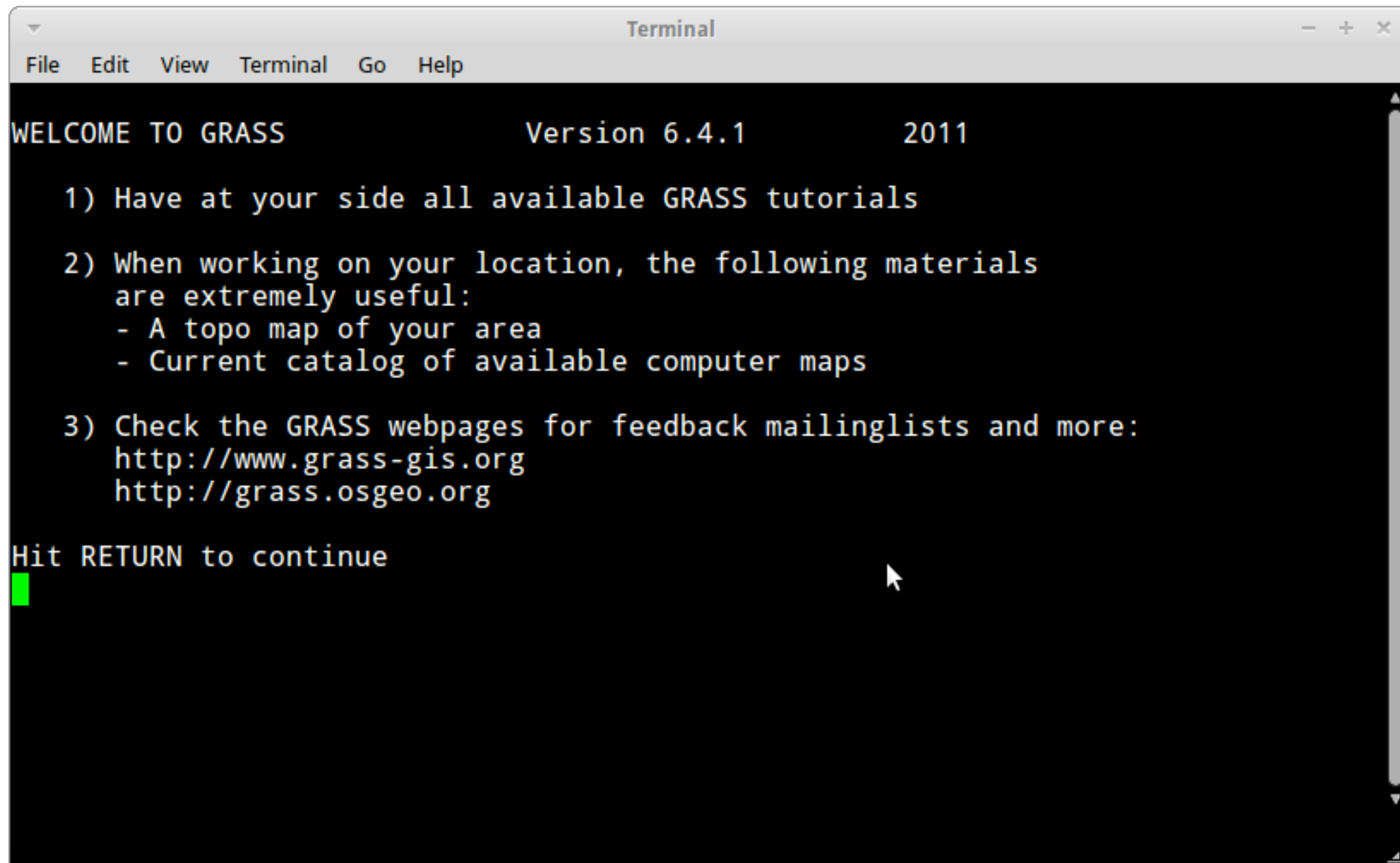
FERRAMENTAS GISM



FERRAMENTAS MAPDISPLAY



WELCOME!

A screenshot of a macOS Terminal window titled "Terminal". The window has a menu bar with "File", "Edit", "View", "Terminal", "Go", and "Help". The terminal content displays the GRASS 6.4.1 welcome message, including a list of instructions and a prompt to hit RETURN to continue. A green cursor is visible on the line "Hit RETURN to continue".

```
WELCOME TO GRASS                Version 6.4.1                2011

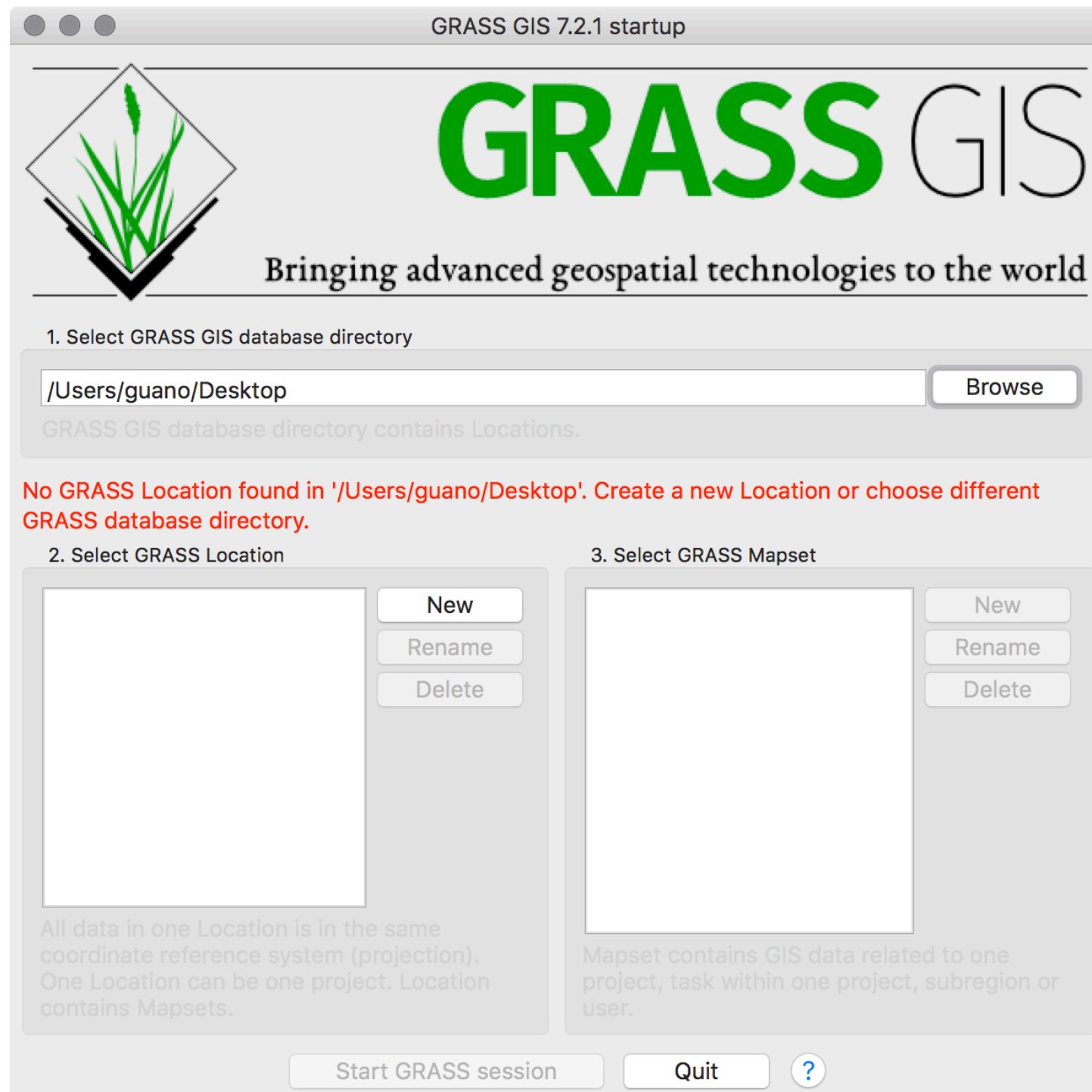
1) Have at your side all available GRASS tutorials

2) When working on your location, the following materials
   are extremely useful:
   - A topo map of your area
   - Current catalog of available computer maps

3) Check the GRASS webpages for feedback mailinglists and more:
   http://www.grass-gis.org
   http://grass.osgeo.org

Hit RETURN to continue
```

WELCOME!



CRIAR LOCATION E MAPSET

Define new GRASS Location

Define GRASS Database and Location Name

GIS Data Directory:

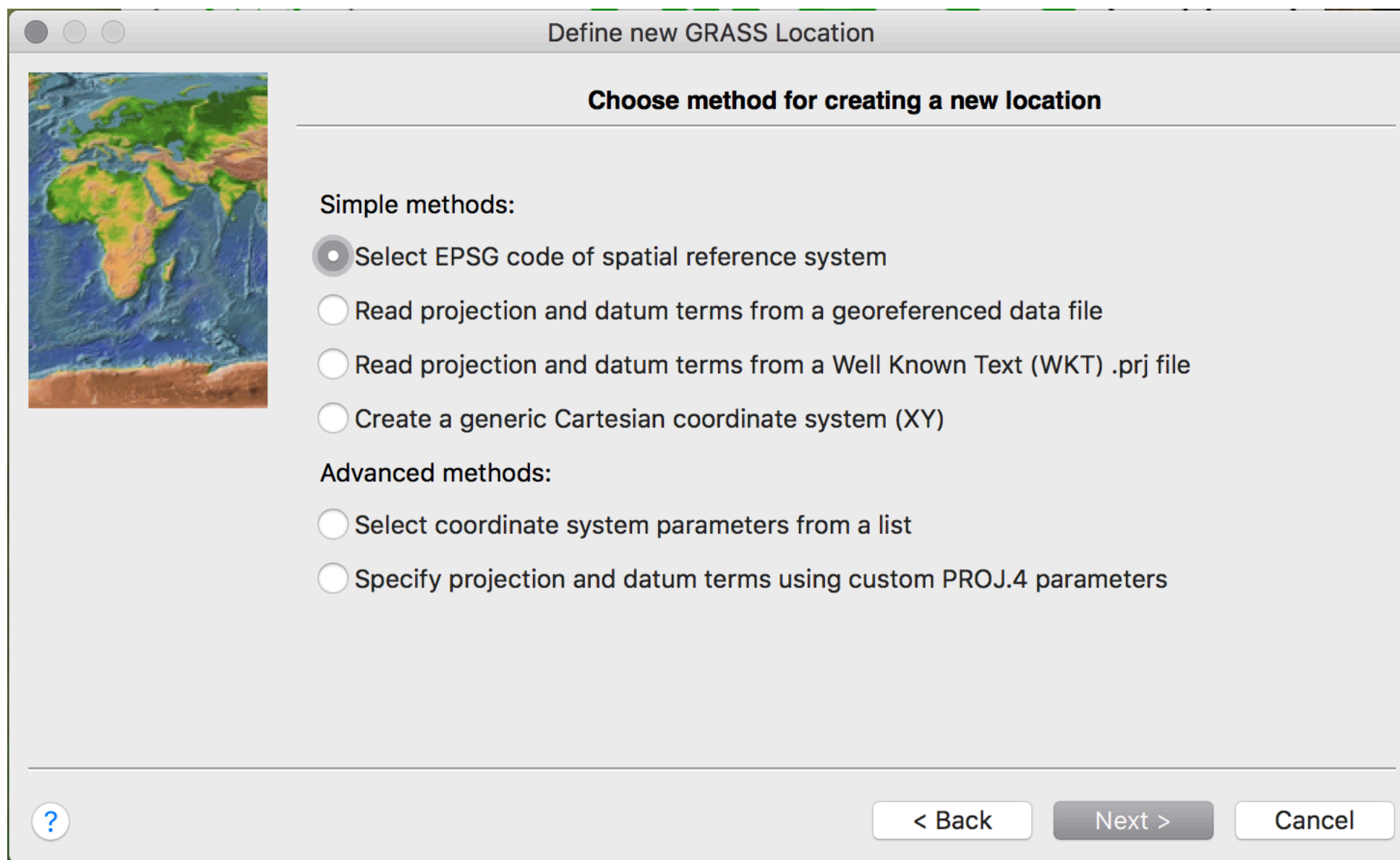
Project Location:

Location Title:

☐ Set default region extent and resolution

☐ Create user mapset

CRIAR LOCATION E MAPSET



CRIAR LOCATION E MAPSET

Define new GRASS Location

Choose EPSG Code

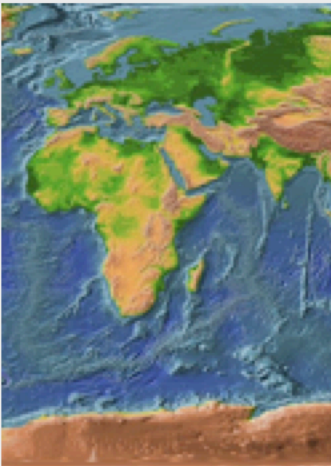
Path to the EPSG-codes file:

EPSG code:

Code	Description	Parameters
32721	WGS 84 / UTM zone 21S	+proj=utm +zone=21 +sout
32722	WGS 84 / UTM zone 22S	+proj=utm +zone=22 +sout
32723	WGS 84 / UTM zone 23S	+proj=utm +zone=23 +sout
32724	WGS 84 / UTM zone 24S	+proj=utm +zone=24 +sout
32725	WGS 84 / UTM zone 25S	+proj=utm +zone=25 +sout
32726	WGS 84 / UTM zone 26S	+proj=utm +zone=26 +sout
32727	WGS 84 / UTM zone 27S	+proj=utm +zone=27 +sout
32728	WGS 84 / UTM zone 28S	+proj=utm +zone=28 +sout

CRIAR LOCATION E MAPSET

Define new GRASS Location



Choose

Path to the EPSG-codes file:

EPSG code:

Code	Description	Parameters
32721	WGS 84 / UTM zone 21S	+proj=utm +zone=21 +sout
32722	WGS 84 / UTM zone 22S	+proj=utm +zone=22 +sout
32723	WGS 84 / UTM zone 23S	+proj=utm +zone=23 +sout
32724	WGS 84 / UTM zone 24S	+proj=utm +zone=24 +sout
32725	WGS 84 / UTM zone 25S	+proj=utm +zone=25 +sout
32726	WGS 84 / UTM zone 26S	+proj=utm +zone=26 +sout
32727	WGS 84 / UTM zone 27S	+proj=utm +zone=27 +sout
32728	WGS 84 / UTM zone 28S	+proj=utm +zone=28 +sout

Select datum transformation

Select from list of datum transformations

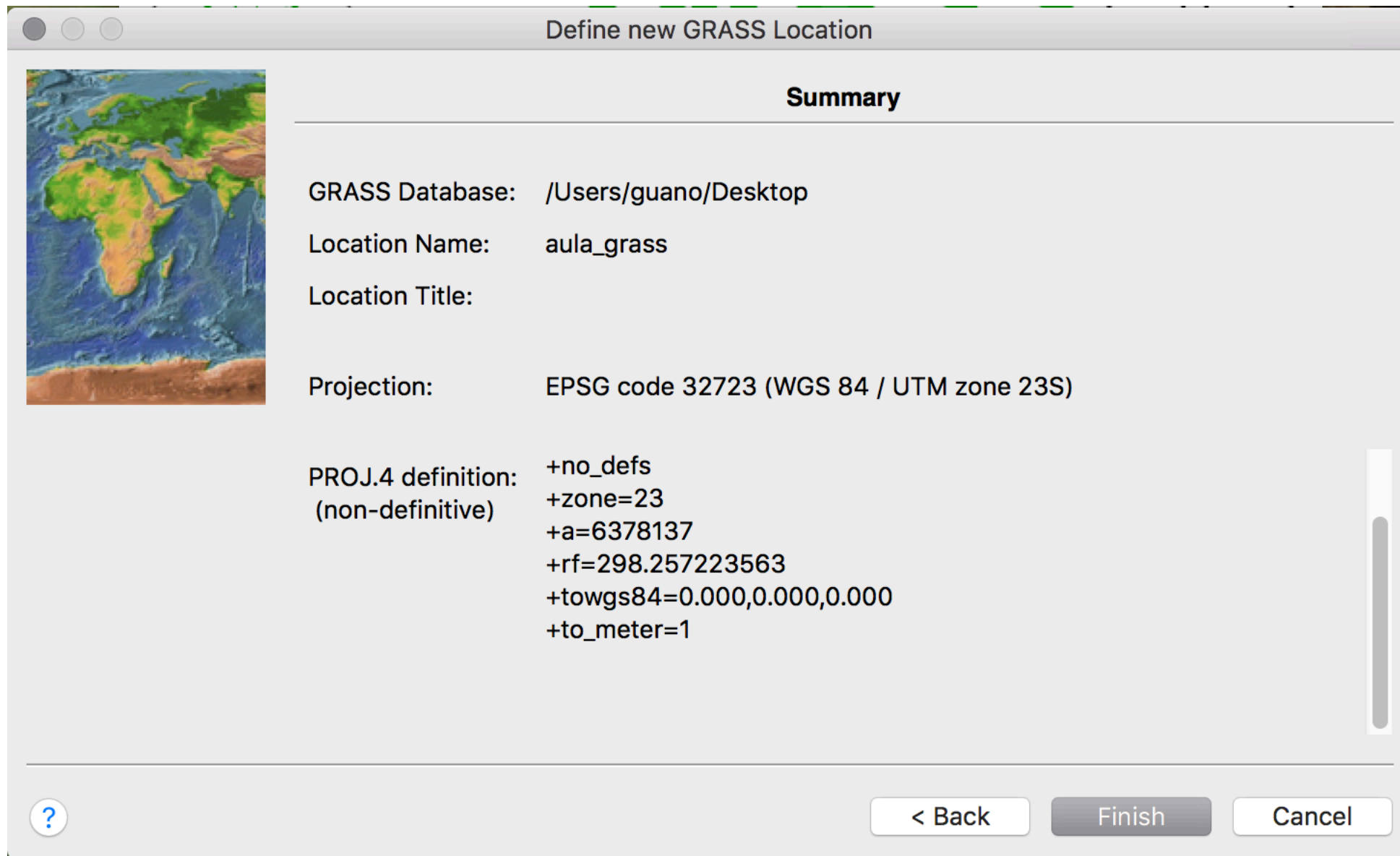
0
Do not apply any datum transformations

1
Used in whole wgs84 region
towgs84=0.000,0.000,0.000
Default 3-Parameter Transformation (May not be optimum for old

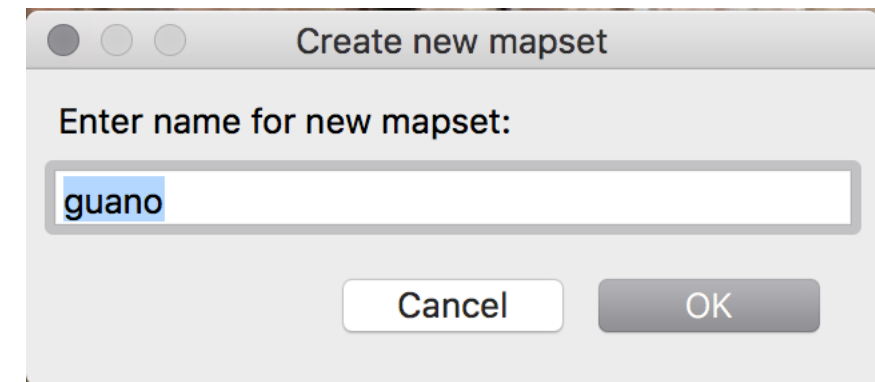
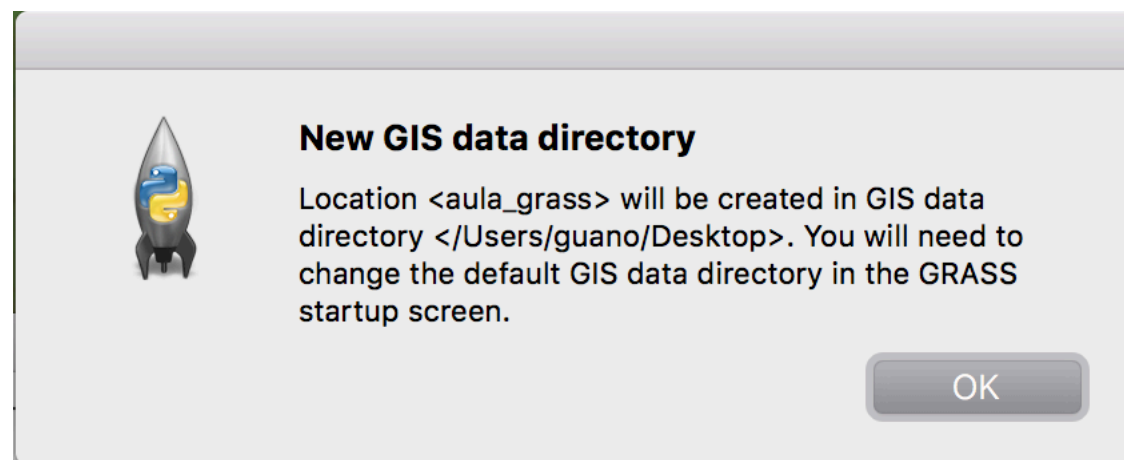
Cancel OK

? < Back Next > Cancel

CRIAR LOCATION E MAPSET



CRIAR LOCATION E MAPSET



IMPORTAR SRTM

Workspace	▶
Map display	▶
Import raster data	▶
Import vector data	▶
Import 3D raster data	▶
Import database table	▶
Export raster map	▶
Export vector map	▶
Export 3D raster maps	▶
Export database table	▶
Link external data	▶
Manage maps	▶
Map type conversions	▶
 Georectify [g.gui.gcp]	
 Graphical modeler [g.gui.gmodeler]	
Run model	
3D image rendering [m.nviz.image]	
Animation tool [g.gui.animation]	
Bearing/distance to coordinates [m.cogo]	
 Cartographic Composer [g.gui.psmmap]	
Map Swipe [g.gui.mapswipe]	
Launch script	
Close GUI	⌘W

Common formats import [r.in.gdal]
Import of common formats with reprojection [r.import]
ASCII x,y,z point import and gridding [r.in.xyz]
ASCII grid import [r.in.ascii]
ASCII polygons, lines, and point import [r.in.poly]
Raw binary array import [r.in.bin]
GRIDATB.FOR import [r.in.gridatb]
Matlab 2D array import [r.in.mat]
PNG import [r.in.png]
SPOT NDVI import [i.in.spotvgt]
SRTM HGT import [r.in.srtm]
Terra ASTER HDF import [r.in.aster]
LAS LiDAR points import [r.in.lidar]
Unpack raster map [r.unpack]
Reproject raster map from different GRASS location [r.proj]

Import raster data

Profiles

Load: Save Remove

Source type

☒ File ☐ Directory ☐ Database ☐ Protocol

Source input

File: Browse

List of raster layers - right click to (un)select all

Layer id	Layer name	Projection match	Name for output GRASS map (editable)
☒ 1	S25W049.hgt	No	srtm_S25W049

☐ Override projection check (use current location's projection)

☒ Allow output files to overwrite existing files

☒ Add imported layers into layer tree

☐ Close dialog on finish

Close

Import

Source settings

Import settings

Reprojection

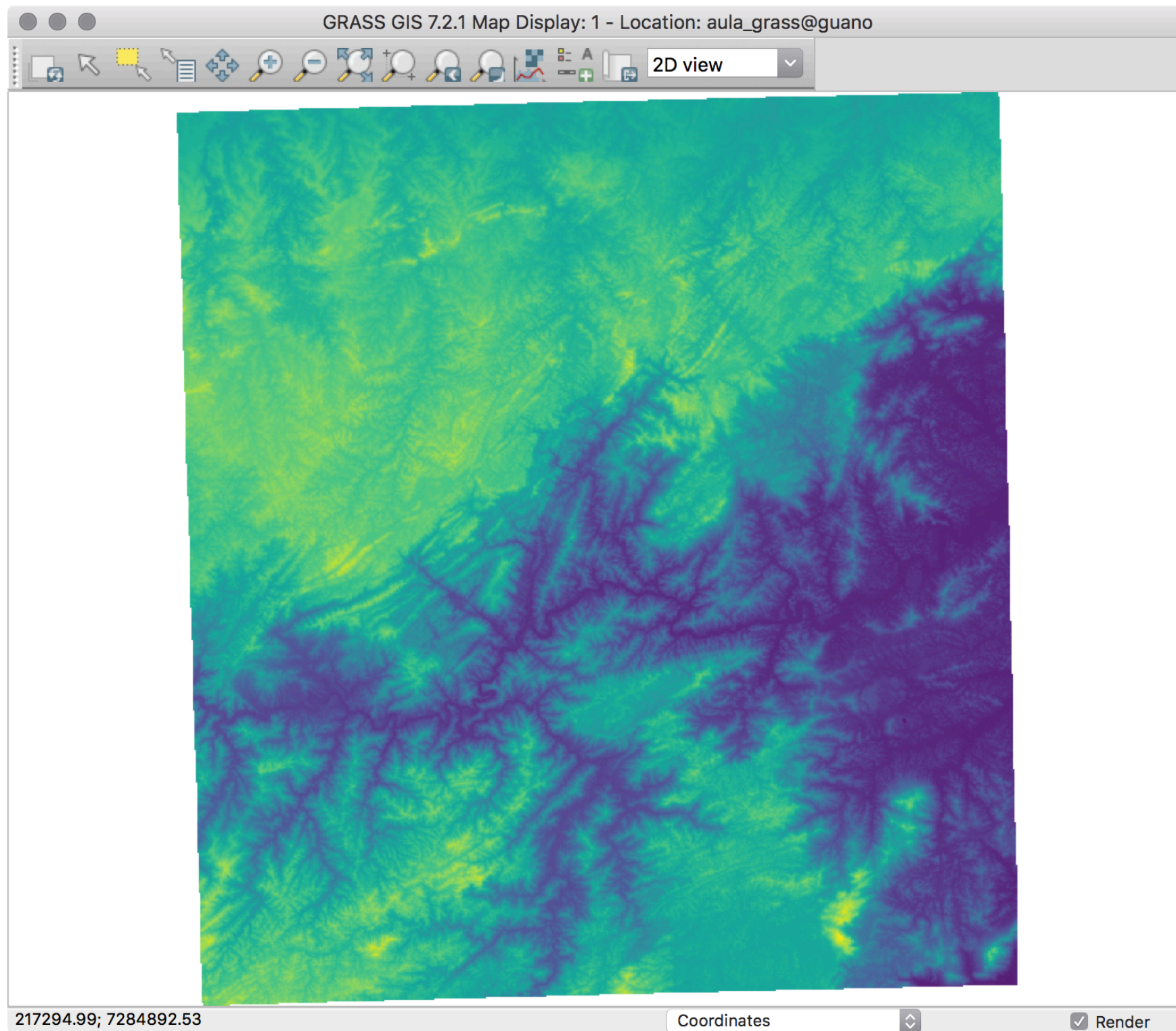
Projection of following layers do not match with projection of
Layers to be reprojected - right click to (un)select all

Layer id	Name for output GRASS map
☒ 1	srtm_S25W049

Cancel

Import & reproject

DISPLAY RASTER



ALTERAR CORES (RASTER – MANAGE COLORS – R.COLORS)

r.colors [raster, color table]

 Creates/modifies the color table associated with a raster map.

Map Defi... Remo... Print Opti... Comm... Manual

[multiple] Name of raster map(s): (map=name)

Input file with one map name per line: (file=name)
 Browse

or enter values directly:

Load Save as

Close Run Copy ?

r.colors -e map=srtm_S25W049@guano color=elevation

r.colors [raster, color table]

 Creates/modifies the color table associated with a raster map.

Map Defi... Remo... Print Opti... Comm... Manual

☐ Only write new color table if it does not already exist (w)
☐ Invert colors (n)
☐ Logarithmic scaling (g)
☐ Logarithmic-absolute scaling (a)
☒ Histogram equalization (e)

Name of color table: (color=style)

Raster map from which to copy color table: (raster=name)

3D raster map from which to copy color table: (raster_3d=name)

Path to rules file: (rules=name)
 Browse

Close Run Copy ?

r.colors -e map=srtm_S25W049@guano color=elevation

ACERTAR REGION

Region	▶
GRASS working environment	▶
Map projections	▶
Addons extensions	▶

Display region	[g.region -p]
Set region	[g.region]

g.region [general, settings, computational region, extent, resolution, level1]



Manages the boundary definitions for the geographic region.

Existing

Bounds

Reso...

Effects

Print

Optional

Comm...

 Manual

☐ Set from default region

(d)

☐ Save as default region

(s)

Set current region from named region:

(region=name)

▼

[multiple] Set region to match raster map(s):

(raster=name)

srtm_S25W049@guano

▼

Set region to match 3D raster map(s) (both 2D and 3D values):

(raster_3d=name)

▼

[multiple] Set region to match vector map(s):

(vector=name)

▼

Close

Run

Copy



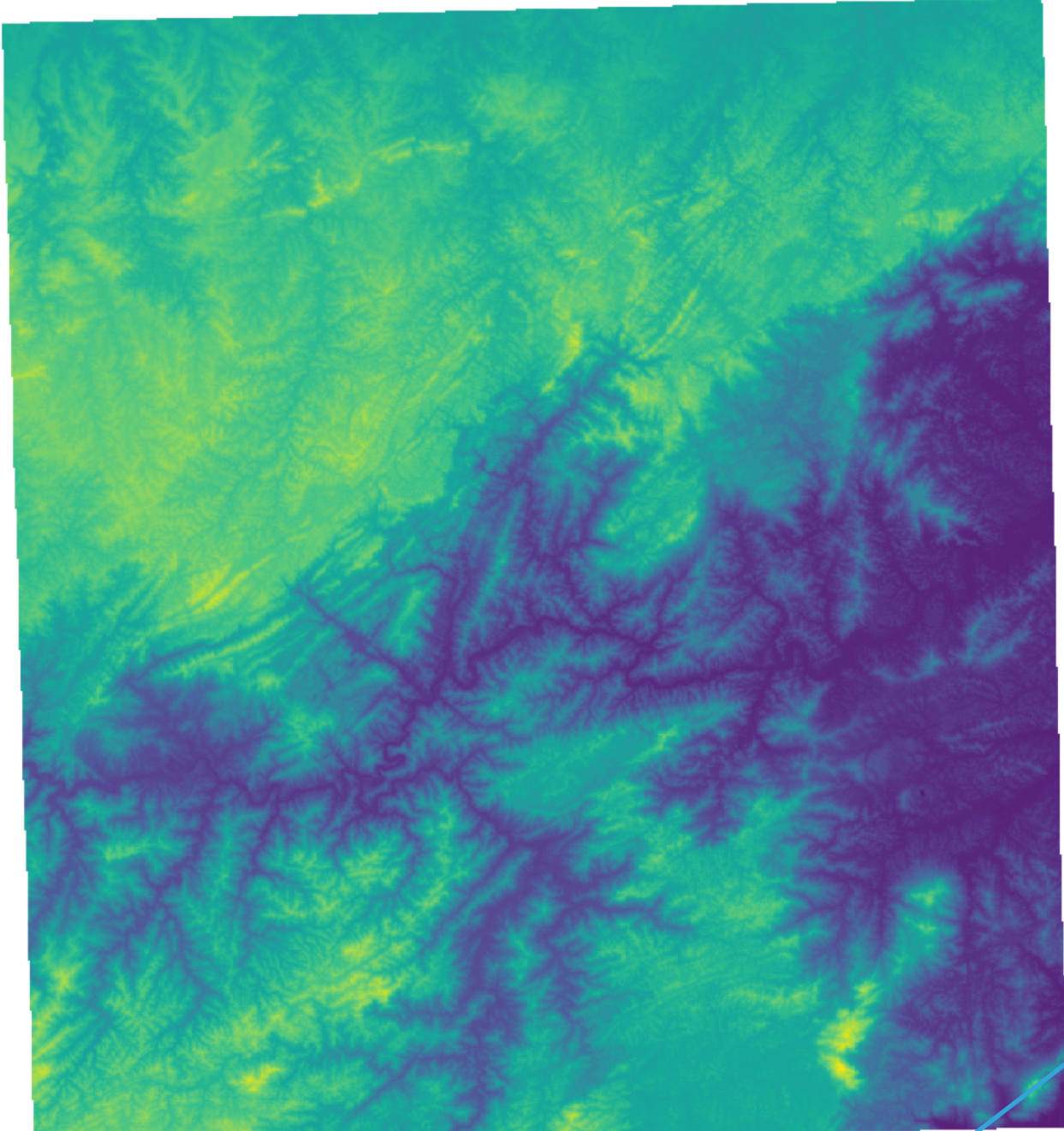
☐ Close dialog on finish

g.region --overwrite raster=srtm_S25W049@guano

VER REGION NO MAP DISPLAY

GRASS GIS 7.2.1 Map Display: 1 - Location: aula_grass@guano

2D view



217294.99; 7284892.53

Coordinates

☒ Render

☒ Coordinates

Extent

Computational region

Show comp. extent

Display mode

Display resolution

Display geometry

Map scale

Go to

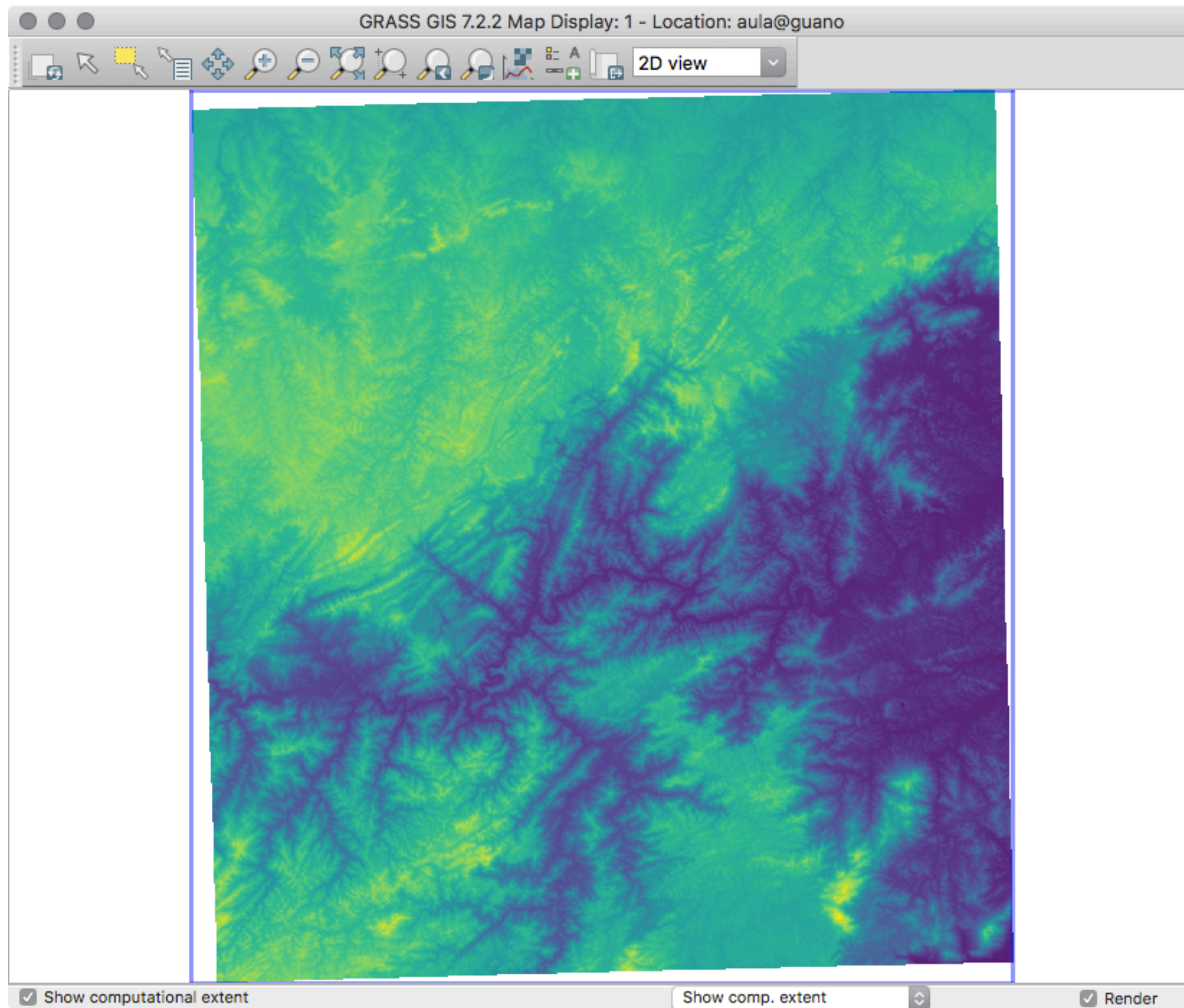
Projection

217294.99; 7284892.53

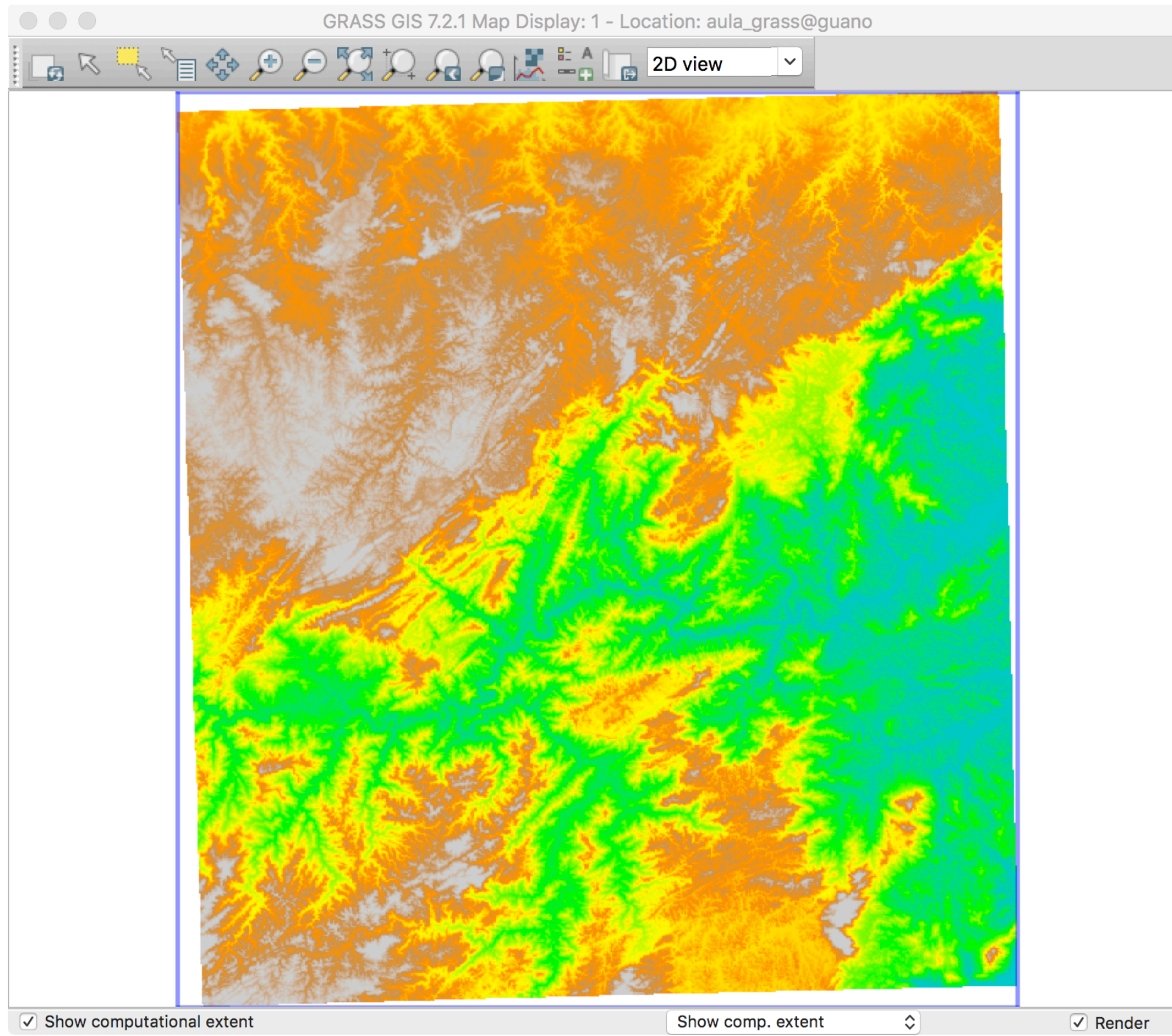
Coordinates

☒ Render

VER REGION NO MAP DISPLAY



ESCALA DE CORES (FUNCIONANDO)



RELEVO SOMBREADO

Develop raster map	▶
Manage colors	▶
Query raster maps	▶
Map type conversions	▶
Raster buffers and distance	▶
Mask [r.mask]	
Raster map calculator [r.mapcalc]	
Neighborhood analysis	▶
Overlay rasters	▶
Solar radiance and shadows	▶
Terrain analysis	▶
Transform features	▶
Hydrologic modeling	▶
Groundwater modeling	▶
Landscape patch analysis	▶
Wildfire modeling	▶
Change category values and labels	▶
Generate random cells	▶
Generate surfaces	▶
Interpolate surfaces	▶
Reports and statistics	▶

Generate contour lines [r.contour]
Cost surface [r.cost]
Cumulative movement costs [r.walk]
Least cost route or flow [r.drain]
Compute shaded relief [r.relief]
Apply shade to raster [r.shade]
Slope and aspect [r.slope.aspect]
Terrain parameters [r.param.scale]
Textural features [r.texture]
Visibility [r.viewshed]
Distance to features [r.grow.distance]
Horizon angle [r.horizon]

RELEVO SOMBREADO

- ▶ 1) zoom em uma área pequena
- ▶ 2) MapDisplay - set region to display

Zoom to default region

Zoom to saved region

Set computational region extent from display

Set computational region extent interactively

Set computational region from named region

Save display geometry to named region

Save computational region to named region

RELEVO SOMBREADO

r.relief [raster, elevation, relief, terrain, hillshade]

Creates shaded relief map from an elevation map (DEM).

Required

Sun position

Optional

Command output

Manual

Name of input raster map: *

(input=name)

srtm_S25W049@guano

Name for output shaded relief map: *

(output=name)

srtm_S25W049_shade_315_25

Close

Run

Copy

?

☒ Add created map(s) into layer tree

☐ Close dialog on finish

r.relief --overwrite input=srtm_S25W049@guano output=srtm_S25W049_shade_315_25 altitude=25 azimuth=315

r.relief [raster, elevation, relief, terrain, hillshade]

Creates shaded relief map from an elevation map (DEM).

Required

Sun position

Optional

Command output

Manual

Altitude of the sun in degrees above the horizon (valid range 0-90):

(altitude=float)

25

Azimuth of the sun in degrees to the east of north (valid range 0-360):

(azimuth=float)

315

Close

Run

Copy

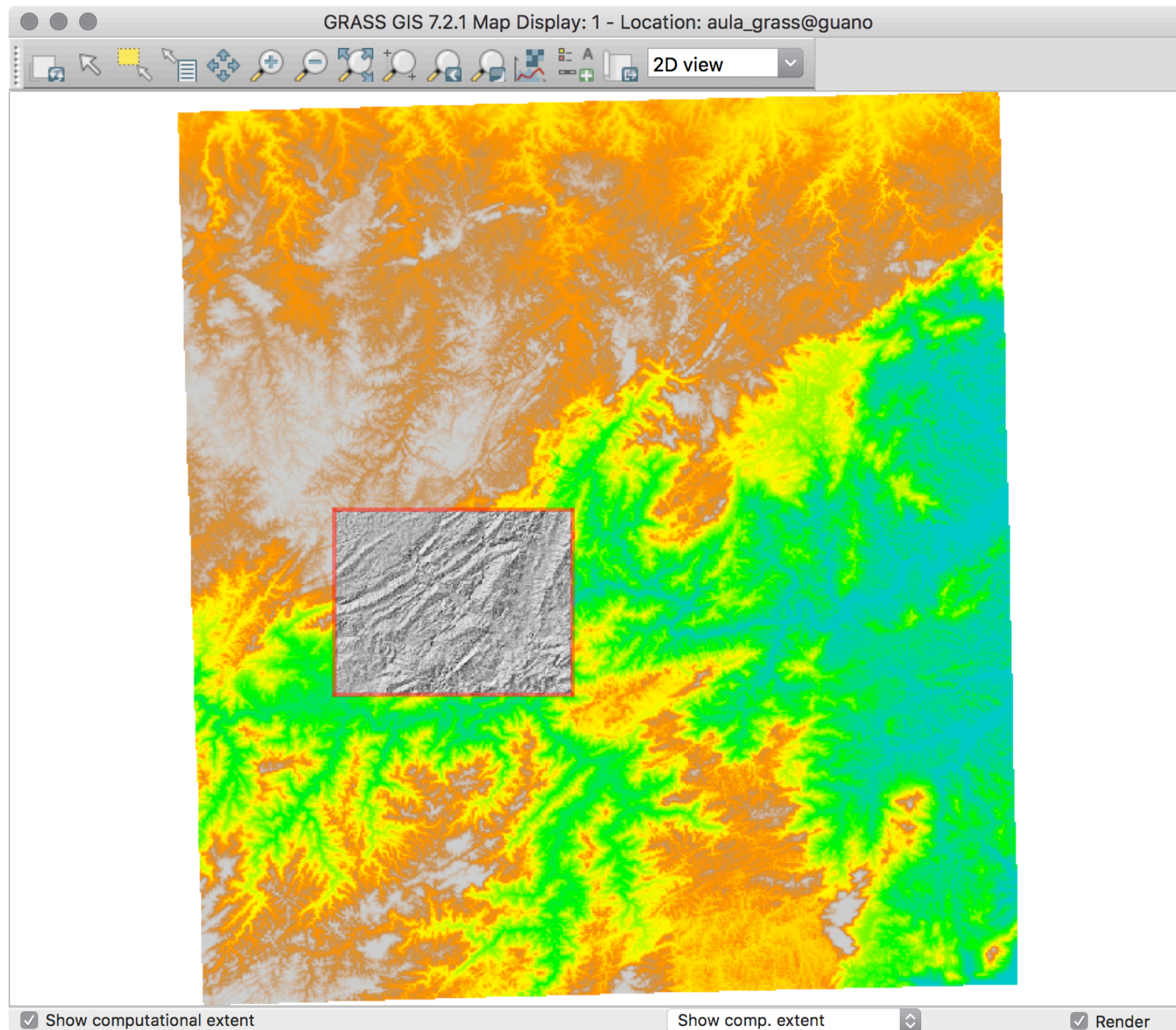
?

☒ Add created map(s) into layer tree

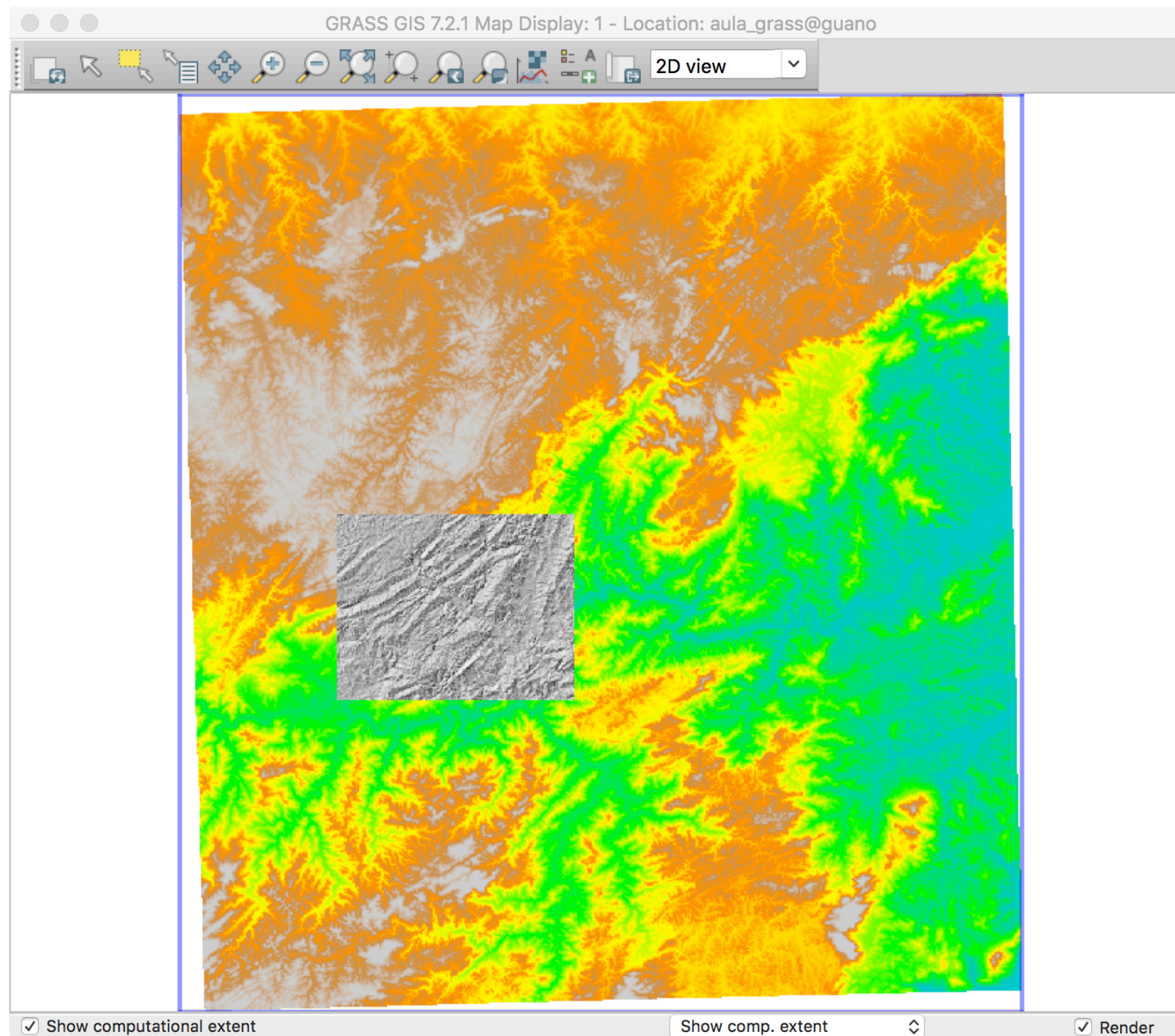
☐ Close dialog on finish

r.relief --overwrite input=srtm_S25W049@guano output=srtm_S25W049_shade_315_25 altitude=25 azimuth=315

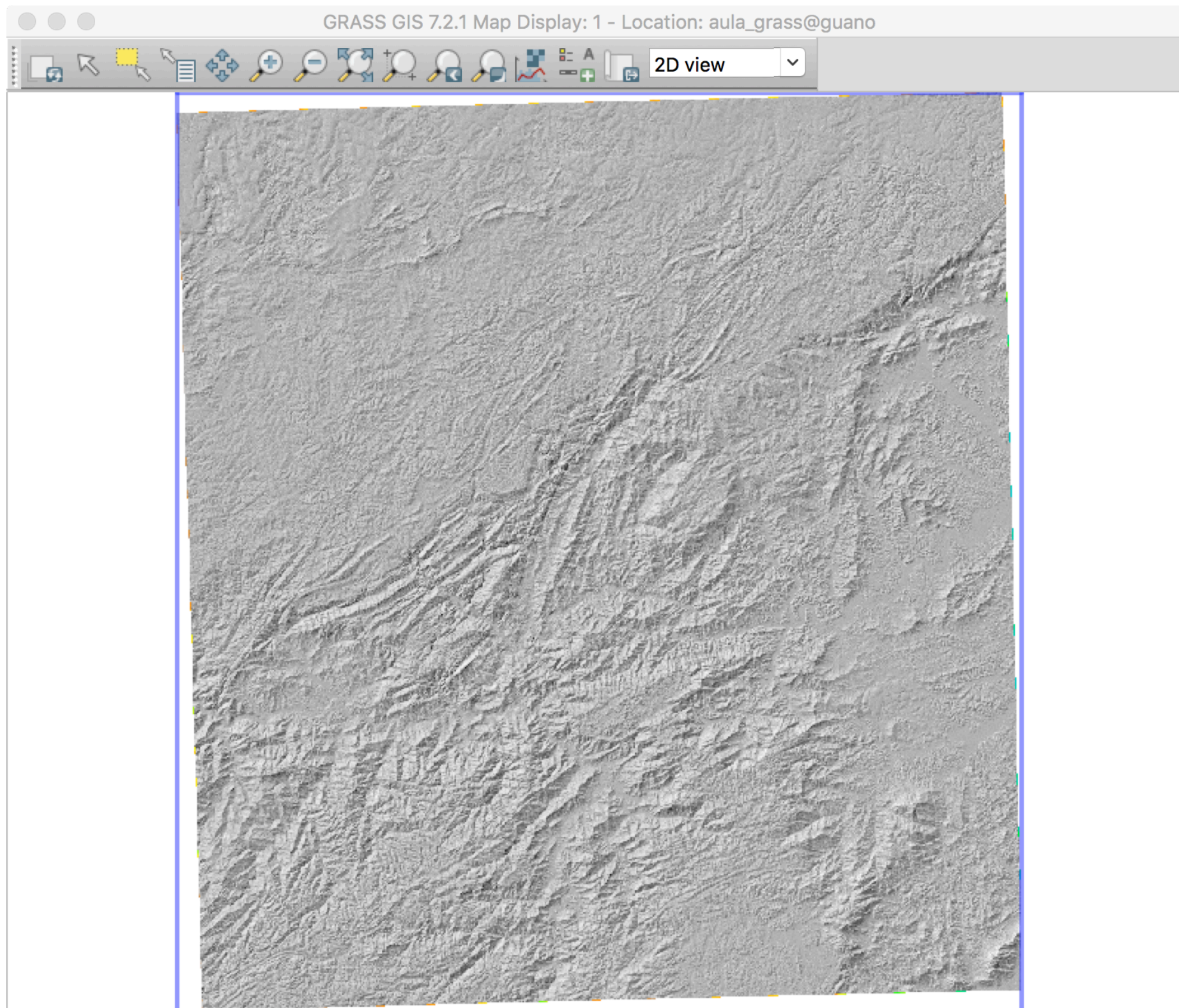
RELEVO SOMBREADO



RELEVO SOMBREADO – DEFINIR REGION PARA LAYER



RELEVO SOMBREADO



REGION – MUDAR RESOLUÇÃO PARA 250M

g.region [general, settings, computational region, extent, resolution]

Manages the boundary definitions for the geographic region.

Existing Bounds **Reso...** Effects Print Optional Comm... Manual

Number of rows in the new region: (rows=value)

Number of columns in the new region: (cols=value)

2D grid resolution (north-south and east-west): (res=value)

3D grid resolution (north-south, east-west and top-bottom): (res3=value)

North-south 2D grid resolution: (nsres=value)

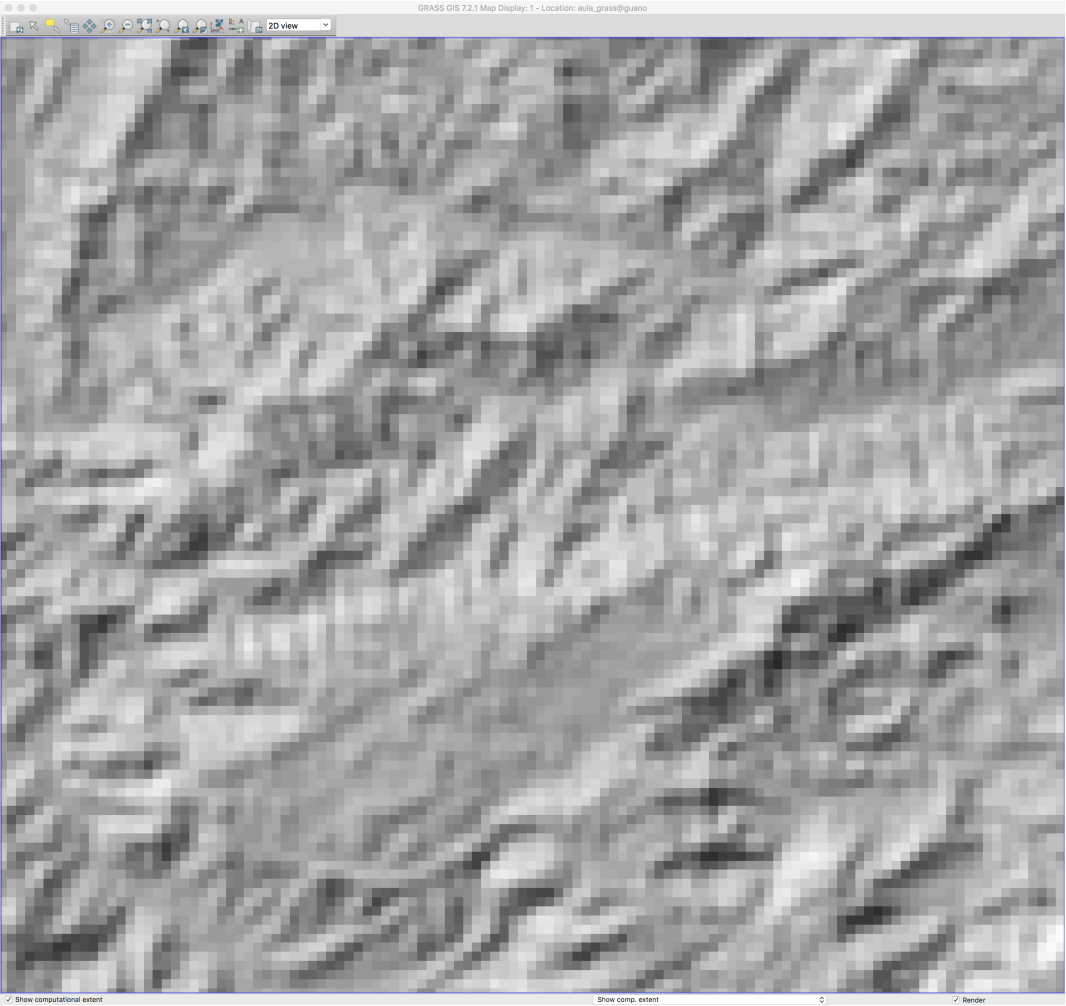
East-west 2D grid resolution: (ewres=value)

Top-bottom 3D grid resolution: (tbres=value)

☐ Close dialog on finish

g.region --overwrite res=250

CRIAR LOCATION E MAPSET



IMPORTAR VETOR (PONTOS – DAVIS.DAT)

Workspace	▶
Map display	▶
Import raster data	▶
Import vector data	▶
Import 3D raster data	▶
Import database table	▶
Export raster map	▶
Export vector map	▶
Export 3D raster maps	▶
Export database table	▶
Link external data	▶
Manage maps	▶
Map type conversions	▶
 Georectify [g.gui.gcp]	
 Graphical modeler [g.gui.gmodeler]	
Run model	
3D image rendering [m.nviz.image]	
Animation tool [g.gui.animation]	
Bearing/distance to coordinates [m.cogo]	
 Cartographic Composer [g.gui.psmmap]	
Map Swipe [g.gui.mapswipe]	
Launch script	
Close GUI	⌘W

Common import formats [v.in.ogr]
Import of common formats with reprojection [v.import]
ASCII points or GRASS ASCII format [v.in.ascii]
ASCII points as a vector lines [v.in.lines]
DXF import [v.in.dxf]
WFS [v.in.wfs]
ESRI e00 import [v.in.e00]
Geonames import [v.in.geonames]
Matlab array or Mapgen format import [v.in.mapgen]
LAS LiDAR points import [v.in.lidar]
Unpack vector map [v.unpack]
Reproject vector map from different GRASS location [v.proj]

IMPORTAR VETOR

v.in.ascii [vector, import, ASCII]

Creates a vector map from an ASCII points file or ASCII vector file.

Required

Input format

Points

Optional

Command output

Manual

Name of input file to be imported: *

(input=name)

/Volumes/MacintoshHD2/Dropbox/USP/aulas/_SIG/SIG_posGrad/2017_

Browse

or enter values directly:

Load

Save as

Name for output vector map: *

(output=name)

davis

Close

Run

Copy

?

☒ Add created map(s) into layer tree

☐ Close dialog on finish

v.in.ascii --overwrite input=/Volumes/MacintoshHD2/Dropbox/USP/aulas/_SIG/SIG_posGrad/2017_IEE/exe

v.in.ascii [vector, import, ASCII]

Creates a vector map from an ASCII points file or ASCII vector file.

Required

Input format

Points

Optional

Command output

Manual

☐ Do not expect a header when reading in standard format

(n)

Input file format:

(format=string)

point

Field separator:

(separator=character)

comma

Text delimiter:

(text=character)

doublequote

Close

Run

Copy

?

☒ Add created map(s) into layer tree

☐ Close dialog on finish

v.in.ascii --overwrite input=/Volumes/MacintoshHD2/Dropbox/USP/aulas/_SIG/SIG_posGrad/2017_IEE/exe

IMPORTAR VETOR

v.in.ascii [vector, import, ASCII]

 Creates a vector map from an ASCII points file or ASCII vector file.

Required Input format **Points** Optional Command output  Manual

☐ Do not create table in points mode (t)

☒ Do not build topology (b)

☐ Only import points falling within current region (points mode) (r)

☐ Ignore broken line(s) in points mode (i)

Number of header lines to skip at top of input file (points mode): (skip=integer)

1

Column definition in SQL style (points mode): (columns=string)

Number of column used as x coordinate (points mode): (x=integer)

1

Number of column used as y coordinate (points mode): (y=integer)

2

Number of column used as z coordinate (points mode): (z=integer)

3

Number of column used as category (points mode): (cat=integer)

0

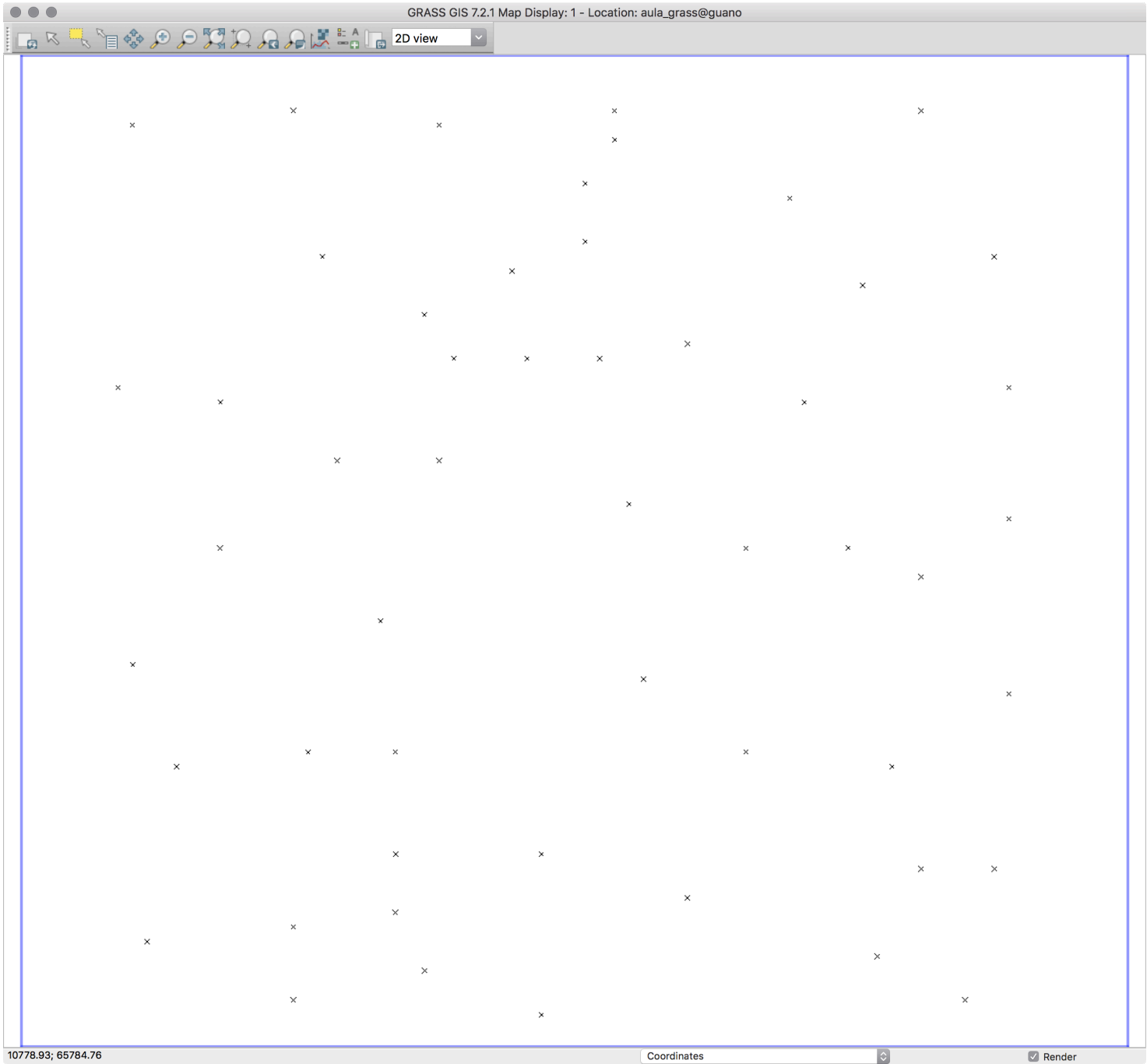
Close Run Copy ?

☒ Add created map(s) into layer tree

☐ Close dialog on finish

v.in.ascii -b --overwrite input=/Volumes/MacintoshHD2/Dropbox/USP/aulas/_SIG/SIG_posGrad/2017_III/

VETOR



INTERPOLAR SUPERFICIE

Develop raster map	▶
Manage colors	▶
Query raster maps	▶
Map type conversions	▶
Raster buffers and distance	▶
Mask [r.mask]	
Raster map calculator [r.mapcalc]	
Neighborhood analysis	▶
Overlay rasters	▶
Solar radiance and shadows	▶
Terrain analysis	▶
Transform features	▶
Hydrologic modeling	▶
Groundwater modeling	▶
Landscape patch analysis	▶
Wildfire modeling	▶
Change category values and labels	▶
Generate random cells	▶
Generate surfaces	▶
Interpolate surfaces	▶
Reports and statistics	▶

Bilinear and bicubic from vector points [v.surf.bspline]
IDW from raster points [r.surf.idw]
IDW from vector points [v.surf.idw]
Raster contours [r.surf.contour]
Regularized spline tension [v.surf.rst]
Raster series interpolation [r.series.interp]
Fill NULL cells [r.fillnulls]

INTERPOLAR SUPERFICIE

v.surf.rst [vector, surface, interpolation, 3D]

Performs surface interpolation from vector points map by splines. Spatial approximation and topographic analysis from given point or isoline data in vector format to floating point raster form using regularized spline with tension.

Required

Selection

Parameters

Outputs

Optional

Command out...

Manual

☐

Perform cross-validation procedure without raster approximation

(c)

☐

Use scale dependent tension

(t)

Name of the attribute column with values to be used for approximation:

(zcolumn=name)

Name of raster map used as mask:

(mask=name)

Tension parameter:

(tension=float)

40.

Smoothing parameter:

(smooth=float)

Name of the attribute column with smoothing parameters:

(smooth_column=string)

Maximum number of points in a segment:

(segmax=integer)

40

Minimum number of points for approximation in a segment (>segmax):

(npmin=integer)

300

Minimum distance between points (to remove almost identical points):

(dmin=float)

Maximum distance between points on isoline (to insert additional points):

(dmax=float)

Conversion factor for values used for approximation:

(zscale=float)

1.0

Anisotropy angle (in degrees counterclockwise from East):

(theta=float)

Anisotropy scaling factor:

(scalex=float)

Close

Run

Copy

?

☒ Add created map(s) into layer tree

☐ Close dialog on finish

v.surf.rst --overwrite input=davis@guano elevation=davis_dem

v.surf.rst [vector, surface, interpolation, 3D]

Performs surface interpolation from vector points map by splines. Spatial approximation and topographic analysis from given point or isoline data in vector format to floating point raster form using regularized spline with tension.

Required

Selection

Parameters

Outputs

Optional

Command out...

Manual

☐

Output partial derivatives instead of topographic parameters

(d)

Name for output surface elevation raster map:

(elevation=name)

davis_dem

Name for output slope raster map:

(slope=name)

Name for output aspect raster map:

(aspect=name)

Name for output profile curvature raster map:

(pcurvature=name)

Name for output tangential curvature raster map:

(tcurvature=name)

Name for output mean curvature raster map:

(mcurvature=name)

Name for output deviations vector point map:

(deviations=name)

Name for output cross-validation errors vector point map:

(cvdev=name)

Name for output vector map showing quadtree segmentation:

(treeseg=name)

Name for output vector map showing overlapping windows:

(overwin=name)

Close

Run

Copy

?

☒ Add created map(s) into layer tree

☐ Close dialog on finish

v.surf.rst --overwrite input=davis@guano elevation=davis_dem

GERAR CURVAS DE NIVEL

r.contour [raster, surface, contours, vector]

 Produces a vector map of specified contours from a raster map.

Required Contour levels Optional Command output  Manual

Name of input raster map: * (input=name)

Name for output vector map: * (output=name)

Close Run Copy ?

☒ Add created map(s) into layer tree
☐ Close dialog on finish

r.contour --overwrite input=davis_dem@guano output=davis_dem_r50m_c10m step=10

r.contour [raster, surface, contours, vector]

 Produces a vector map of specified contours from a raster map.

Required Contour levels Optional Command output  Manual

Increment between contour levels: (step=float)

[multiple] List of contour levels: (levels=float)

Minimum contour level: (minlevel=float)

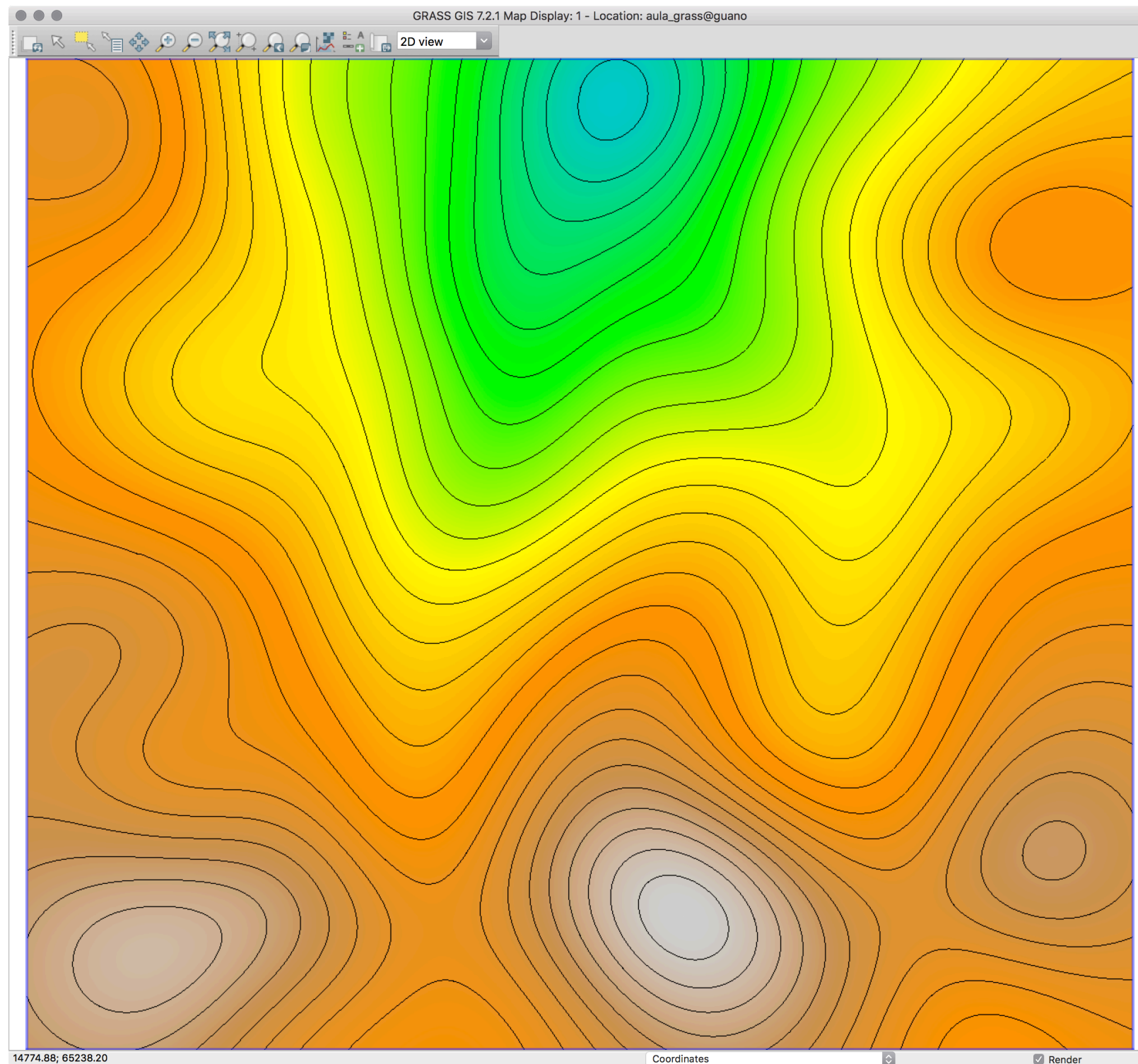
Maximum contour level: (maxlevel=float)

Close Run Copy ?

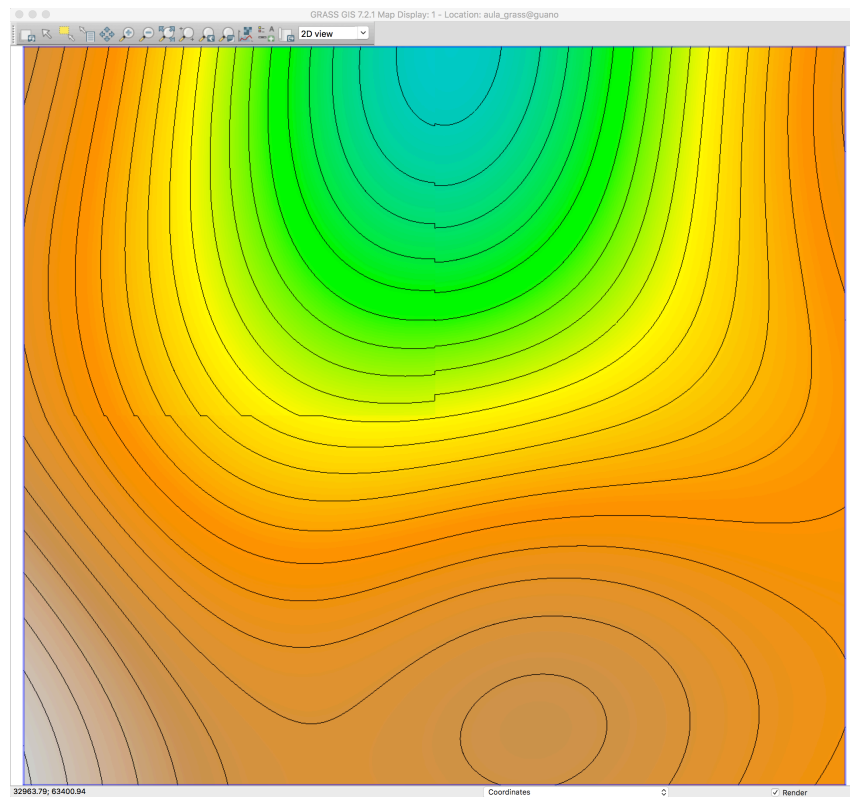
☒ Add created map(s) into layer tree
☐ Close dialog on finish

r.contour --overwrite input=davis_dem@guano output=davis_dem_r50m_c10m step=10

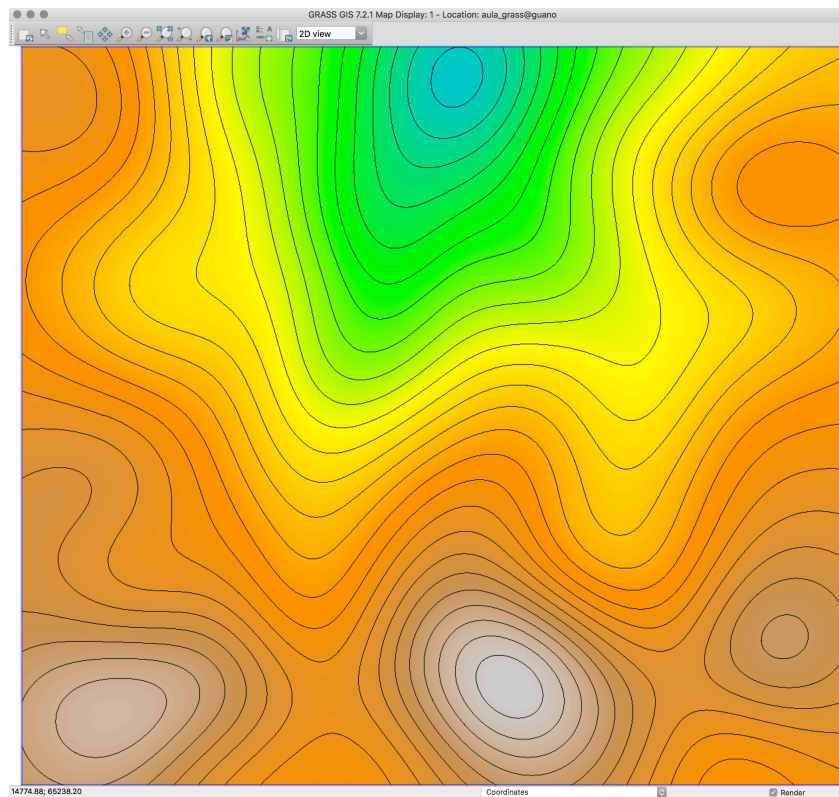
DEM + CURVAS DE NIVEL



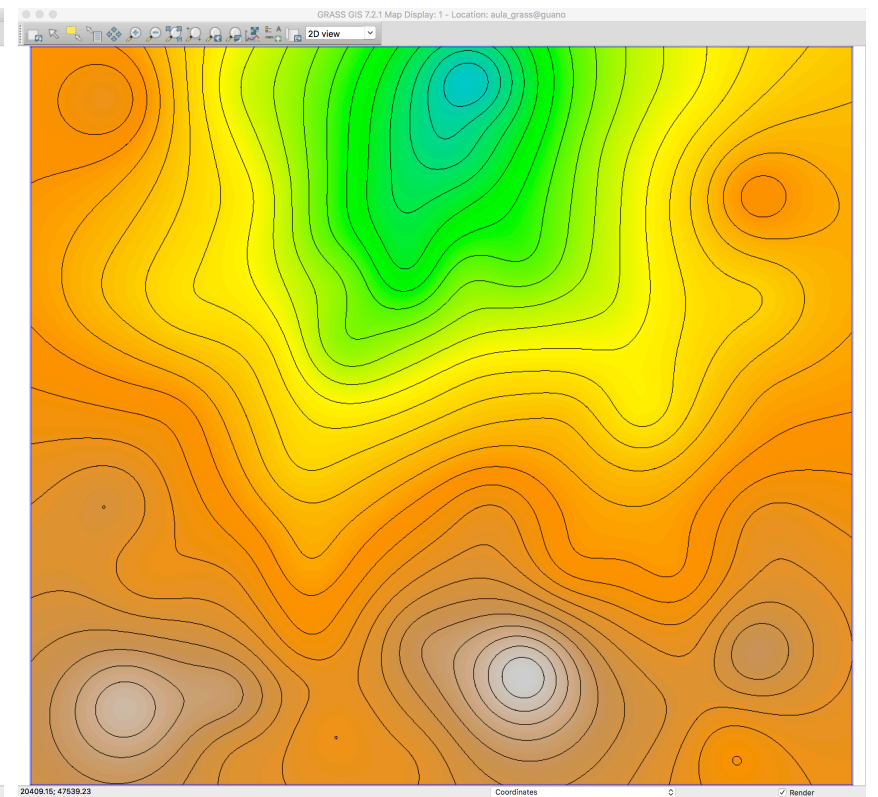
DEM + CURVAS DE NIVEL



T=10



T=40



T=100

INTERPOLAR SUPERFICIE + DERIVADAS

v.surf.rst [vector, surface, interpolation, 3D]

Performs surface interpolation from vector points map by splines. Spatial approximation and topographic analysis from given point or isoline data in vector format to floating point raster form using regularized spline with tension.

Required

Selection

Parameters

Outputs

Optional

Command out...

Manual

☐

Output partial derivatives instead of topographic parameters

(d)

Name for output surface elevation raster map:

(elevation=name)

davis_dem_t40

Name for output slope raster map:

(slope=name)

davis_dem_t40_slope

Name for output aspect raster map:

(aspect=name)

davis_dem_t40_aspect

Name for output profile curvature raster map:

(pcurvature=name)

davis_dem_t40_pcurv

Name for output tangential curvature raster map:

(tcurvature=name)

davis_dem_t40_tcurv

Name for output mean curvature raster map:

(mcurvature=name)

Name for output deviations vector point map:

(deviations=name)

Name for output cross-validation errors vector point map:

(cvdev=name)

Name for output vector map showing quadtree segmentation:

(treeseg=name)

Name for output vector map showing overlapping windows:

(overwin=name)

Close

Run

Copy

?

☒

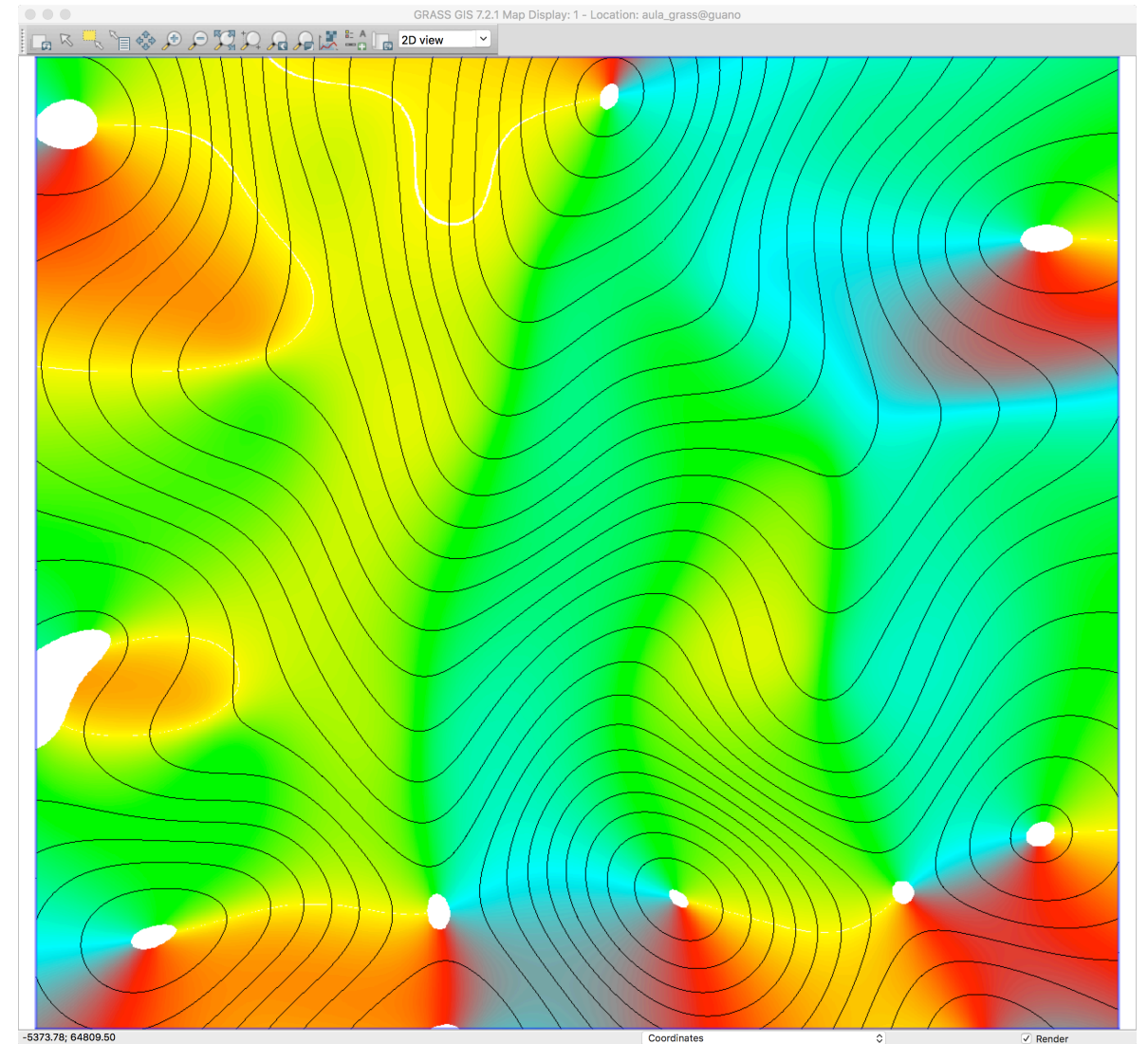
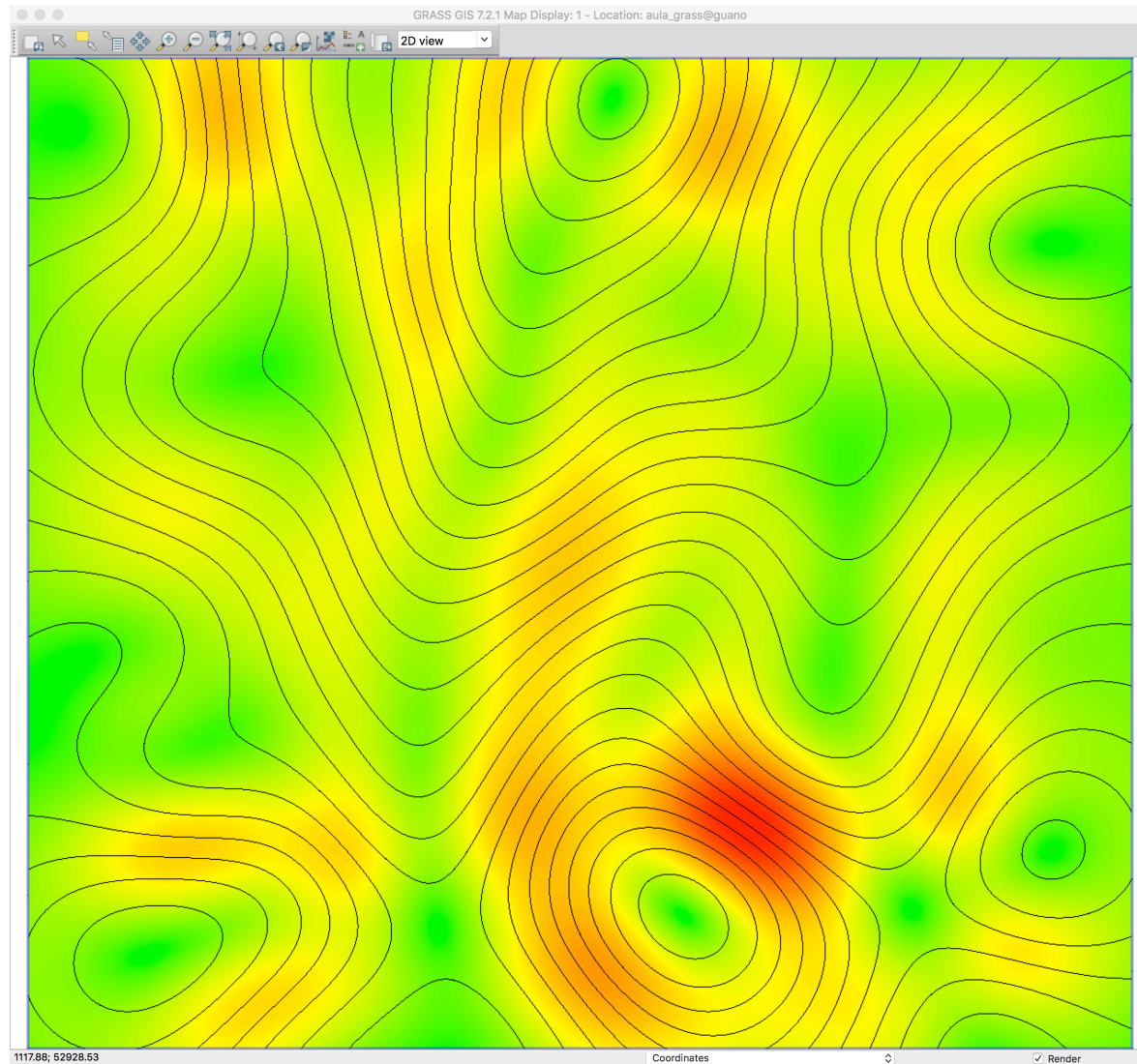
Add created map(s) into layer tree

☐

Close dialog on finish

v.surf.rst --overwrite input=davis@guano elevation=davis_dem_t40 slope=davis_dem_t40_slope aspect=davis_dem_t

DECLIVIDADE / ASPECTO



CURVATURAS

