Introducere în GRASS

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Structura prezentarii

1.Introducere in GRASS GIS

2.Operare in GRASS GIS

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I NTRODUCERE G R A S S GIS

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Ce este GRASS?

GRASS = IARBA

IARBA, IERBURI, [substantiv feminin] = Nume generic dat plantelor erbacee, anuale sau perene, cu partile aeriene verzi, subtiri si mladioase, folosite pentru hrana animalelor.

GRASS GIS (**G**eographic **R**esources **A**nalysis **S**upport **S**ystem),
un **S**ystem **I**nformational **G**eografic (GIS).
Acesta este disponibil sub GNU **G**eneral **P**ublic **L**icense (GPL).

Este o parte din familia proiectelor **OSGeo**

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De unde vine GRASS?

GRASS a fost iniţial dezvoltat la începutul anului 1980 de către **US A**rmy **C**onstruction **E**ngineering **R**esearch **L**aboratories (USA-CERL) si a fost distribuit ca un software public.

GRASS a fost în dezvoltare continuă din anul 1982 (a fost distribuit publicului în 1989, dar a avut o răspândire mare odată cu apariţia Internetului în anul 90).

GRASS a implicat un număr mare de agenţii federale din SUA, universităţi şi companii private: NASA, NOAA, USDA, National Park Service, SUA Census Bureau, USGS.

USA-CERL s-a implicat in dezvoltarea GRASS pana la versiunea 4.1 în 1992, au adăugat cinci patch-uri diferite şi actualizări si a scris si componentele de bază ale GRASS 5.0 (1995)

Din 1997, proiectul a fost realizat de **Grupul de Cercetare GRASS** de Universitatea Baylor,Waco (Texas), S.U.A. care a lansat versiunea 4.2 şi, împreună cu alte organisme de dezvoltare, GRASS s-a actualizat şi a fost detectată de către un grup de cercetatori de la Universitatea Hanovra condus de **Markus Neteler** care a supervizat dezvoltarea versiunii 5 si a urmatoarelor.

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De unde vine GRASS?

In perioada 1998-2001, **GRASS** a fost găzduit la Universitatea din Hanovra, Germania.

In perioada 2001-2007, **GRASS** a fost găzduit la ITC-IRST, Trento, Italia.

GRASS este dezvoltat de o retea mondiala de dezvoltatori care continua sa lanseze în mod regulat noi versiuni.

Din 2008 site-ul web principal, GRASS mailing list-uri ale dezvoltatorilor şi alte listele suplimentare de discutii sunt gazduite la **Fundatia OSGeo** în SUA.

Codul sursa este menţinut într-un server SVN (Apache Subversion).
Proiectul GRASS este sprijinit de numeroase site-uri mirror.

Apache Subversion (SVN abreviat, după numele comenzii „*svn*”) management al versiunilor de software şi un sistem de control si revizuire fondat şi sponsorizat în anul 2000 de către **CollabNet Inc.** Acesta menţine versiunile curente şi istorice de fişiere, cum ar fi codul sursa, pagini web, şi documentaţie.

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Promotorii GRASS

Markus Neteler - Germania

2005 – 2010 PHD Spatio-temporal reconstruction of satellite-based temperature maps and their application to the prediction of tick and mosquito disease vector distribution in Northern Italy - University of Hannover (Germany)

Oct. 1993 - March 1999, DIPLOM-GEOGRAPH (Degree in Physical Geography and Landscape Ecology) UNIVERSITY OF HANNOVER

Oct. 1990 - Oct. 1993 UNIVERSITY OF HANNOVER, B.Sc. in Electrical Engineering ("Vordiplom")

Helena Mitashova - Slovacia

2008 – present: Associate Professor, Department of Marine, Earth and Atmospheric Sciences (MEAS), North Carolina State University (NCSU), Raleigh

1987 Ph.D. in Geodesy and Cartography, College of Civil Engineering, Slovak Technical University, Bratislava, Czechoslovakia

1981 M.S. (dipl. Ing) in Geodesy and Cartography, College of Civil Engineering, SlovakTechnical University with the Highest Scholastic Honors, Bratislava, Czechoslovakia

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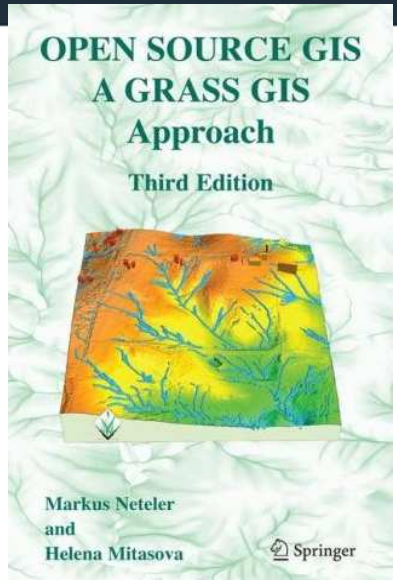
Bibliografie GRASS



Markus Neteler and Helena Mitasova, 2008,
Open Source GIS: A GRASS GIS Approach. Third Edition.
Springer, New York

GRASS GIS 6.0 Tutorial, 2005 Version 1.2 - GDF Hannover

Google
România

grass gis

Căutare Google | Mă simt norocos

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De unde obtin GRASS?

Site oficial:
http://grass.osgeo.org/

Mirror:
http://grass.unibuc.ro/index.php

European mirrors HTTP:

- Finland (**Tier 1**)
- France (**Tier 1**, CICT - Université de Toulouse)
- Germany (**Tier 1**, Univ. of Hannover)
- Germany (**Tier 1**, Netmirror)
- Italy (**Tier 1**)
- Russia (**Tier 1**, gis-lab.info)
- Slovakia (**Tier 1**)
- Bulgaria (Tier 2, Sofia University)
- Croatia (Tier 2, FER)
- Germany (Tier 2, ZdG GmbH)
- France (Tier 2, Univ. of Bourgogne)
- France (Tier 2, ZdG GmbH)
- Germany (Tier 2, Univ. of Duisburg)
- Germany (Tier 2, online-mirror.de)
- Germany (Tier 2, very-clever.com)
- Italy (Tier 2, Univ. of Parma)
- Italy (Tier 2, ominiverdi.org)
- Poland (Tier 2, Wroclaw Univ.)
- Poland (Tier 2, Cracow)
- Romania (Tier 2, Univ. of Bucharest)
- Slovakia (Tier 2, Prime Interactive Ltd.)
- Turkey (Tier 2, Istanbul Teknik Üniversitesi)

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De unde obtin GRASS?

GRASS - USB

- slaxGIS: All in one USB stick!
- FOSSGIS on USB Stick: All in one USB stick!

GRASS – CD/DVD

- ArcheOS: The first GNU/Linux distribution for archaeology (screenshots)
- DebianGIS Live Image - (development project)
- FOSS4G Toolkit CD - includes FOSS4G tools such as GRASS-GIS, MapServer, GDAL, OSSIM, QGIS, PostGIS, Mapbuilder, Mapbender, Cartoweb, Appformap, kaMap, Worldkit, Plone, PrimaGIS, and many other FOSS4G tools.
- FOSS4G2006: Lausanne/Switzerland GRASS Workshop LiveCD 2006
- FOSS4G 2008 live Workshop DVD: conference workshop "Practical Introduction to GRASS and related software for beginners" Workshop. The DVD is based on Kubuntu.
- geobuntu: Xubuntu based LiveCD with latest and greatest FOSSGIS tools
- GISAK - Knoppix based GIS LiveCD
- Italian GRASS DVD: Italian Kubuntu/The Open CD derivate with GRASS 6 and QGIS + data + tutorials (the DVD also contains GFOSS software for MS-Windows)
- Ominiverdi LiveCD Project: Installable LiveCD with GRASS, QGIS, R, PostGIS, sample data and much more Latest update
- **OSGeo Live GIS Disc** - The Live DVD contains a collection of the best Geospatial Open Source software, pre-configured with sample data.
- Poseidon Linux: It contains GRASS, GMT and QGIS (all packages maintained by DebianGIS) as well as SPRING GIS, Terraview, R, Octave, MB-System, OpenDX, Lyx, Kile, Vis5D, etc.
- SOURCEPOLE GIS Knoppix: GRASS, UMN MapServer, MapLab

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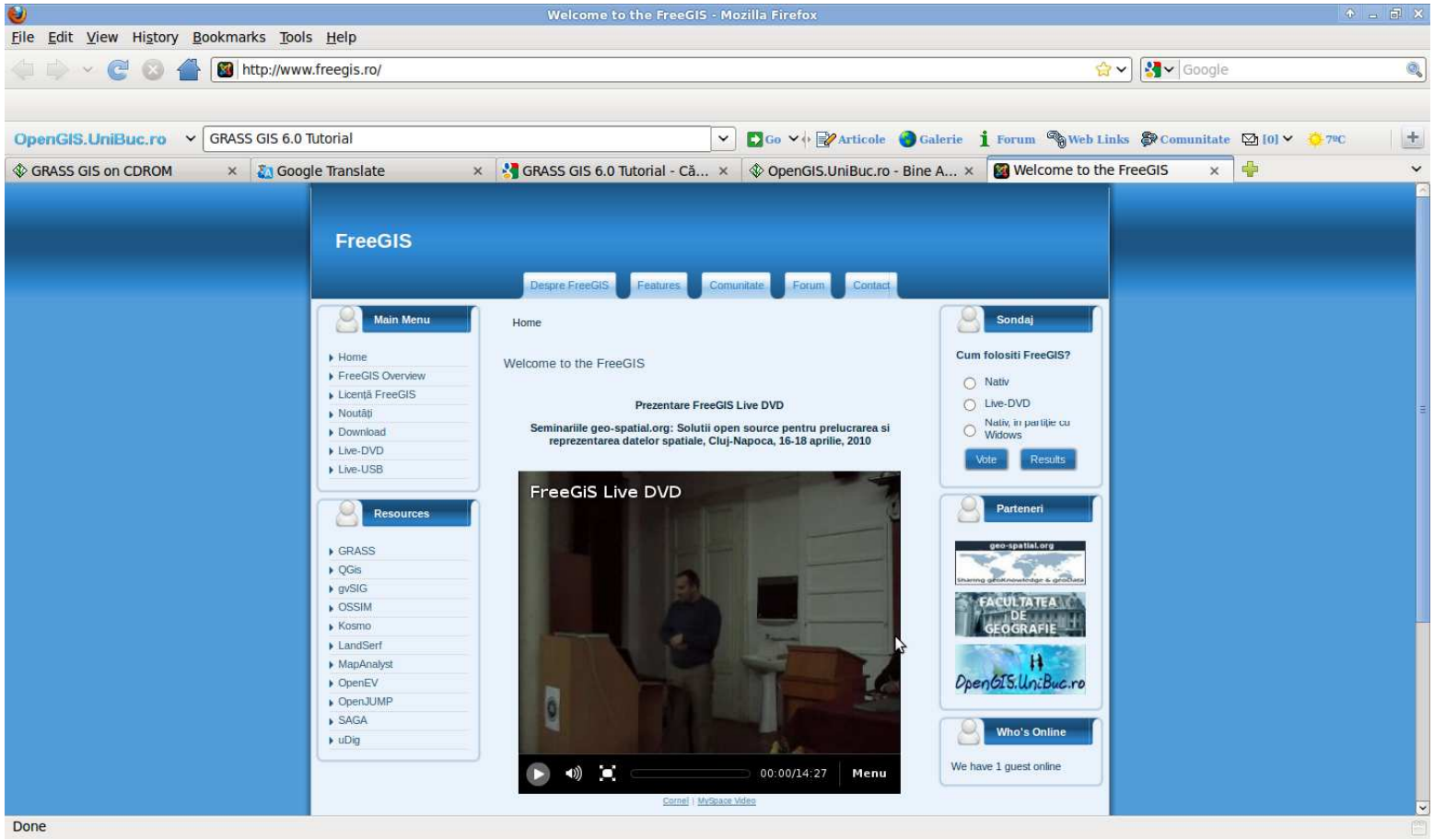
De unde obtin GRASS?

GRASS – FreeGIS Live DVD



http://www.freegis.ro

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Câte versiuni de GRASS sunt?

GRASS 6.4.0

STABLE

GRASS 6.4.0 (stable version; new wxPython GUI, more...)
Most users will want to install this version.

Binaries	*Source code*	*Manuals*
GNU/Linux: • Debian • Mandriva (urpmi grass) • OpenSUSE (Geo Repo) • Red Hat Enterprise Linux (RHEL, CentOS and Scientific Linux) • Ubuntu (9.04, 9.10, 10.04) • Generic weekly snapshot Mac OSX MS-Windows	• grass-6.4.0.tar.gz (md5sum) • Weekly 6.4-svn snapshot • Download latest 6.4-svn code • 6.4-svn source code browser	• User manual pages • Programmer's Manual • Compiling source code

GRASS 6.5

GRASS 6.5 (restricted development; testbed for backporting, more...)
Utility version for developers.

Binaries	*Source code*	*Manuals*
Weekly snapshot: Generic GNU/Linux Daily snapshot: MS-Windows	• Weekly 6.5-svn snapshot • Download latest 6.5-svn code • 6.5-svn source code browser	• User manual pages • Programmer's Manual • Compiling source code

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Câte versiuni de GRASS sunt?

GRASS 7

NEW DEVEL	GRASS 7 (active development version; partial rewrite, more...) Unstable and experimental, but usually works. Compatibility with earlier versions is not guaranteed.		
	Binaries	***Source code***	***Manuals***
	Weekly snapshot: Generic GNU/Linux Daily snapshot: MS-Windows	• Weekly 7.0-svn snapshot • Download latest 7.0-svn code • 7.0-svn source code browser	• User manual pages • Programmer's Manual • Compiling source code

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Ce face GRASS?

- ✓Operare pe platforme LINUX, Windows, Mac OsX
- ✓Interoperabilitate cu standardele raster si vector
- ✓Analiza vector 2D/3D
- ✓Analiza raster 2D/3D
- ✓Procesarea imaginilor
- ✓Vizualizarea hartilor in format 2D/3D

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OPERARE GRASS GIS

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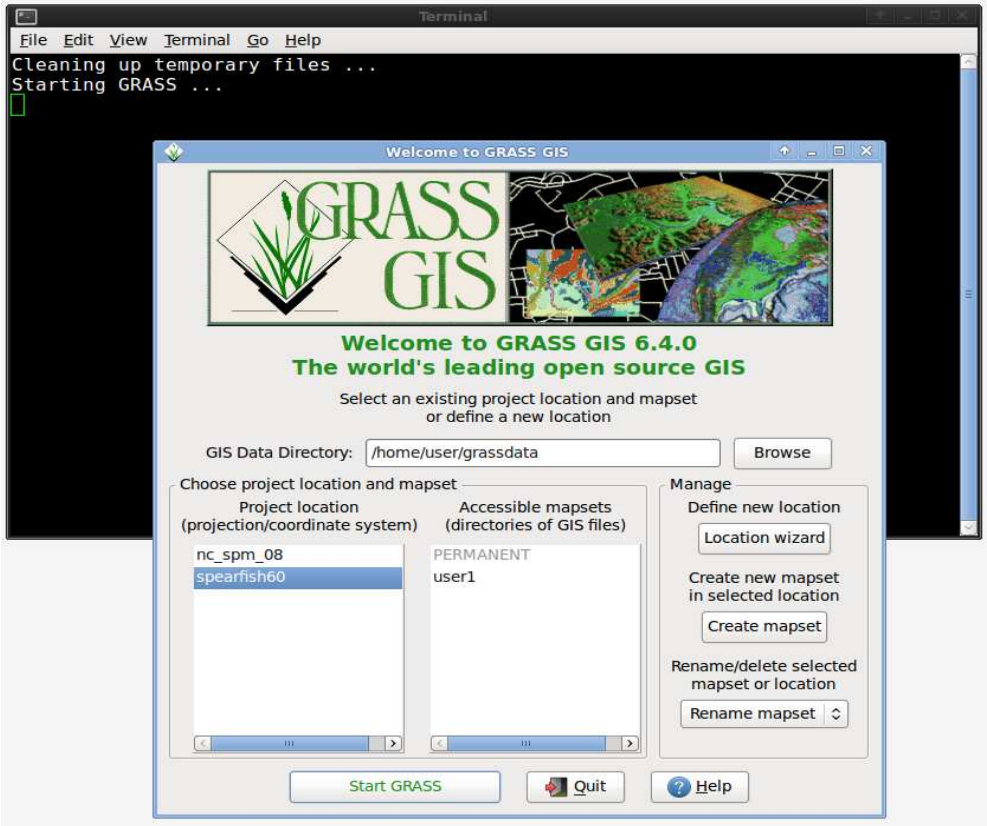
Pornire GRASS

1. Executam in terminal comanda: `grass -wxpython`
1'. Executam in terminal comanda: `grass -tcltk`
2. Accesam `Applications>Education>GRASS GIS`



`wxGUI` este noua interfata a GRASS GIS.
Este succesoarea interfetei `Tcl/Tk GUI` din GRASS 6.

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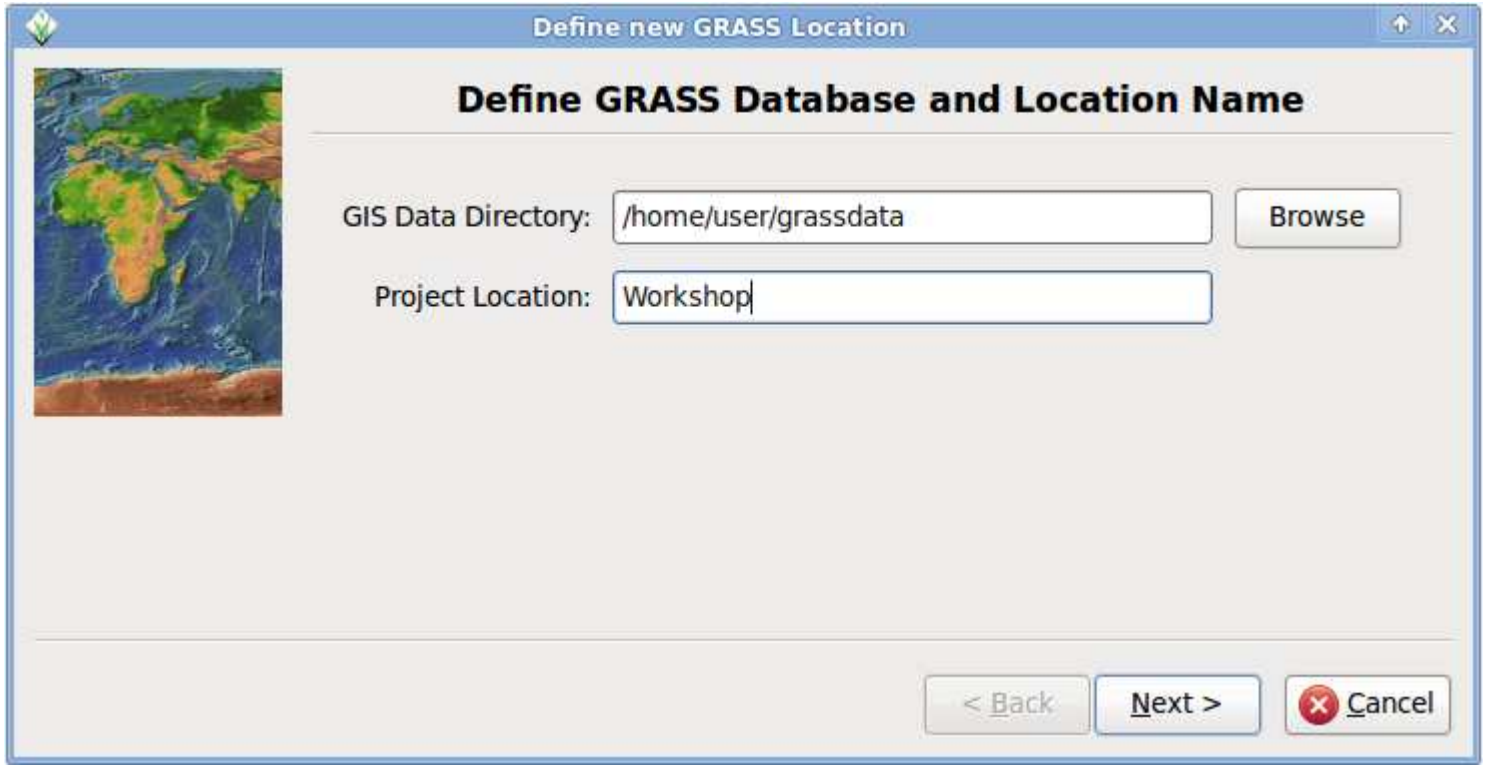
Stabilirea zonei de lucru

1. Accesam `Location wizard` pentru definirea unei noi zone de lucru
2. Stabilim directorul de lucru: `/home/user/grassdata`
3. Stabilim numele zonei de lucru: `Workshop`
4. Apasam butonul: `Next>`



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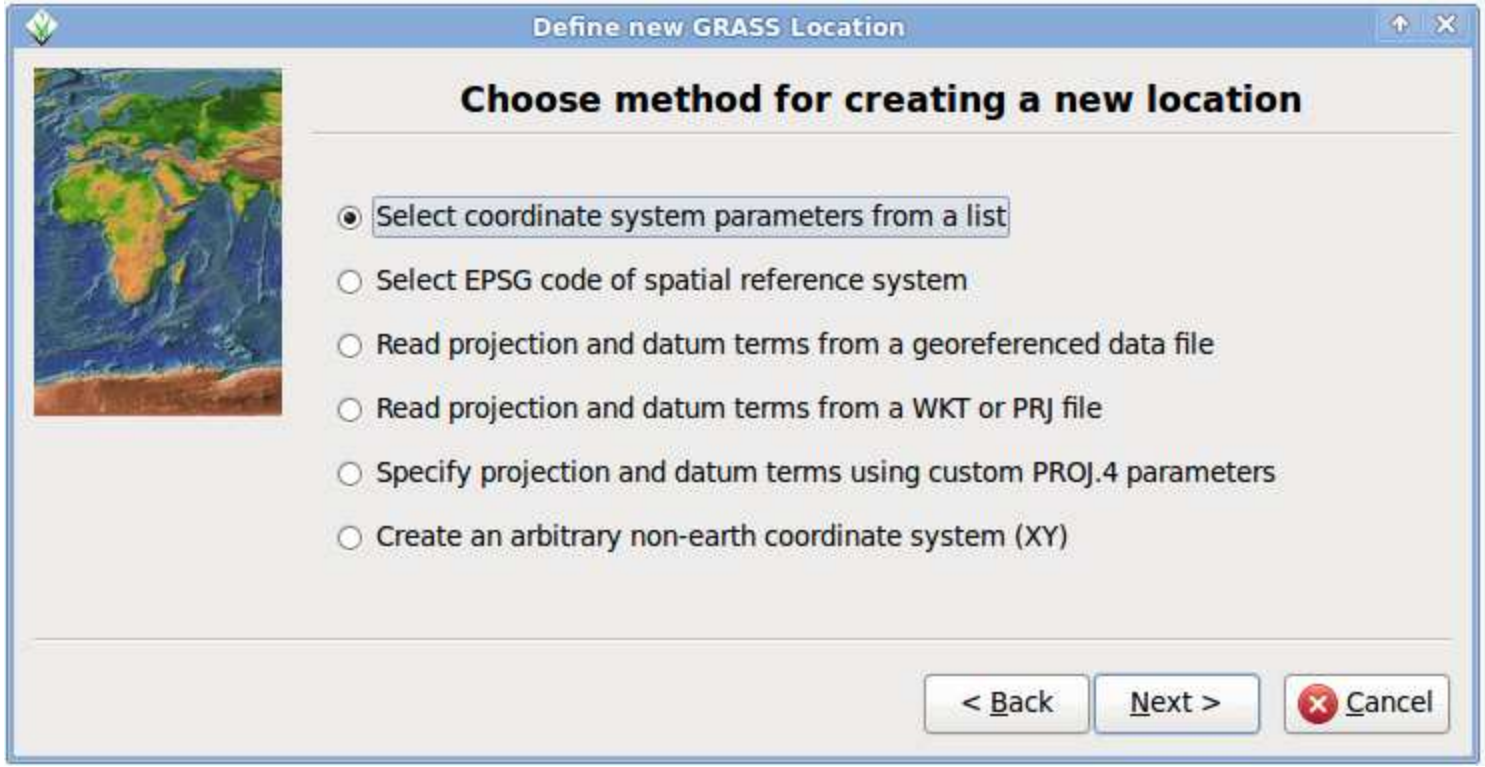
Stabilirea zonei de lucru

1. Alegem `Select coordinate system parameters from a list` pentru definirea coordonetelor
2. Apasam butonul: `Next>`



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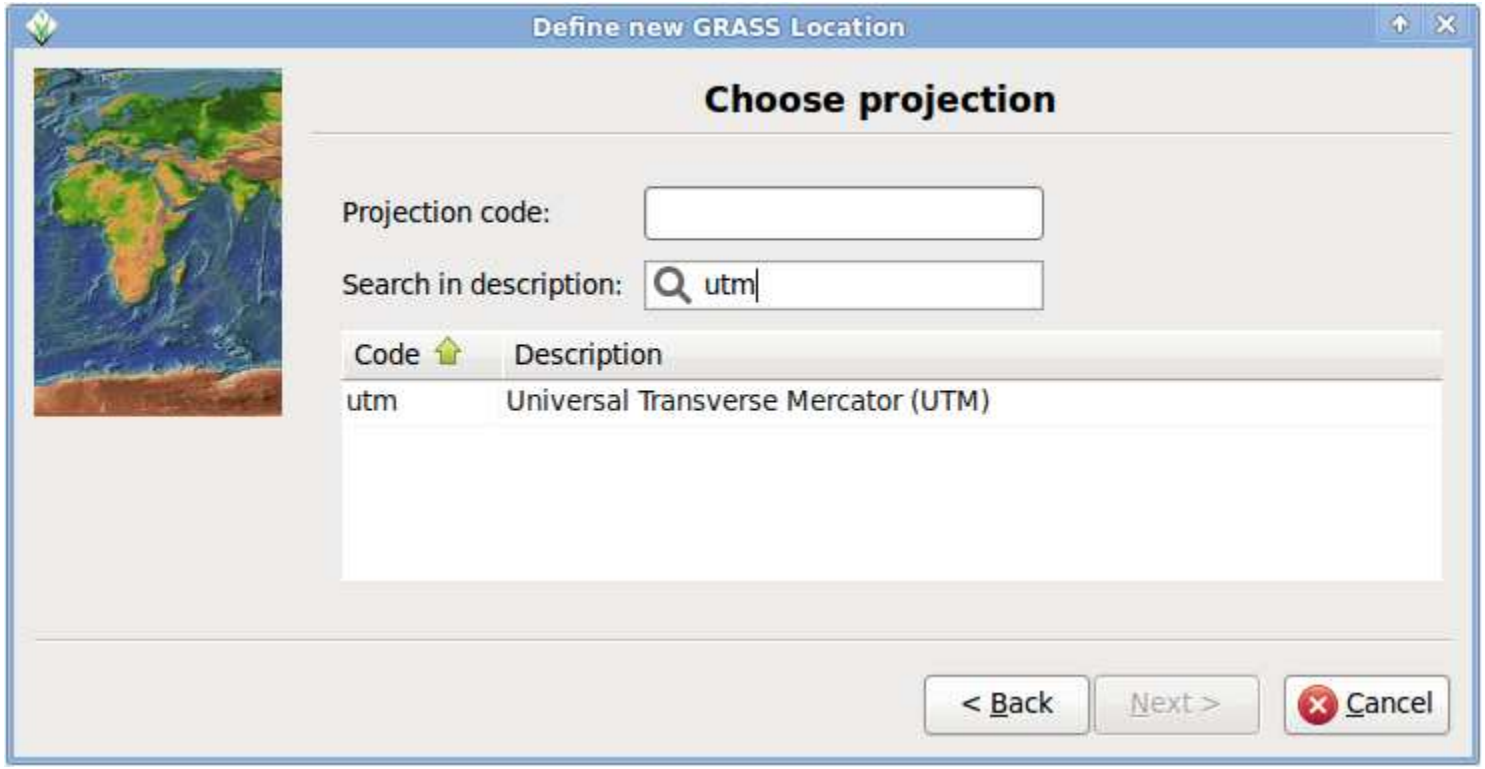
Stabilirea zonei de lucru

1. Cautam proiectia `Universal Transverse Mercator (UTM)`si o selectam

2. Apasam butonul: `Next>`



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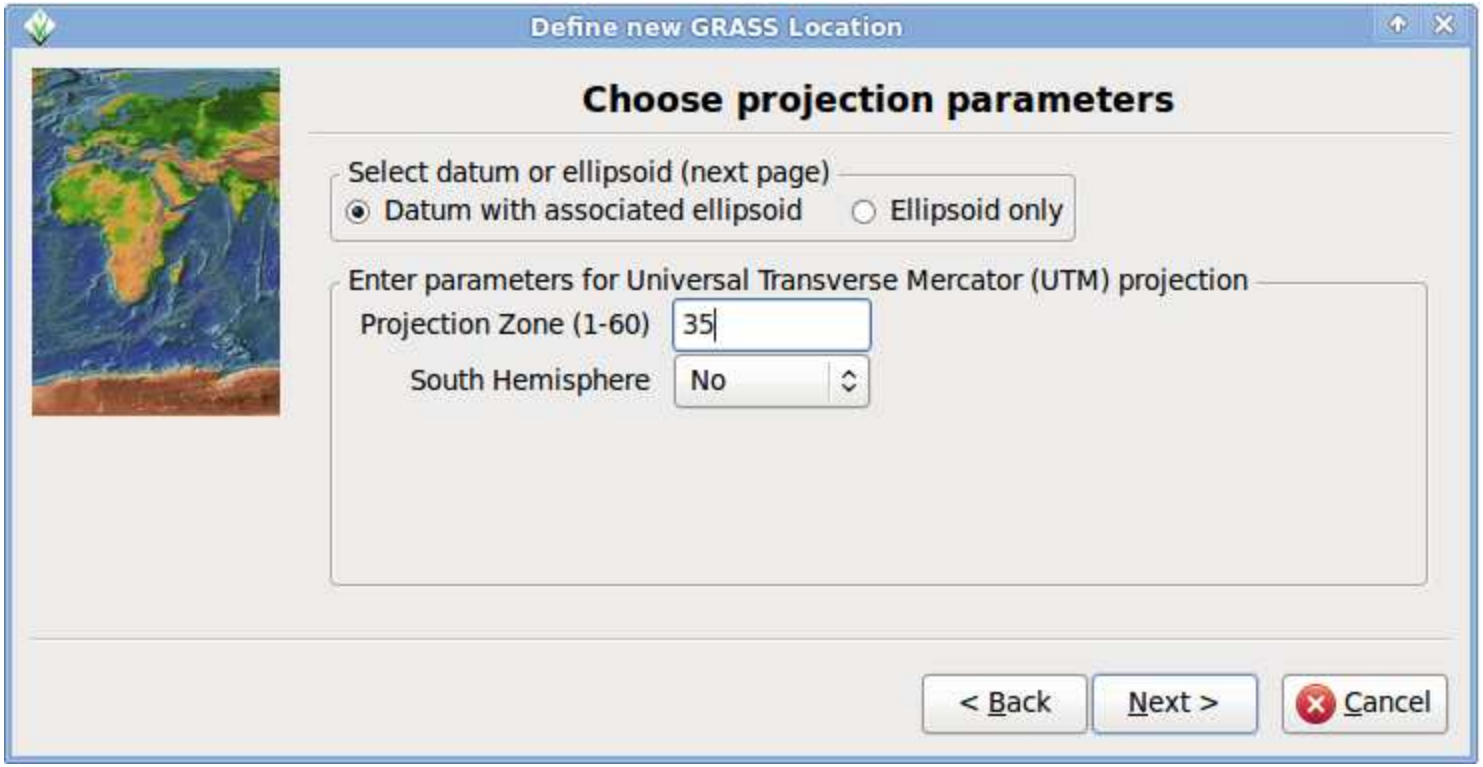
Stabilirea zonei de lucru

1. Alegem zona `35` si `Datum with associated ellipsoid`

2. Apasam butonul: `Next>`



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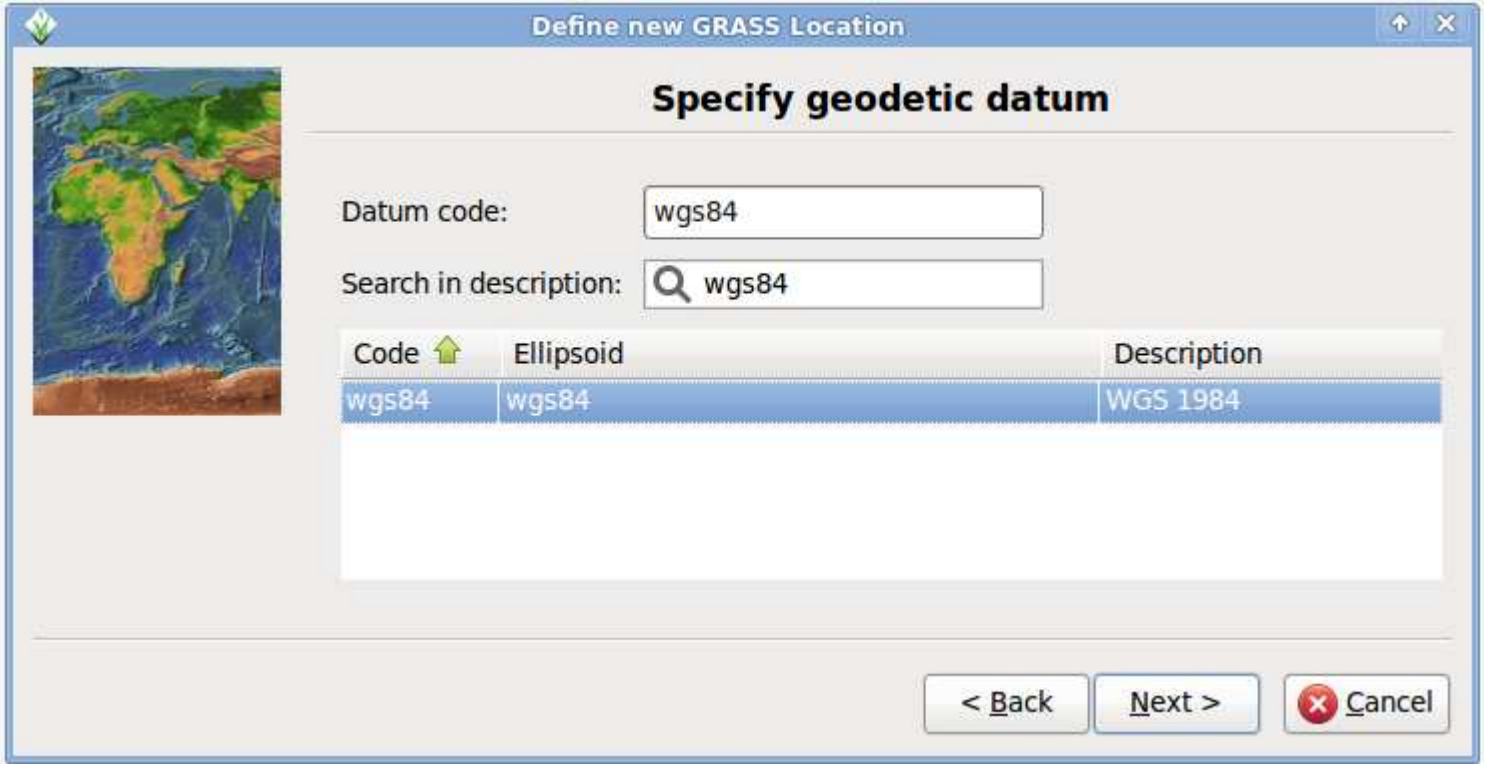
Stabilirea zonei de lucru

1. Cautam elipsoidul `wgs84` si il selectam

2. Apasam butonul: `Next>`



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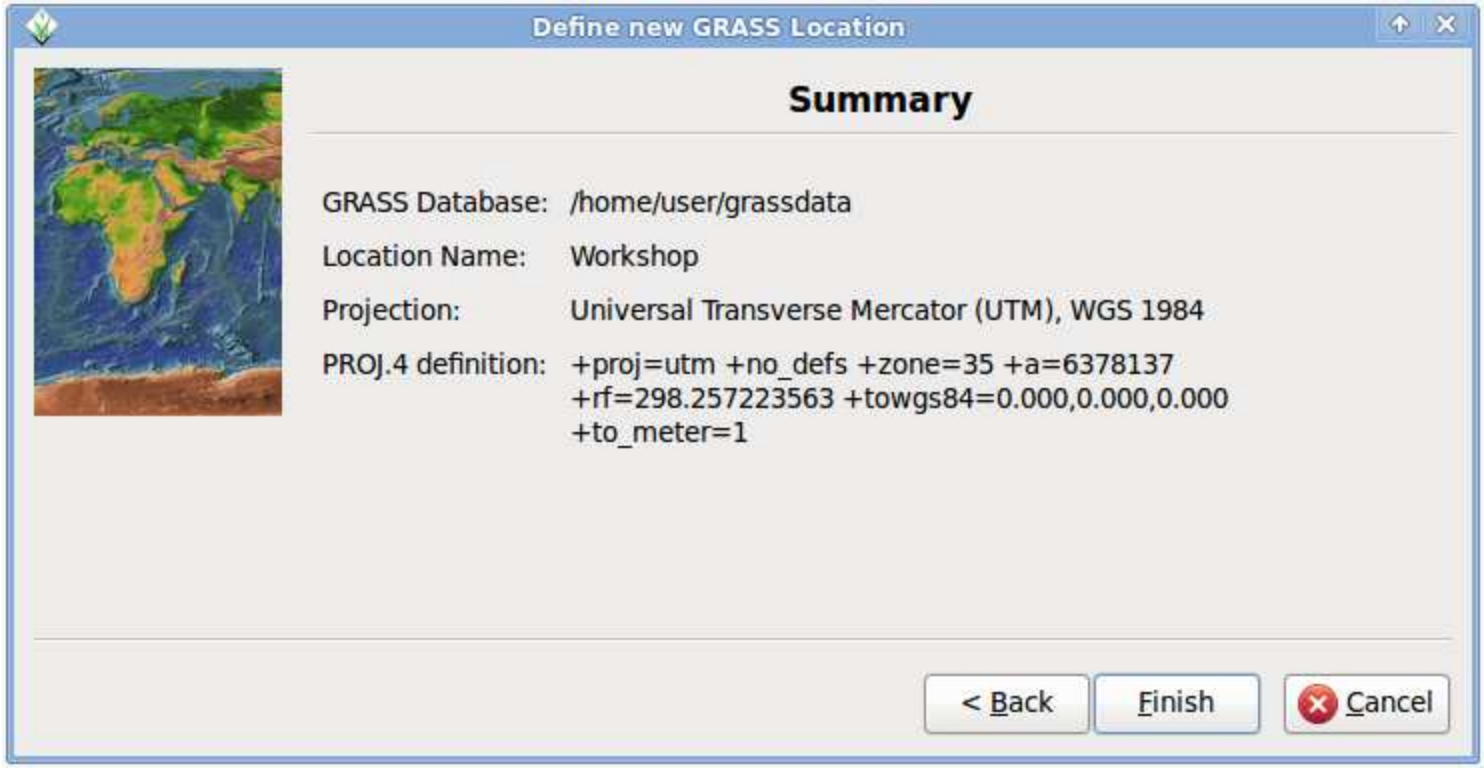
Stabilirea zonei de lucru

1. Se afiseaza datele zonei de lucru

2. Apasam butonul: `Finish`



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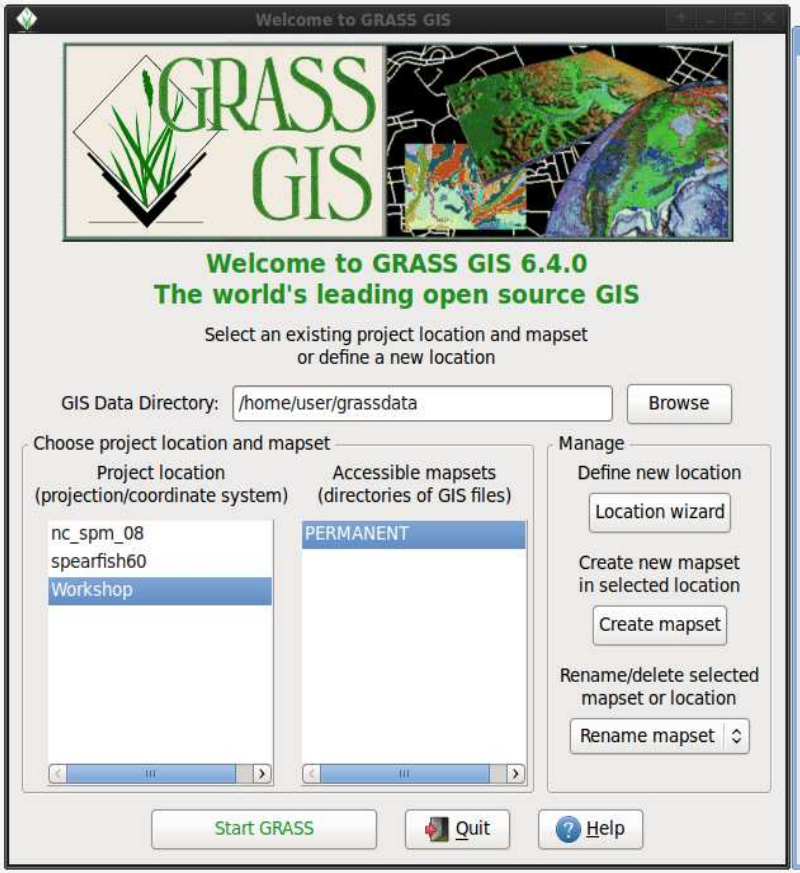
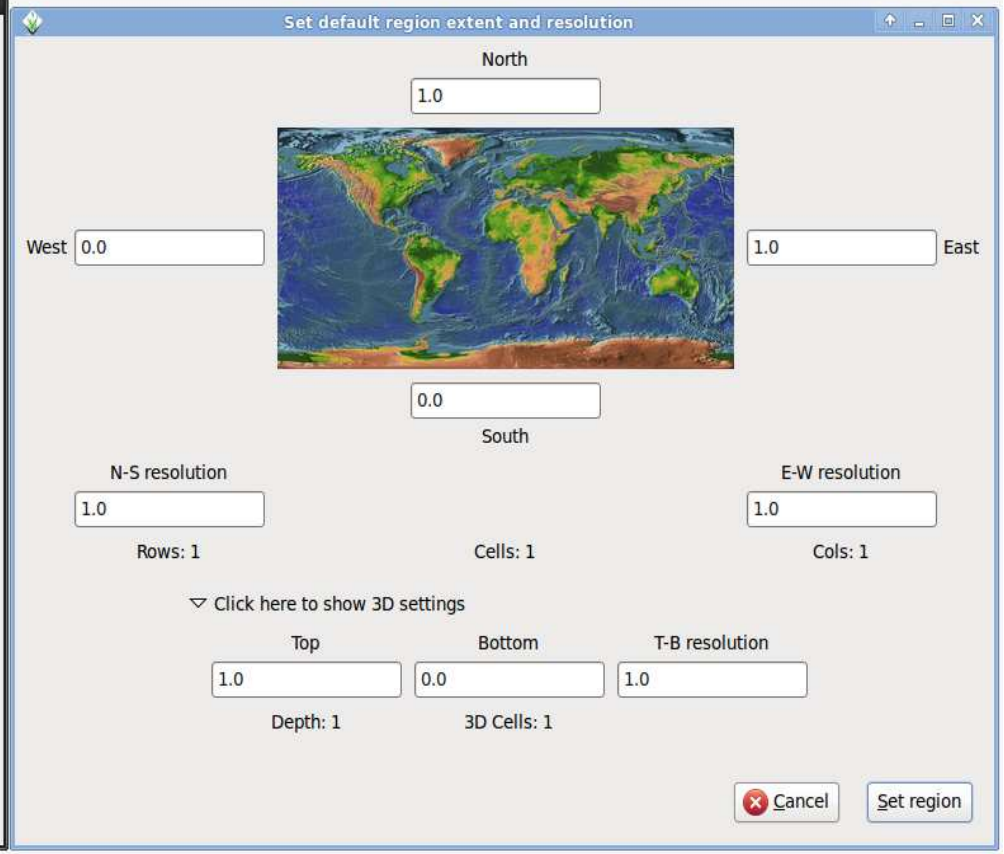
Stabilirea zonei de lucru

1. Stabilim marginile si proprietatile zonei de lucru

2. Apasam butonul: `Set region`

3.Apasam butonul `Start GRASS` pentru a porni programul





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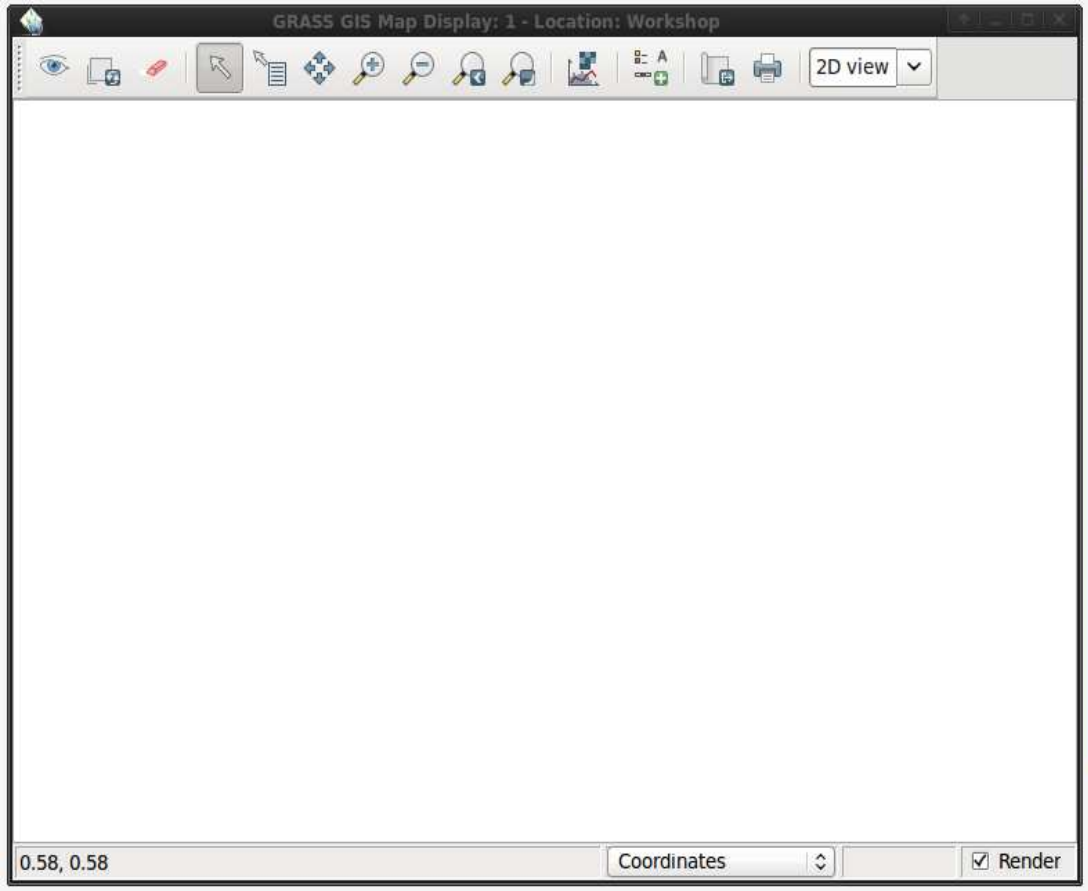
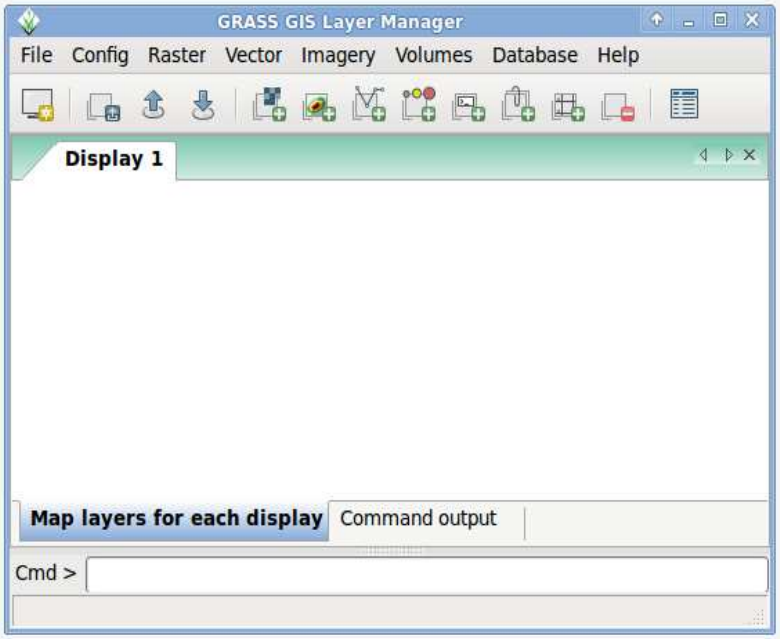
Stabilirea zonei de lucru

Ferestrele de lucru

Fereastra de vizualizare



Fereastra de manipulare a stratelor



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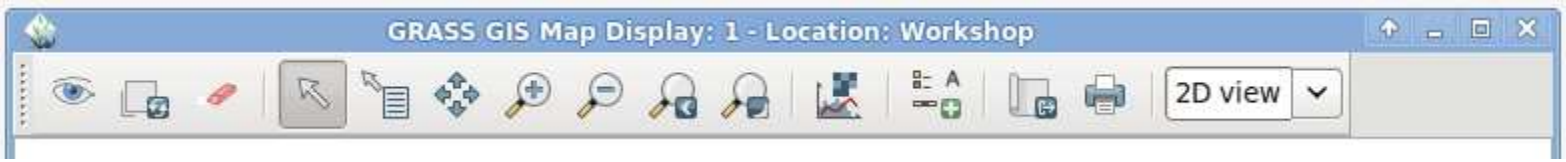
Fereastra de vizualizare



`Display map:` Afiseaza harta in spatiul de lucru
`Re-render map:` Redeseneaza harta
`Display erase:` Sterge harta
`Pointer:` Selecteaza pointer-ul
`Query raster/vector map(s):` Interogheaza harta afisata
`Pan:` Muta stanga-dreapta, jos-sus harta in spatiul de lucru
`Zoom in:` Mareste harta
`Zoom out:` Miscoreaza harta
`Return to previous zoom:` Intoarcere la zoom-ul anterior
`Zoom options:` Seteaza proprietatile functiei zoom
`Analyze:` Analizeaza harta afisata
`Add map elements:` Adauga elementele grafice ale hartii (scara, legenda, titlu)
`Save display to graphic file:` Salveaza spatiul de lucru in format imagine
`Print display:` Imprima spatiul de lucru

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Fereastra de manipulare

Bara de meniuri

File Config Raster Vector Imagery Volumes Database Help

`File:` optiuni pentru lucrul cu fisierele
`Config:` configureaza zona de lucru
`Raster:` manipuleaza datele rester
`Vector:` manipuleaza datele vectoriale
`Imagery:` manipuleaza datele tip imagine
`Volume:` folosit pentru calcule volumetrice
`Databese:` manipuleaza bazele de date
`Help:` ajutor

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Fereastra de manipulare

Bara de butoane

`Start new display:` deschide o noua fereastra de vizualizare
`Load map layers:` incarca straturile
`Open existing workspace file:` deschide un mediu de lucru existent
`Save current existing workspace to file:` salveaza mediul de lucru curent
`Add raster map layer:` adauga un strat raster
`Add various raster-based map layers:` adauga strat raster sub forma de grup
`Add vector map layer:` adauga un strat vectorial
`Add various vector-based map layers:` adauga strat vectorial sub foma de grup
`Add command layer:` adauga un strat tip comanda
`Add layer group:` adauga un grup de straturi
`Add grid or vector labels overlay:` adauga gridul matematic sau etichete
`Delete selected layer:` starge stratul selectat
`Show attribute table:` vizualizeaza tabelul de atribute al stratului selectat

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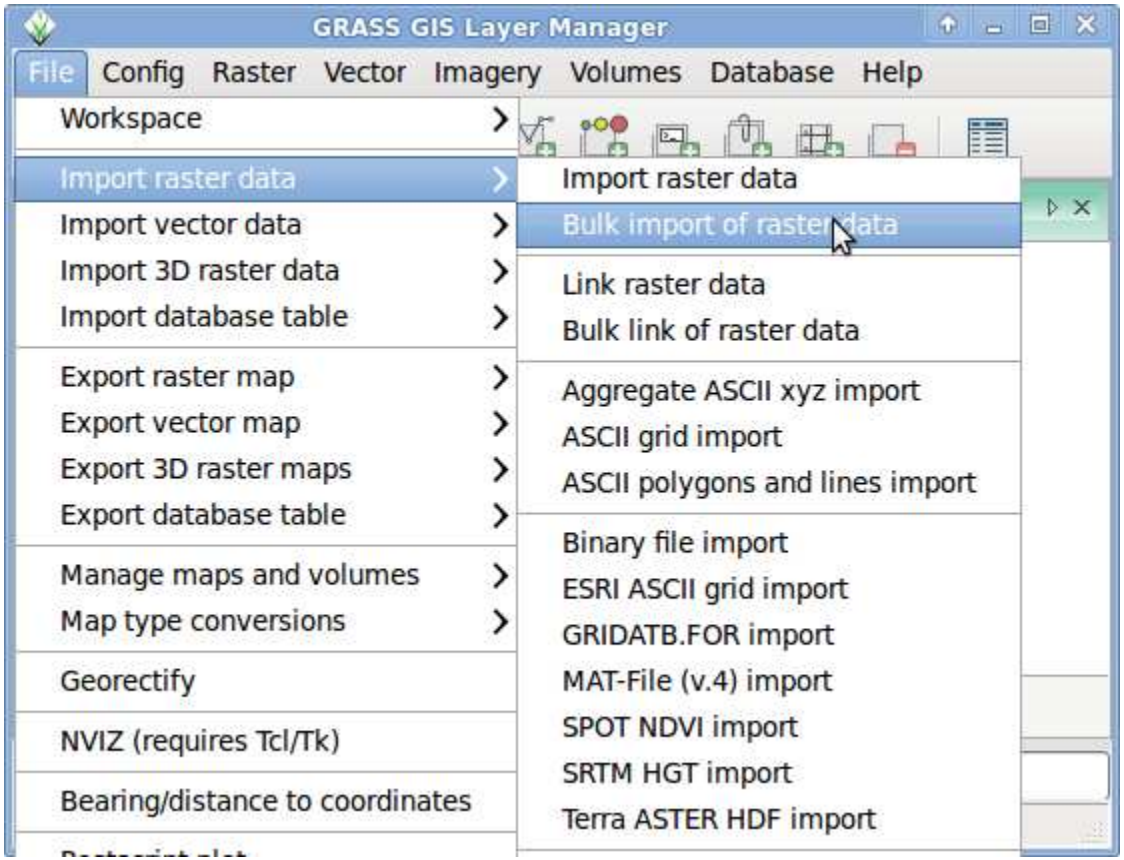
Manipularea datelor in GRASS

Importul datelor raster

Efectuam comada: `File > Import raster data > Bulk import of raster data`



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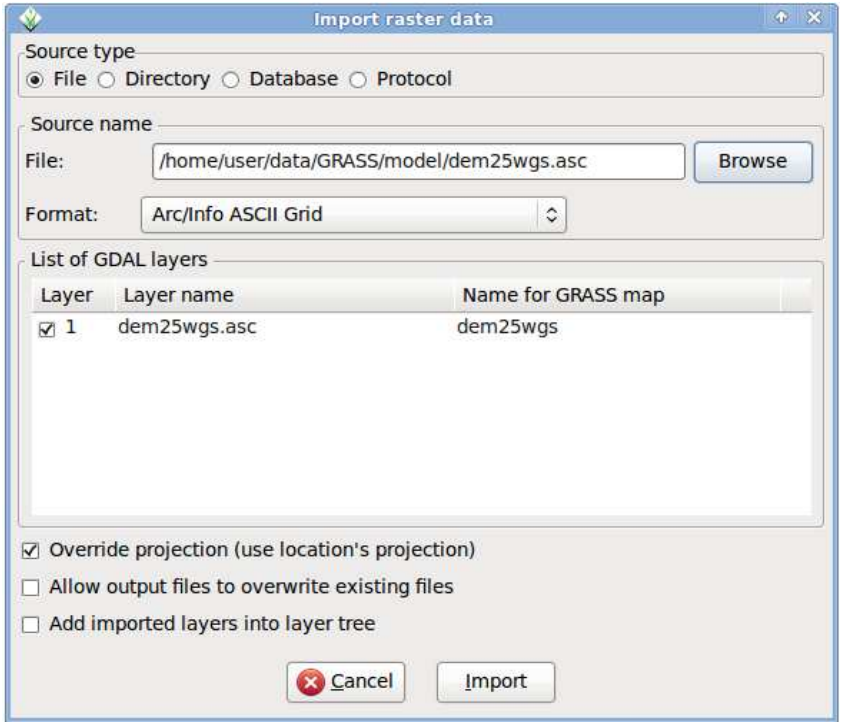
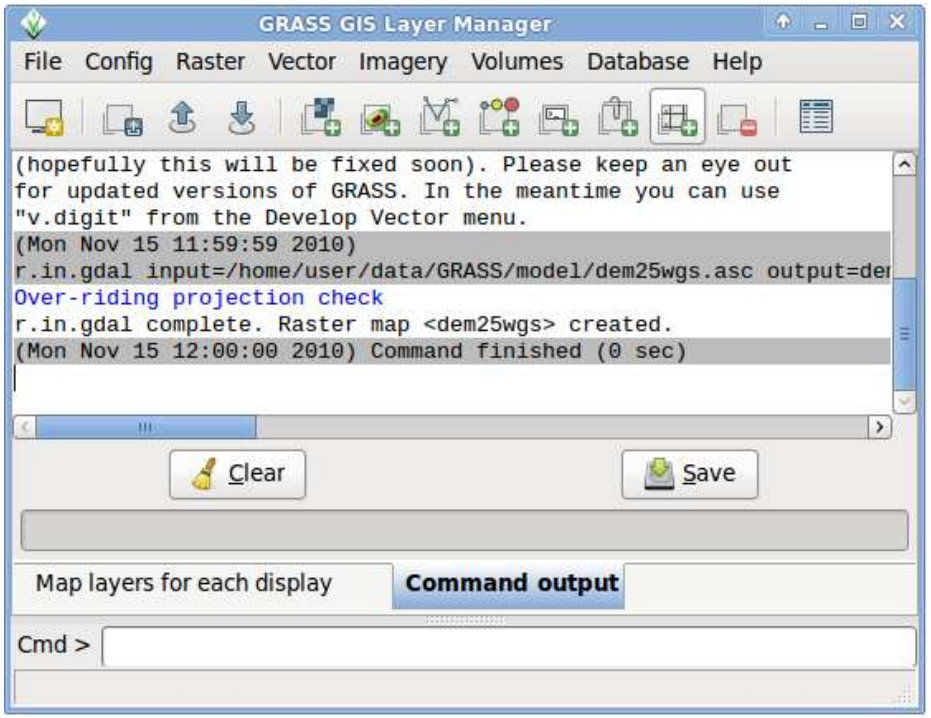
Manipularea datelor in GRASS

Importul datelor raster

1. Selectam tipul de fisier: `Arc/Info ASCII Grid`
2. Selectam locatia: `home/user/data/GRASS/dem25wgs.asc`
3. Apasam butonul: `Import`



In fereastra GIS Layer Manager, la optiunea `Command output`, va apare urmatorul mesaj:



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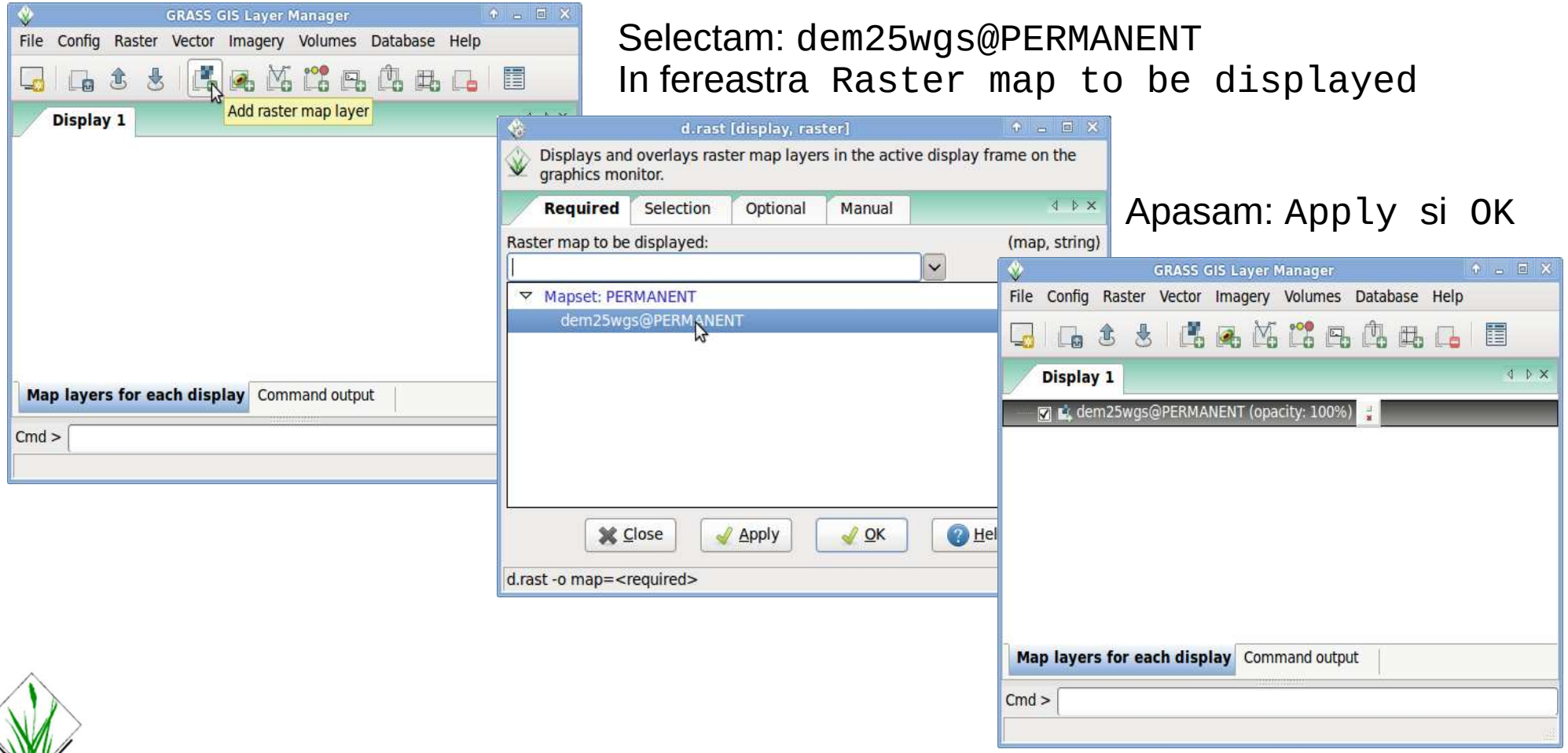
Manipularea datelor in GRASS

Importul datelor raster

Accesam: `Add raster map layer`



Selectam: `dem25wgs@PERMANENT`
In fereastra `Raster map to be displayed`

Apasam: `Apply si OK`

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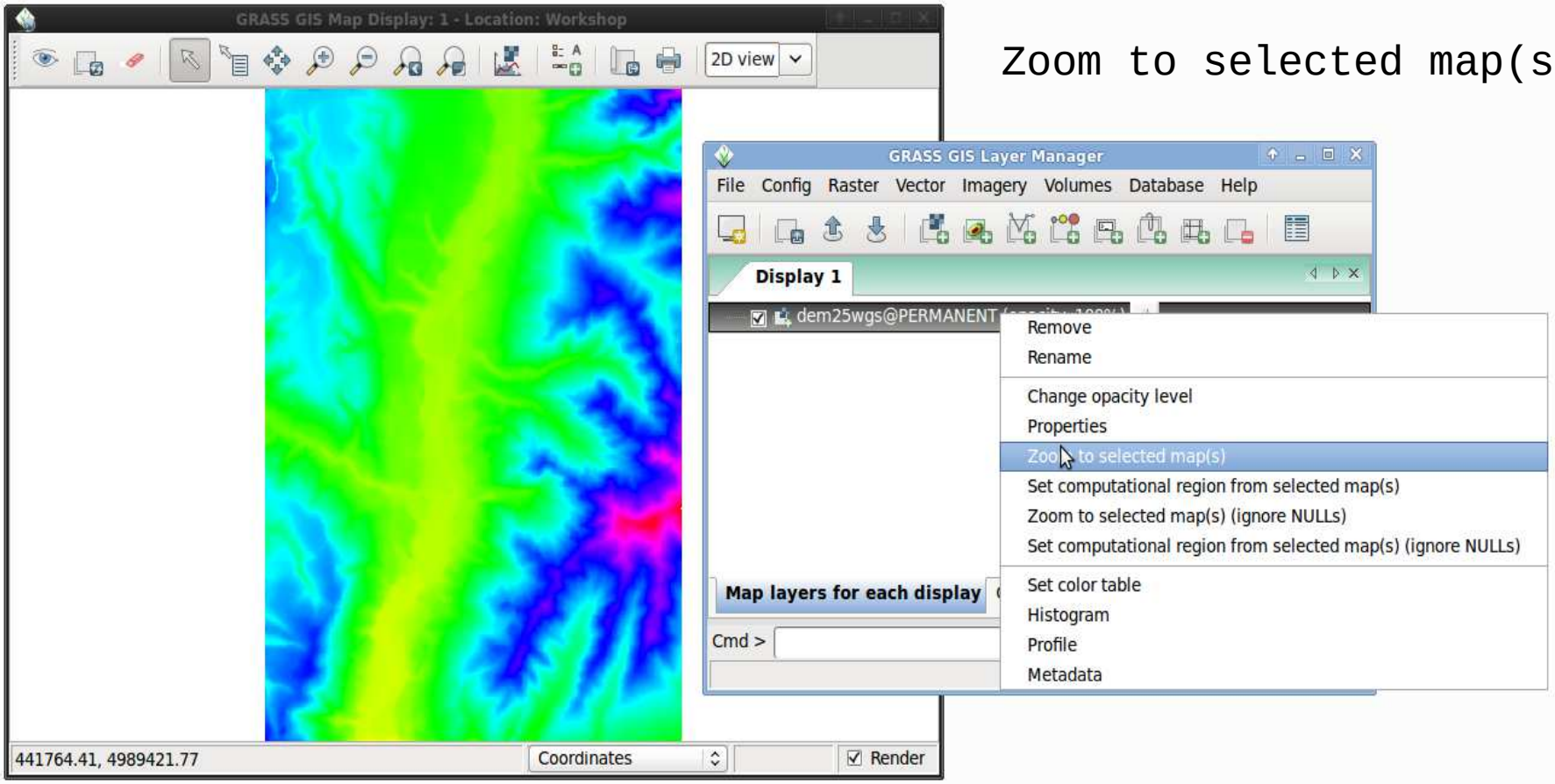
Manipularea datelor in GRASS

Importul datelor raster

Pentru vizualizarea stratului: Click dreapta de mouse si din meniul contextual alegem



Zoom to selected map(s)

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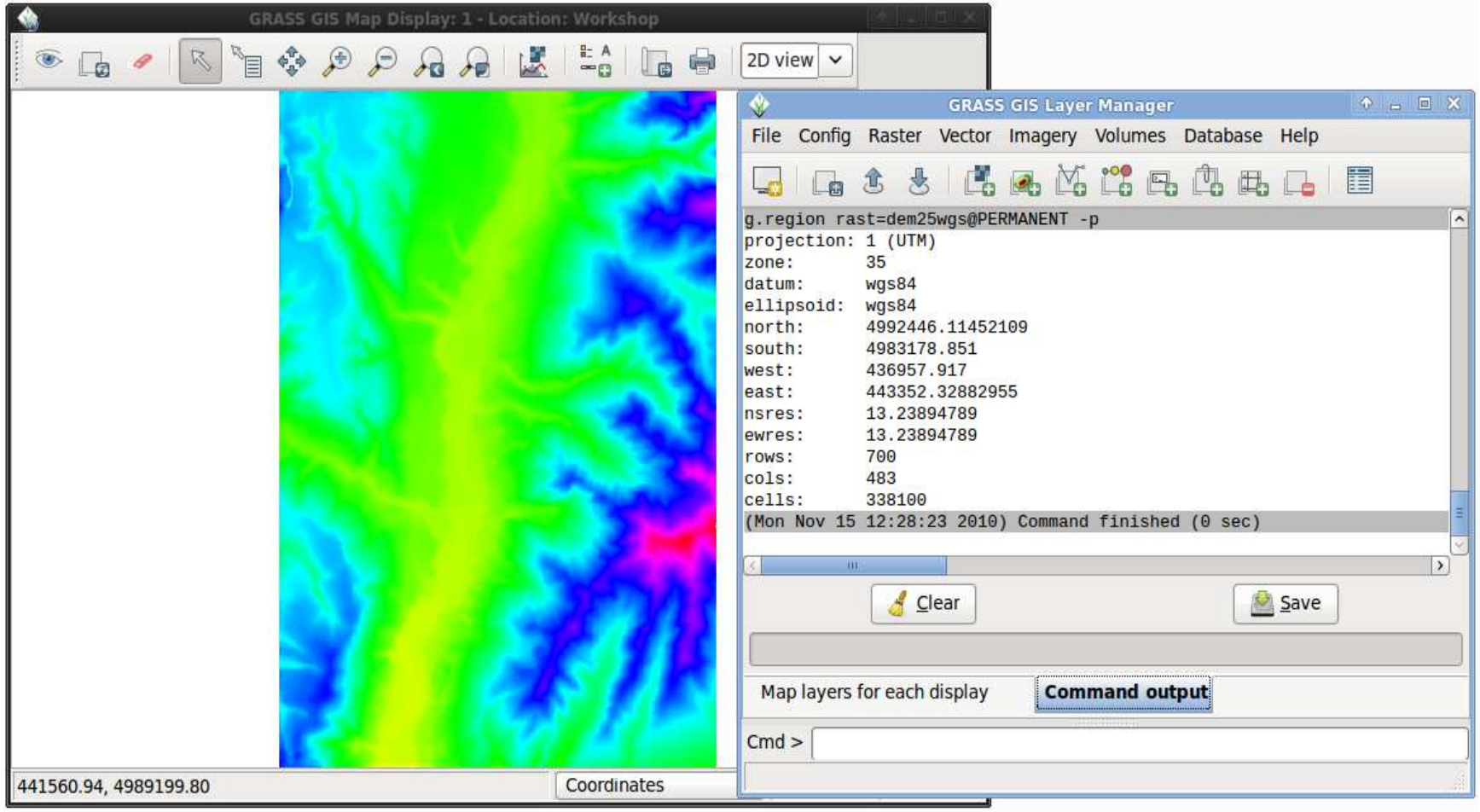
Manipularea datelor in GRASS

Importul datelor raster

In optiunea `Command output` vor apare datele analitice ale modelului importat



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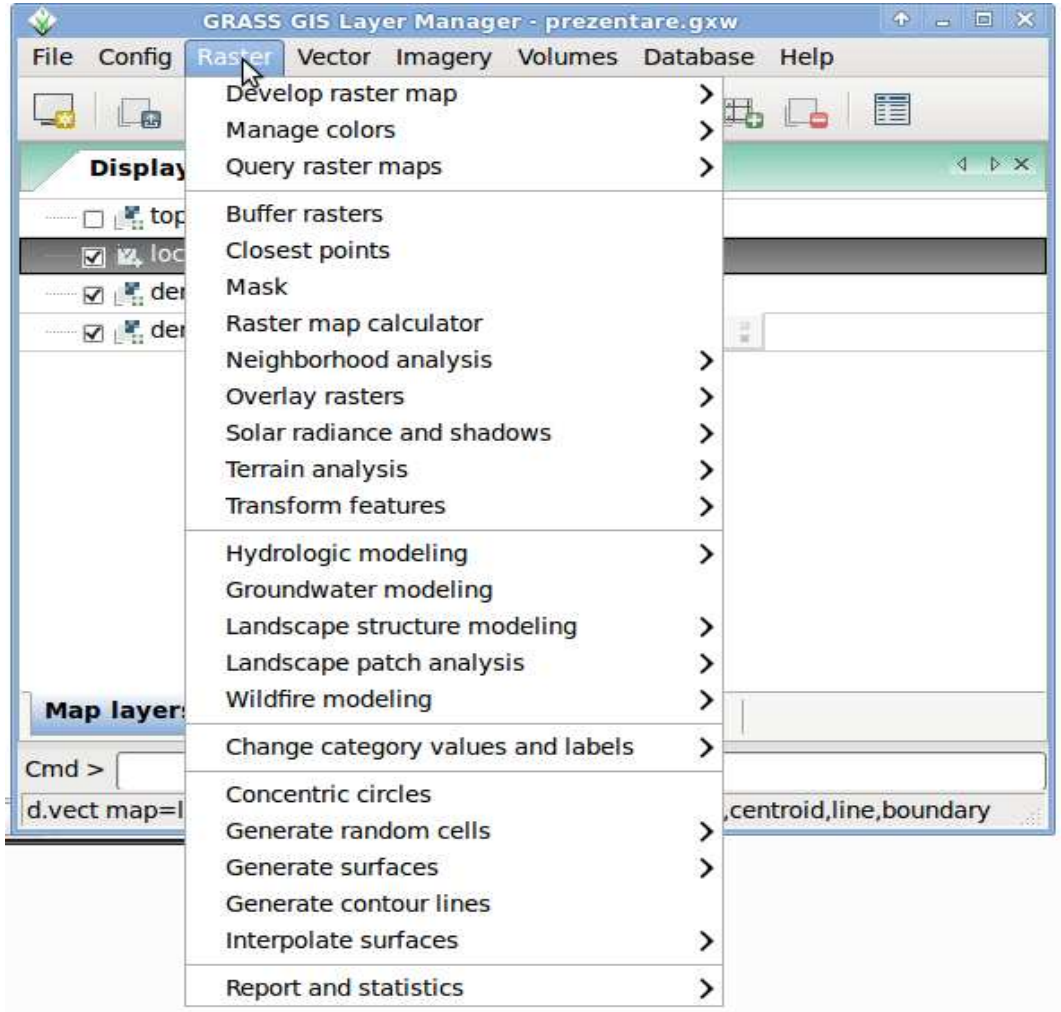
Manipularea datelor in GRASS

Interogarea datelor raster

Optiuni pentru manipulare:



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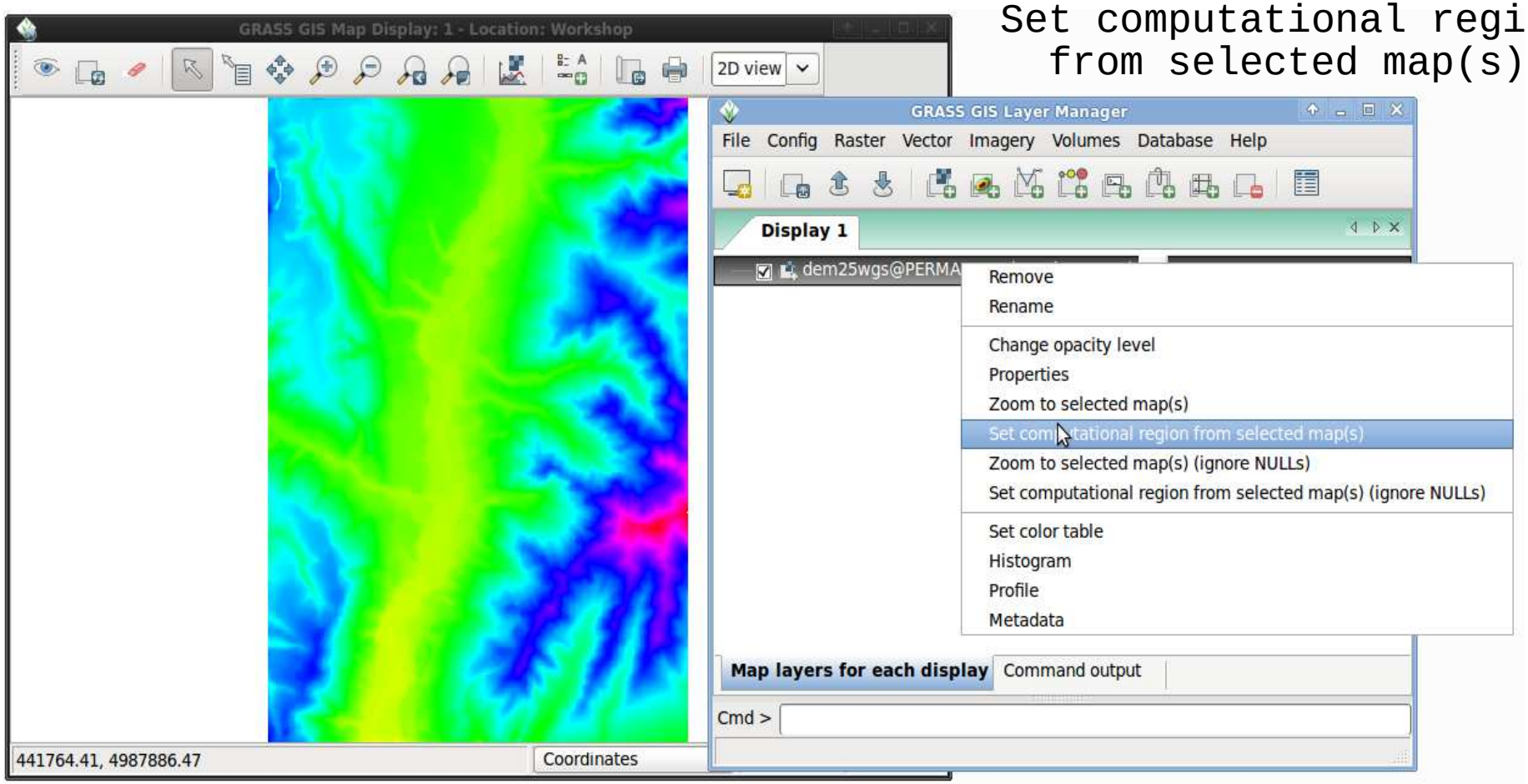
Manipularea datelor in GRASS

Interogarea datelor raster

Pentru selectarea zonei: Click dreapta de mouse si din meniul contextual alegem

`Set computational region from selected map(s)`



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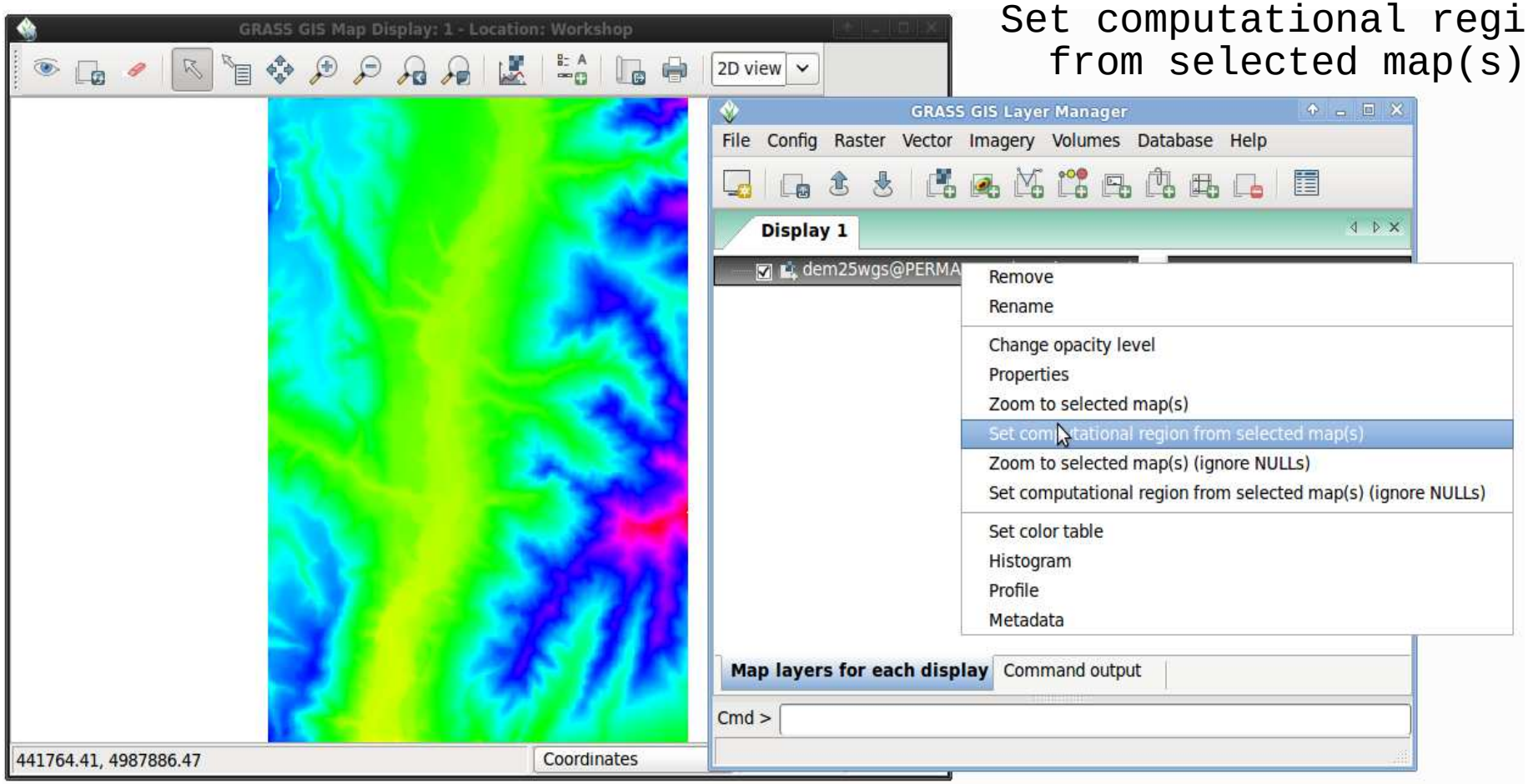
Manipularea datelor in GRASS

Interogarea datelor raster

Pentru selectarea zonei: Click dreapta de mouse si din meniul contextual alegem

`Set computational region from selected map(s)`



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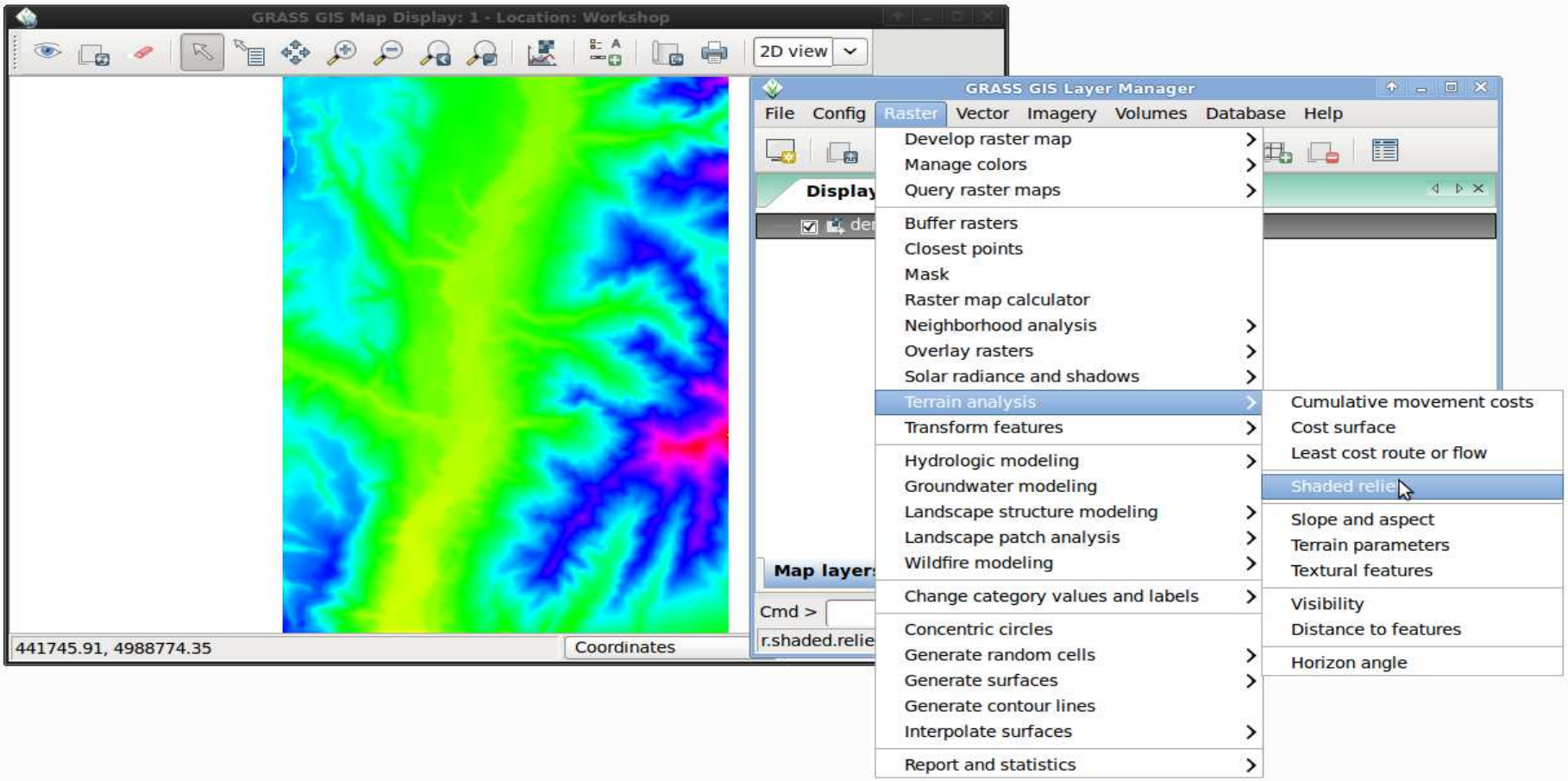
Manipularea datelor in GRASS

Interogarea datelor raster

`Raster > Terrain analysis > Shaded relief`



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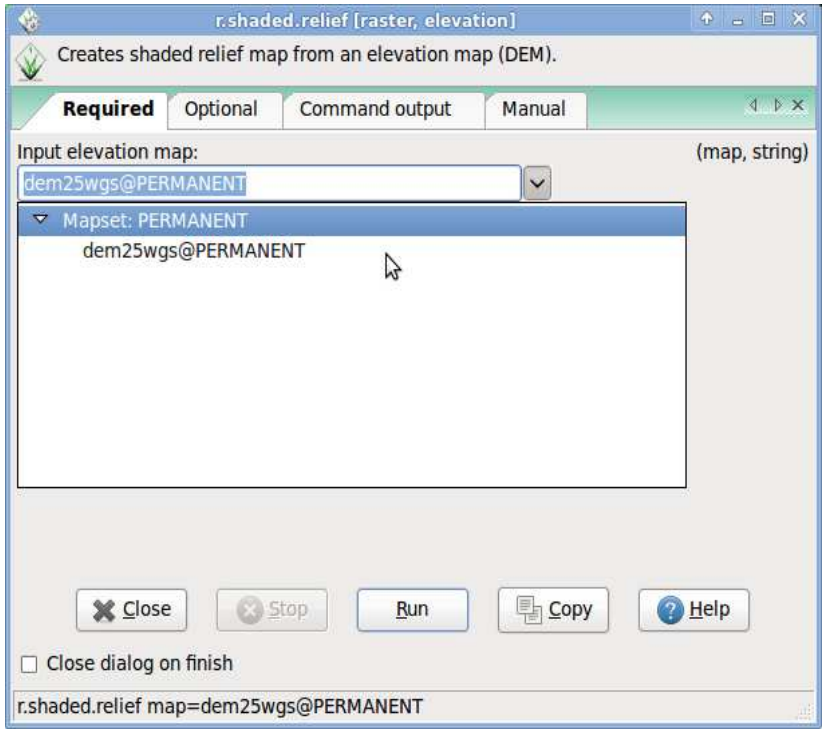
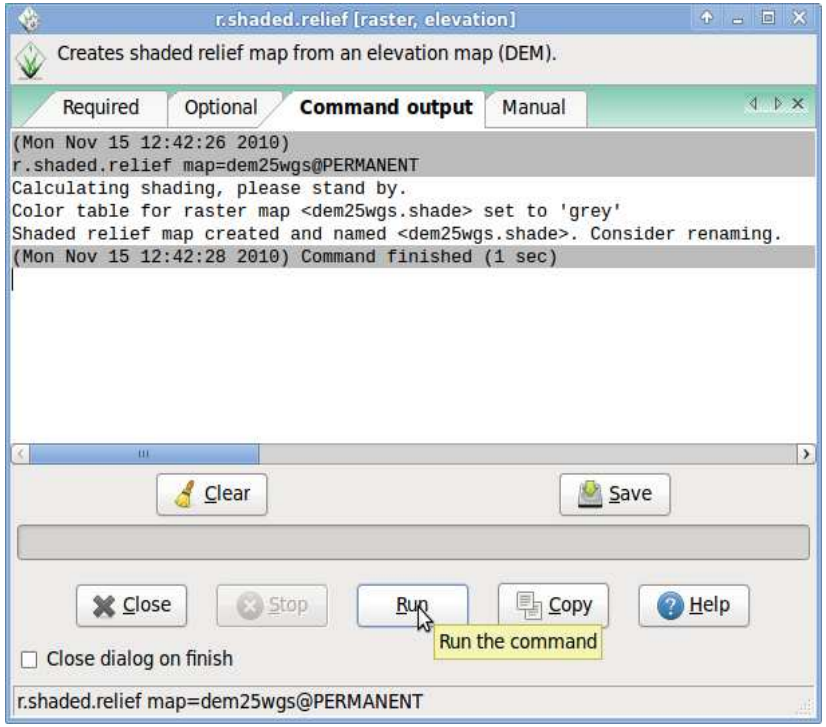
Manipularea datelor in GRASS

Interogarea datelor raster

La `Imput elevation map` alegem: `dem25wgs@PERMANENT` si apasam `Run` apoi `Close`





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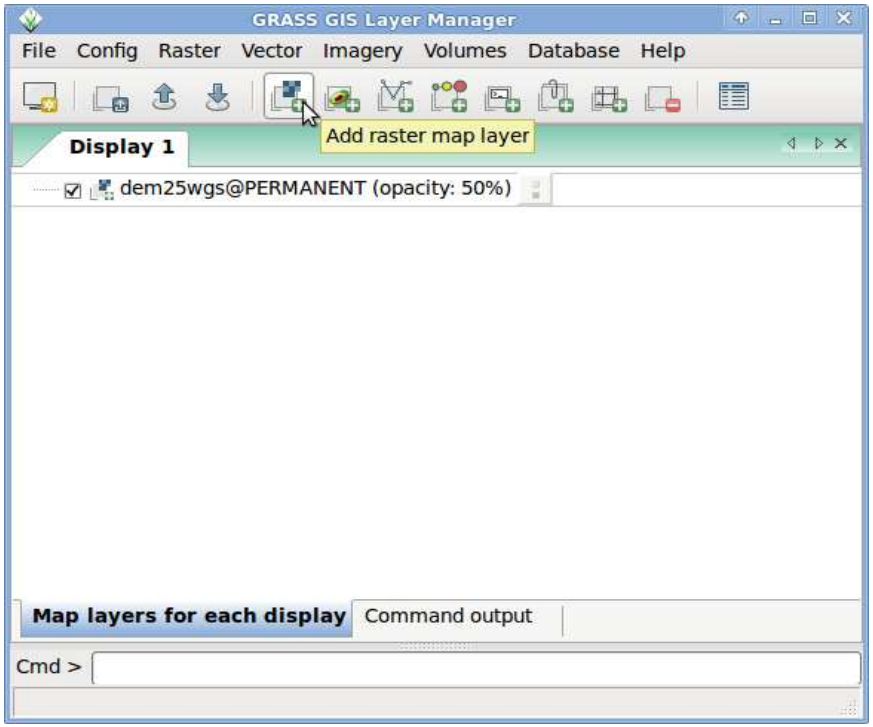
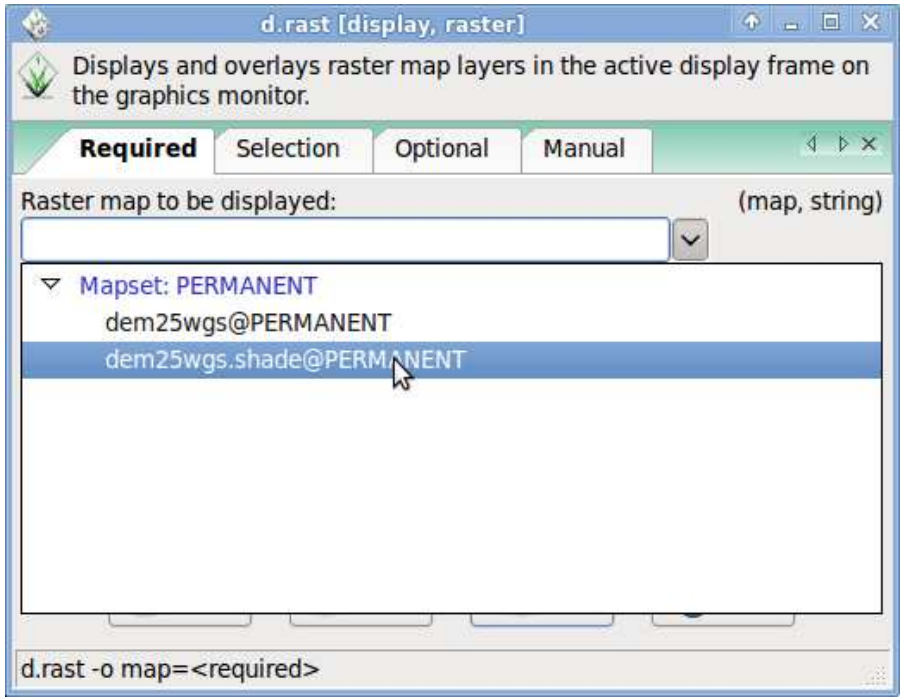
Manipularea datelor in GRASS

Interogarea datelor raster

Accesam `Add raster map layer`, la Raster map to be displayed alegem: `dem25wgs.shade@PERMANENT`, apasam `Apply` si `Close`





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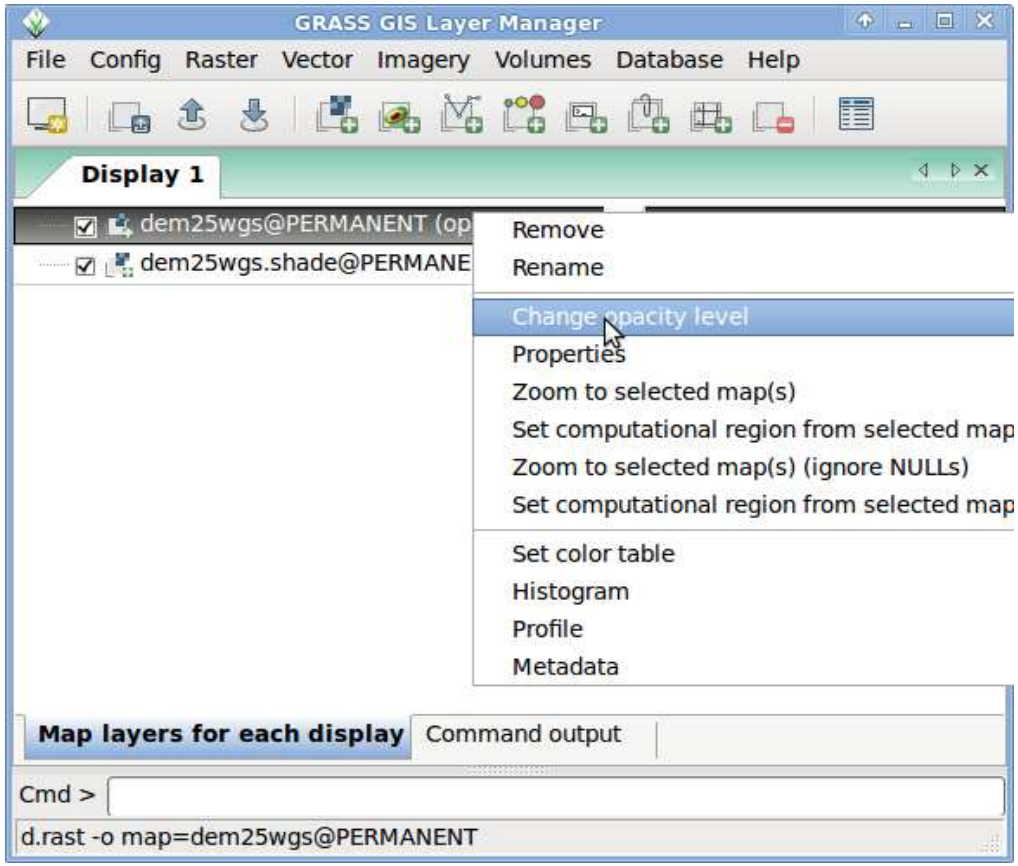
Manipularea datelor in GRASS

Interogarea datelor raster - Realizarea 3D

In fereastra `GRASS GIS Layer Manager`, schimbam ordinea de afisare a stratelor astfel:

`1.dem25wgs@PERMANENT`
`2.dem25wgs.shade@PERMANENT`



Click dreapta pe `dem25wgs@PERMANENT` si alegem `Change opacity level`

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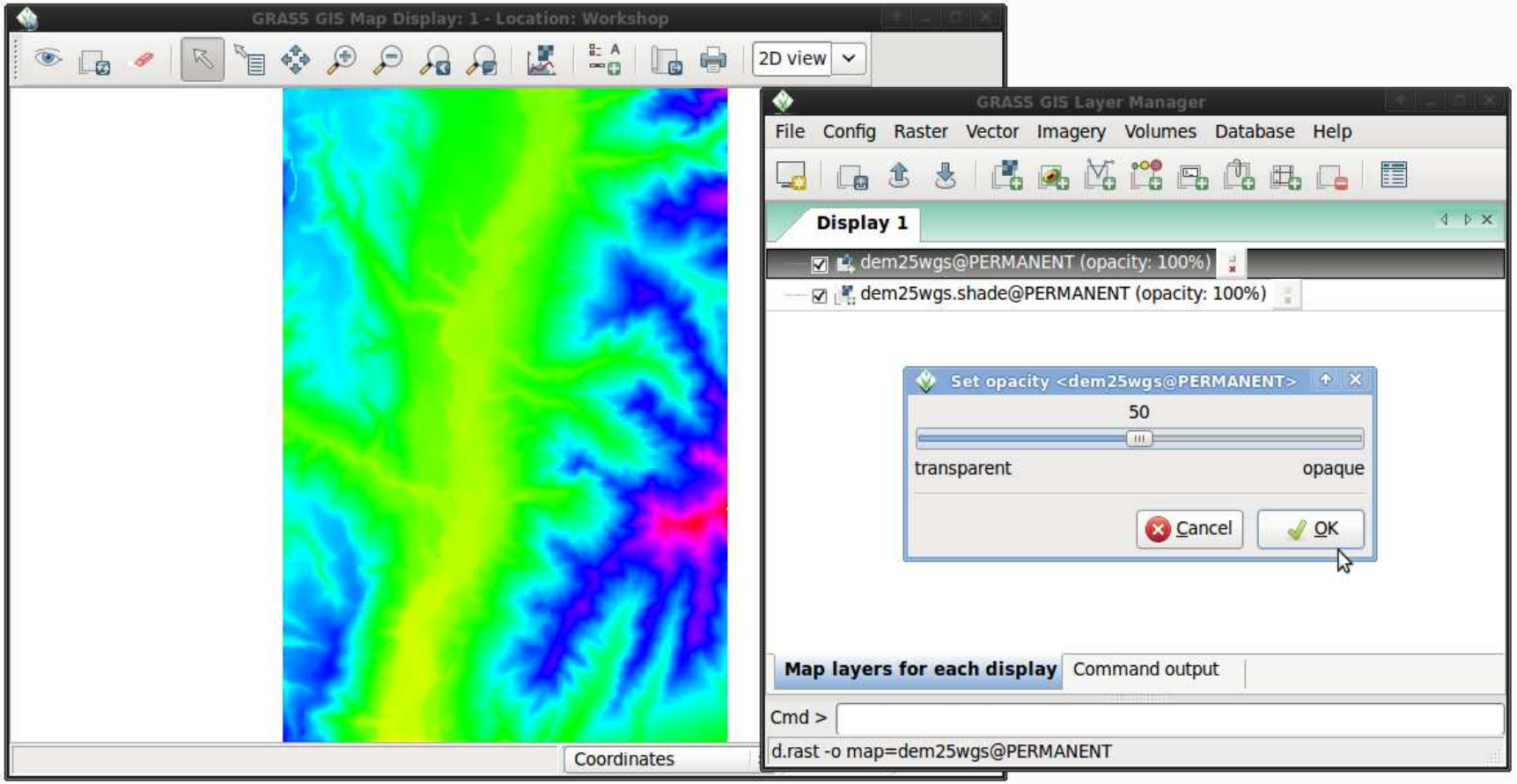
Manipularea datelor in GRASS

Interogarea datelor raster

In fereastra `Set opacity,` selectam opacitatea la `50 unitati`



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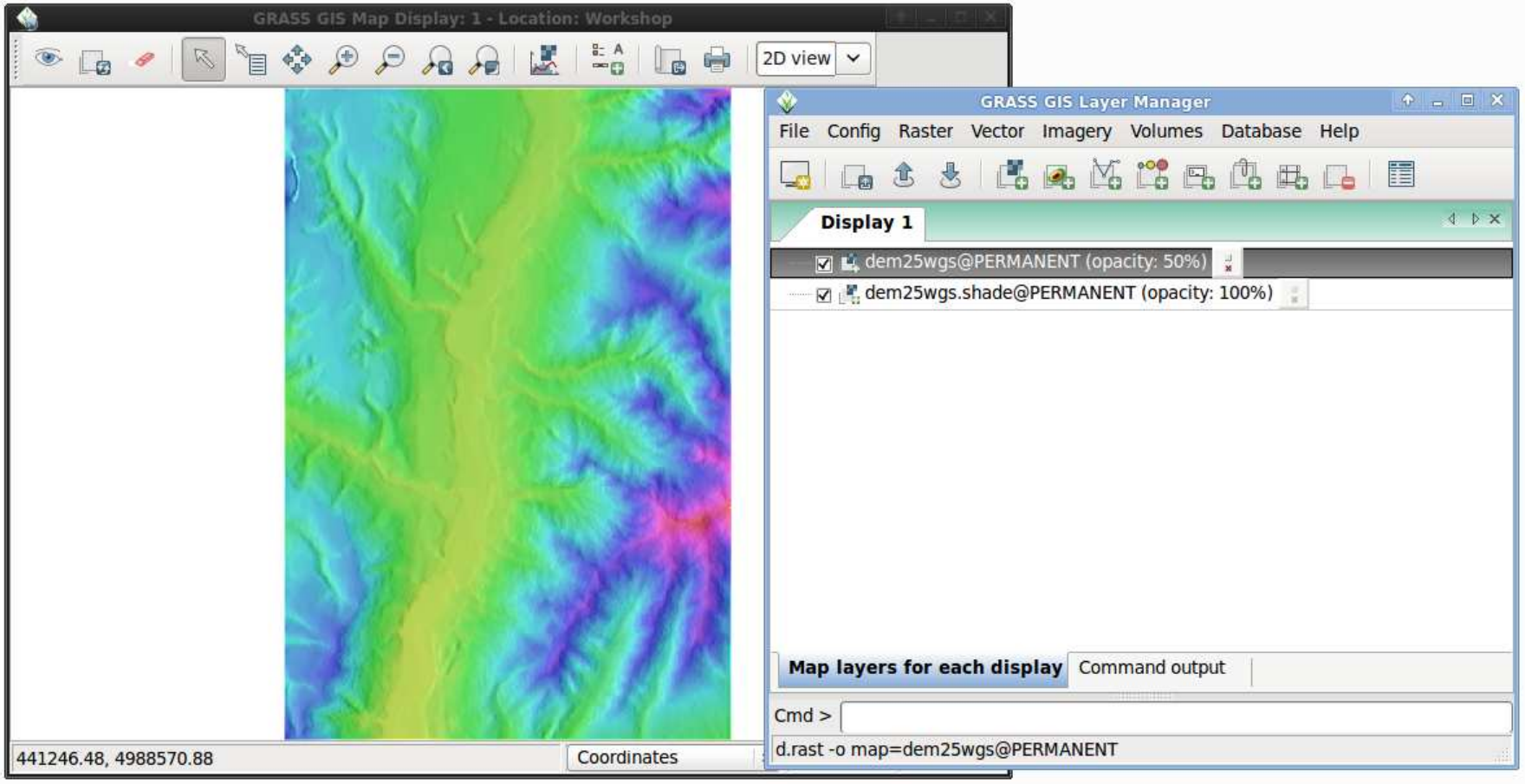
Manipularea datelor in GRASS

Interogarea datelor raster

Rezultatul final



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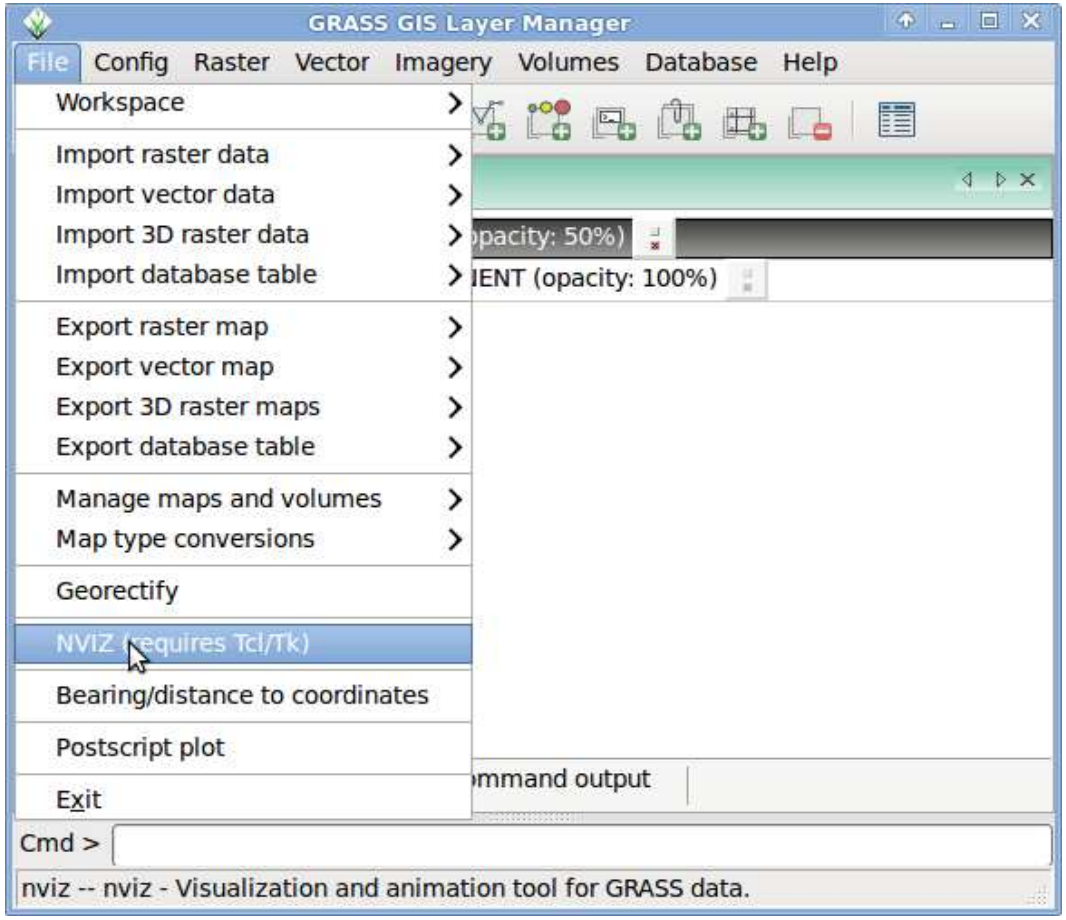
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

In fereastra `GRASS GIS Layer Manager` efectuam: `File > NVIZ`



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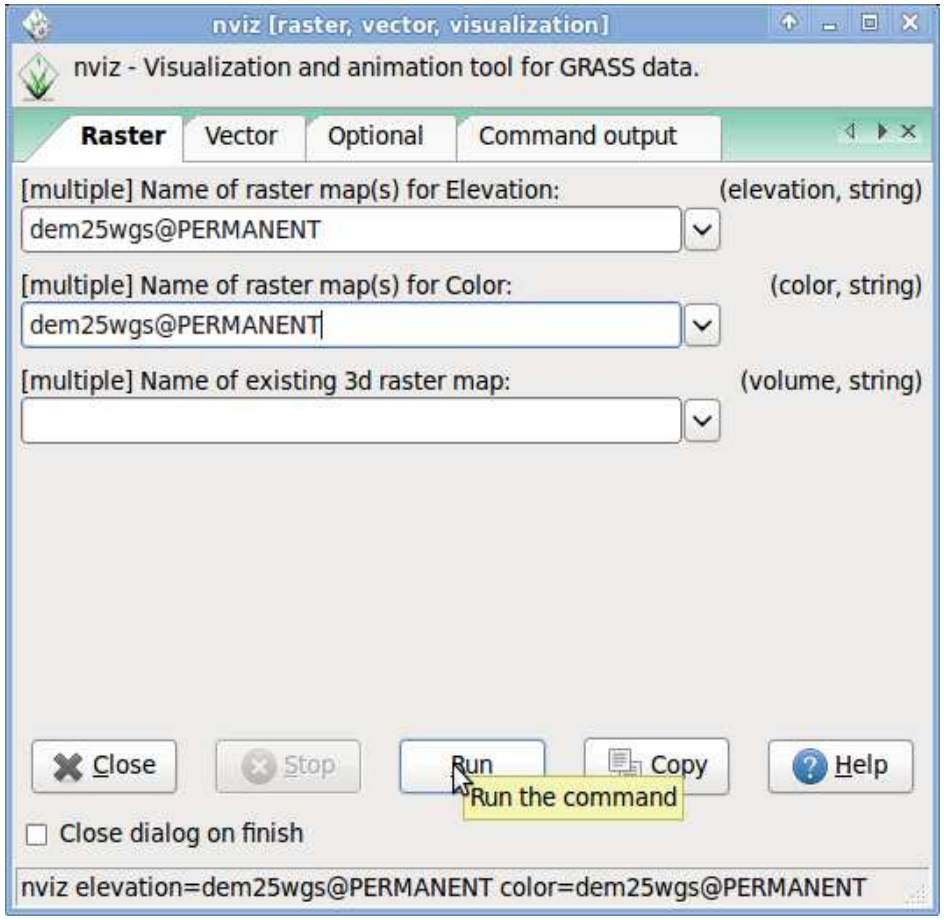
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Alegem la `Name of raster(s) for Elevations: dem25wgs@PERMANENT`, iar la `Name of raster map(s) for Color: dem25wgs@PERMANENT` si rulam comanda.



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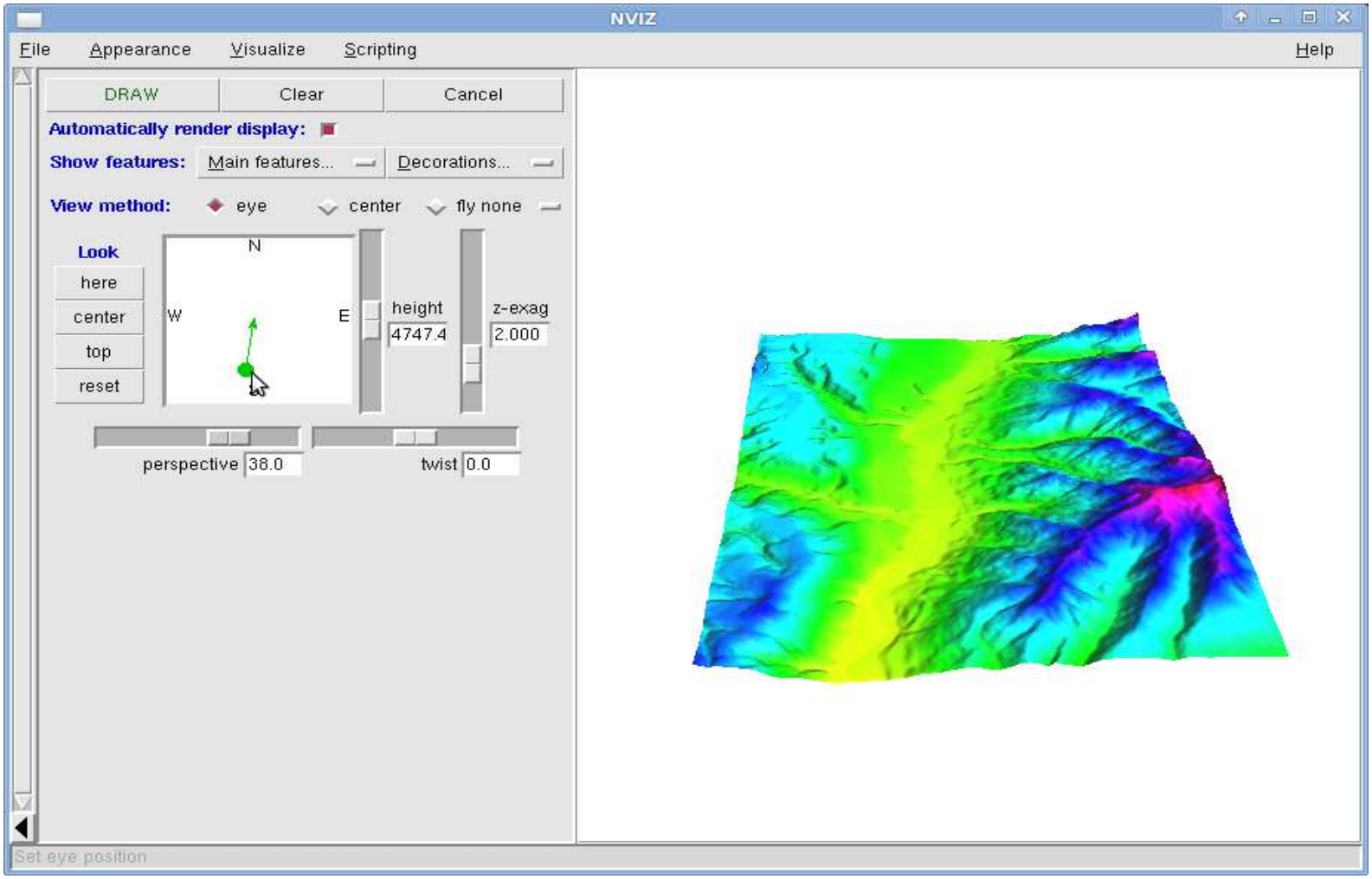
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Rezultatul final:



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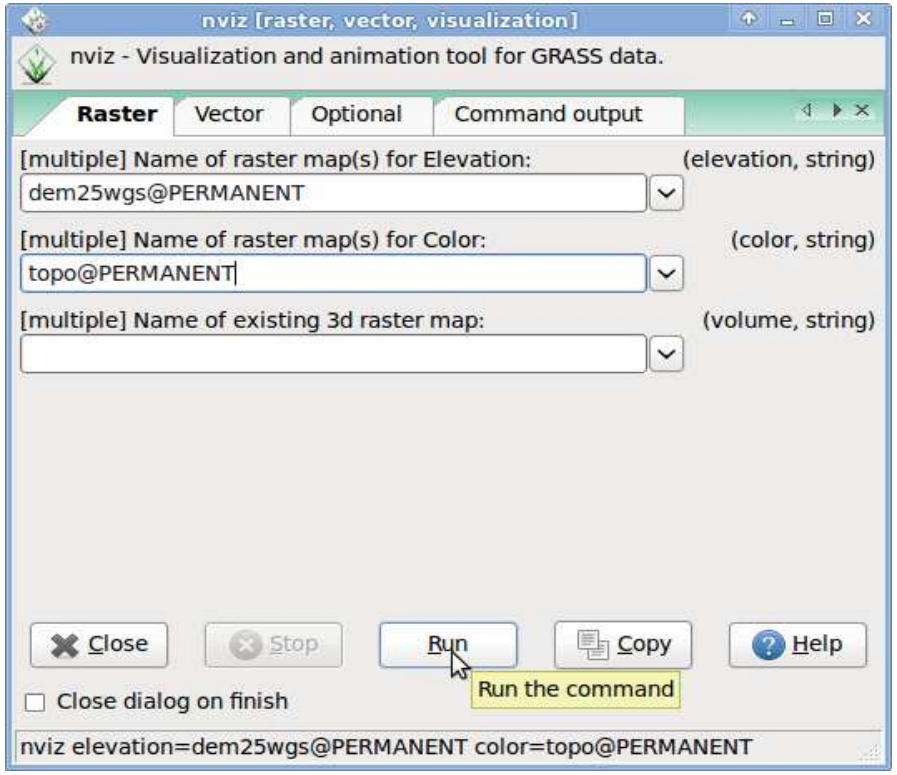
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Drapare harta topografica:

1. Importare harta in spatiul de lucru
2. Deschiderea ferestrei NVIZ
3. Alegem la `Name of raster(s) for Elevations: dem25wgs@PERMANENT`, iar la `Name of raster map(s) for Color: topo@PERMANENT` si rulam comanda.



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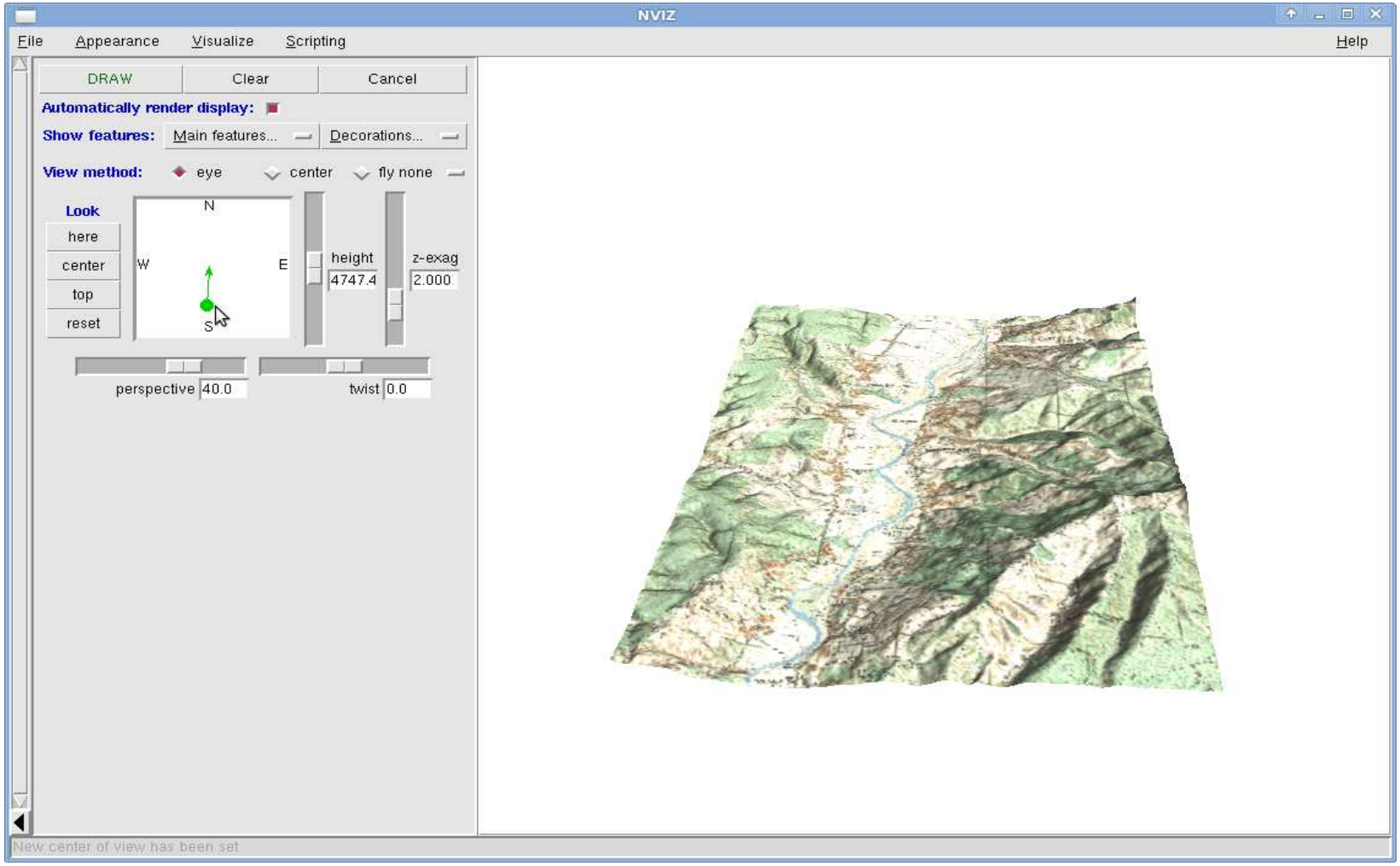
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Rezultatul final:



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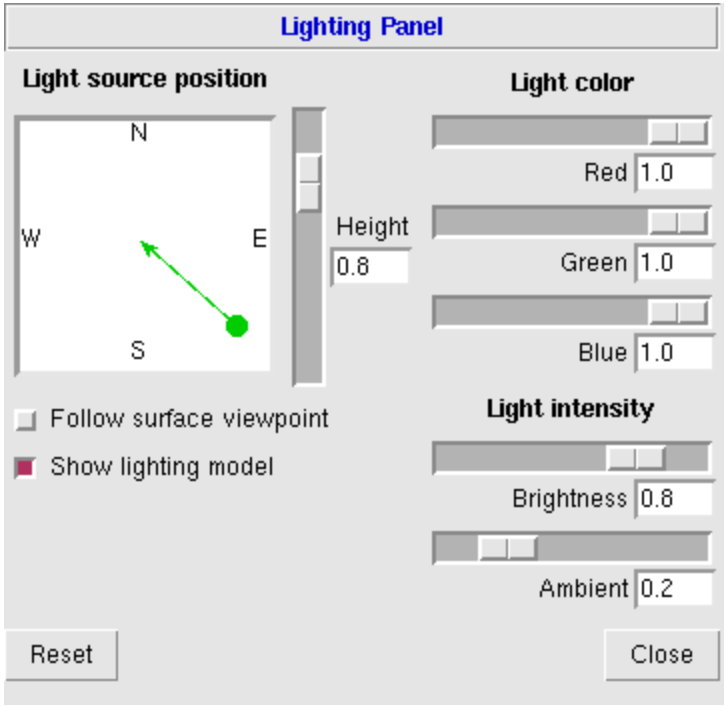
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Schimbarea proprietatilor de vizualizare

Se face cu optiunea `Lighting Panel : Apparence > Lighting`



`Light source position:` directia de iluminare

`Light color:` modifica nuantele de culoare

`Light intensity:` modifica intensitatea luminii

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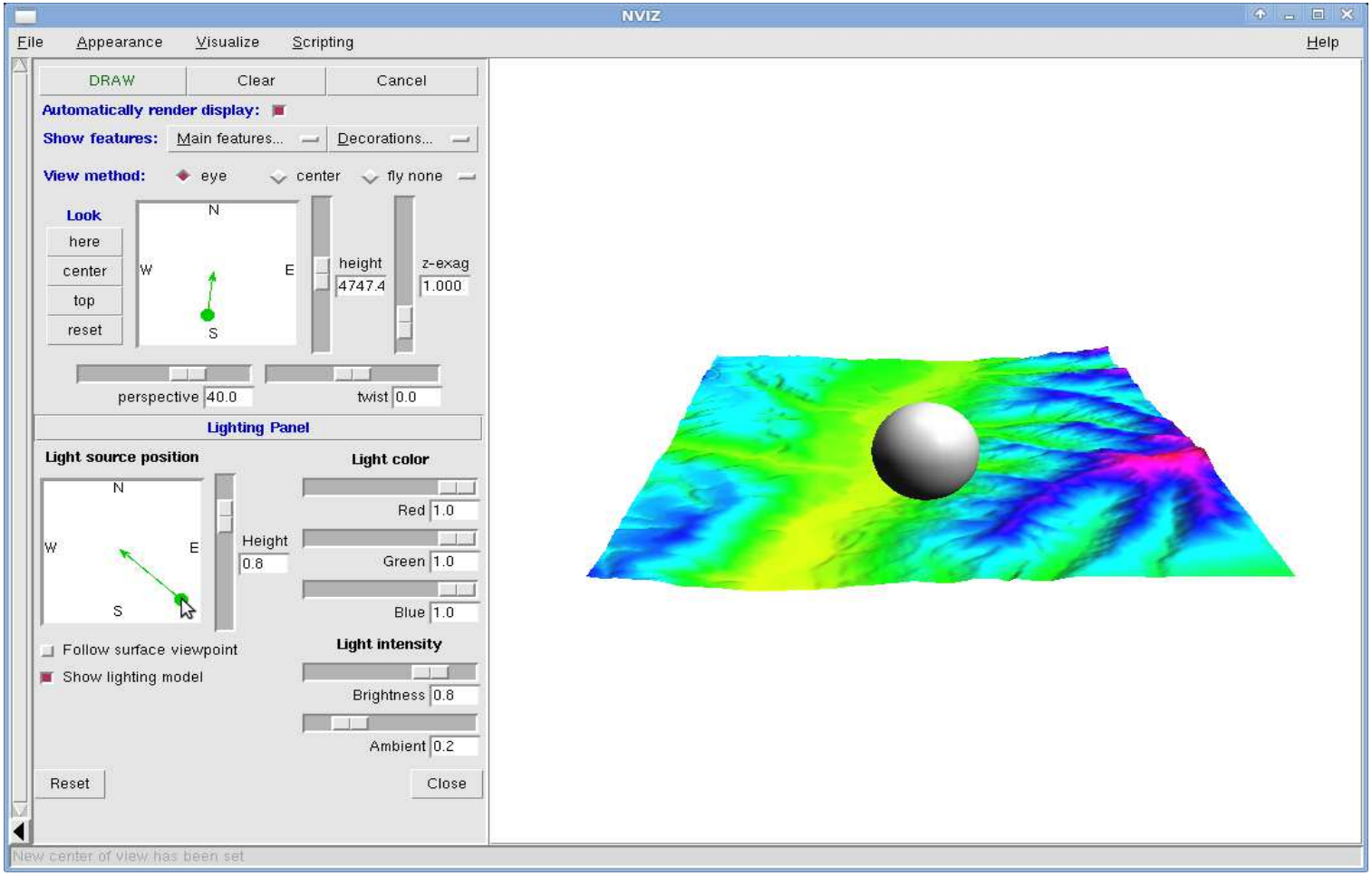
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Schimbarea proprietatilor de vizualizare



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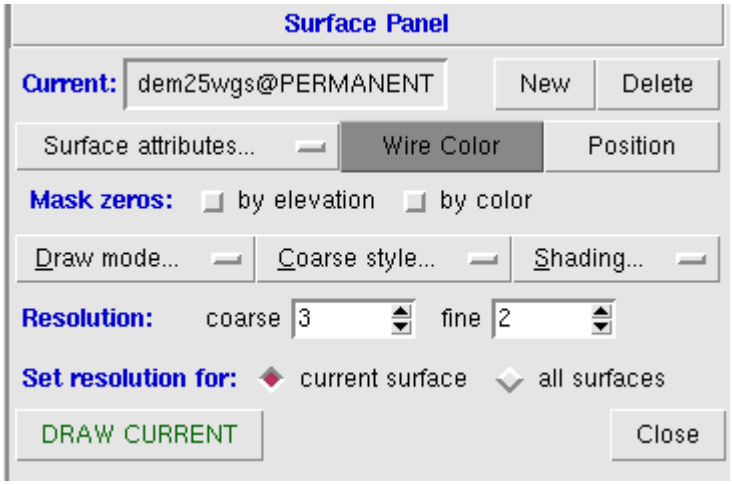
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Intersectarea suprafetei cu un plan orizontal

Se utilizeaza optiunea `Surface panel: Vizualize > Raster Surface`



`Current:` stratul aspura caruia se fac modificari

`Surface attributes:` modificarea atributelor suprafetei

`Resolution:` cresterea/scaderea rezolutiei

`DRAW CURRENT:` se aplica dupa fiecare modificare

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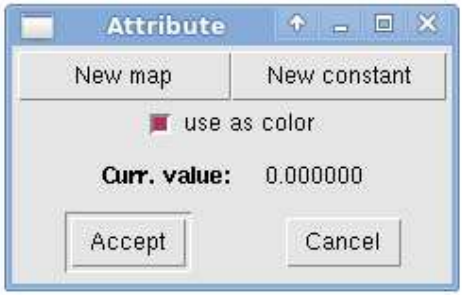
Manipularea datelor in GRASS

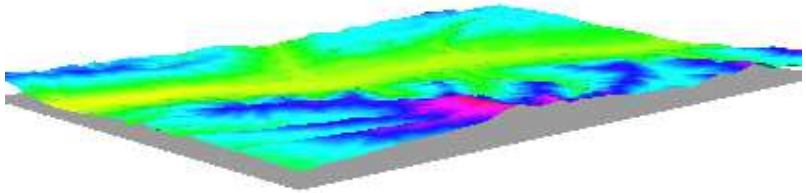
Interogarea datelor raster - Vizualizare 3D

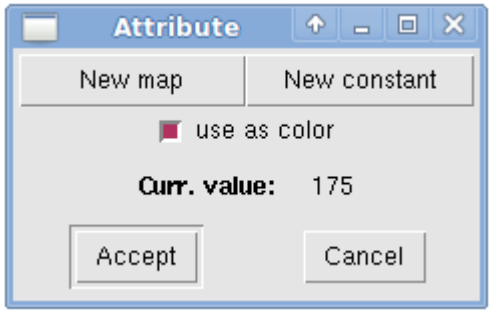
Intersectarea suprafetei cu un plan orizontal

Introducem planul de sectionare: `New > New Constant`



`New Constant:` Adauga proprietatea Z planului
`Constant:` se introduce valoarea Z





Dupa introducerea valorii, aceasta apare la optiunea: `Curr.value` (in cazul nostru 175)

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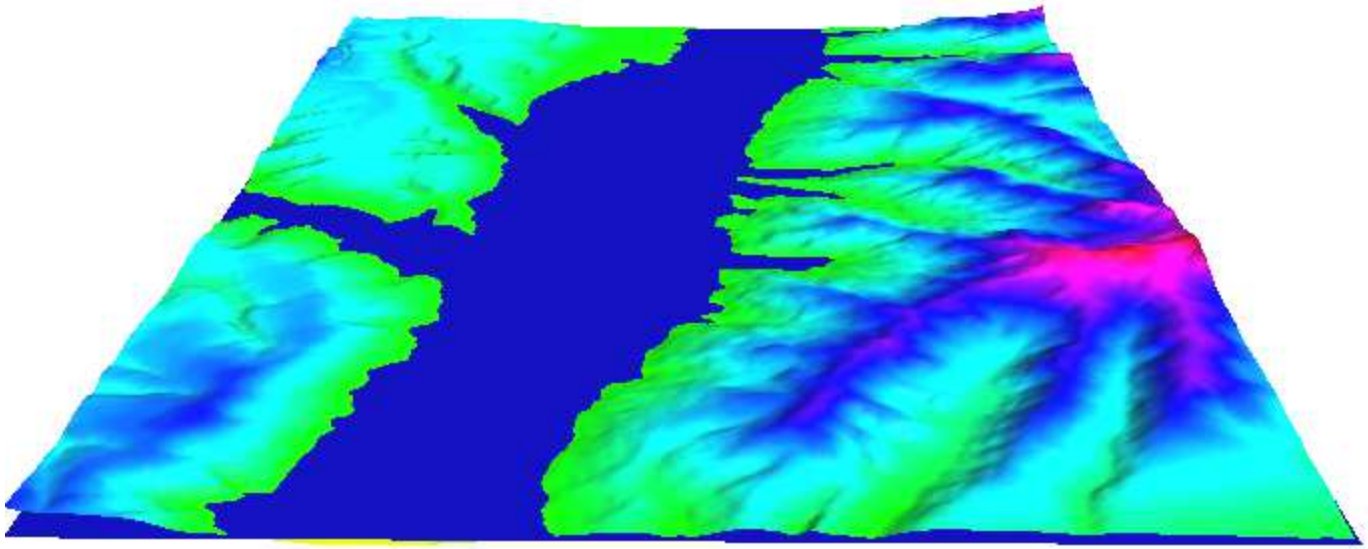
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Intersectarea suprafetei cu un plan orizontal

Rezultatul final:



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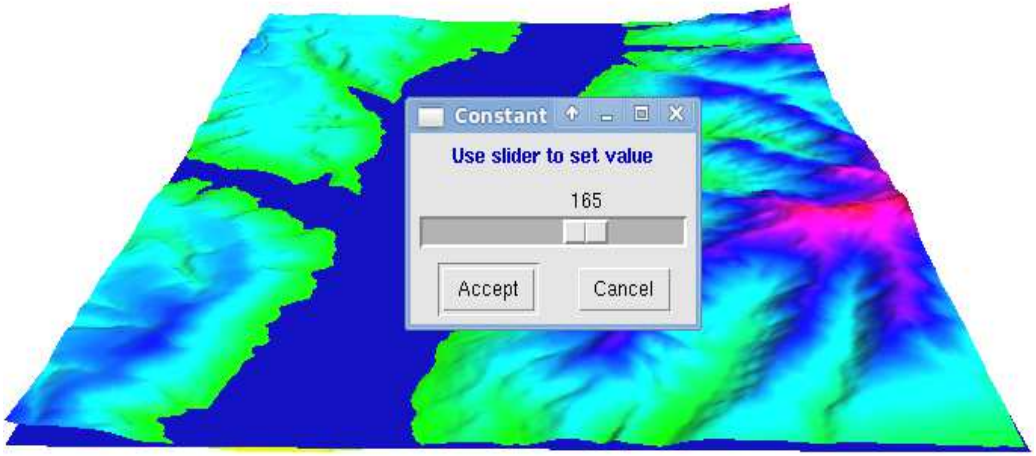
Manipularea datelor in GRASS

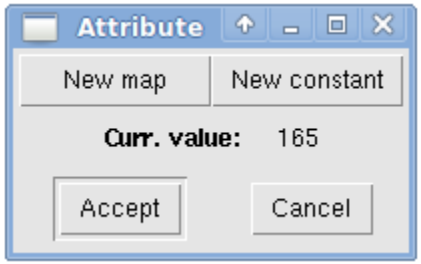
Interogarea datelor raster - Vizualizare 3D

Intersectarea suprafetei cu un plan orizontal

Schimbarea transparentei stratului creat: `Surface attributes... > transparency`

`New Constant:` Adauga transparenta planului
`Constant:` se introduce valoarea transparentei





Dupa introducerea valorii, aceasta apare la optiunea: `Curr.value` (in cazul nostru 165)

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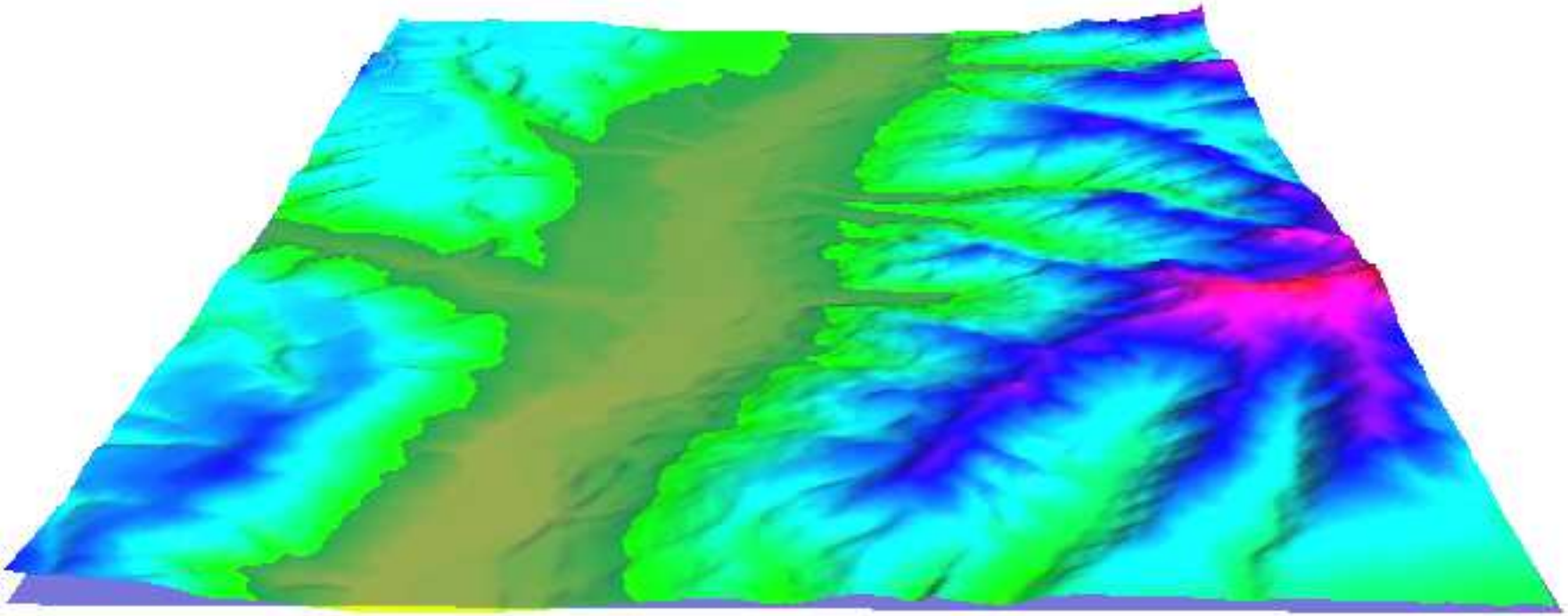
Manipularea datelor in GRASS

Interogarea datelor raster - Vizualizare 3D

Intersectarea suprafetei cu un plan orizontal

Rezultatul final:



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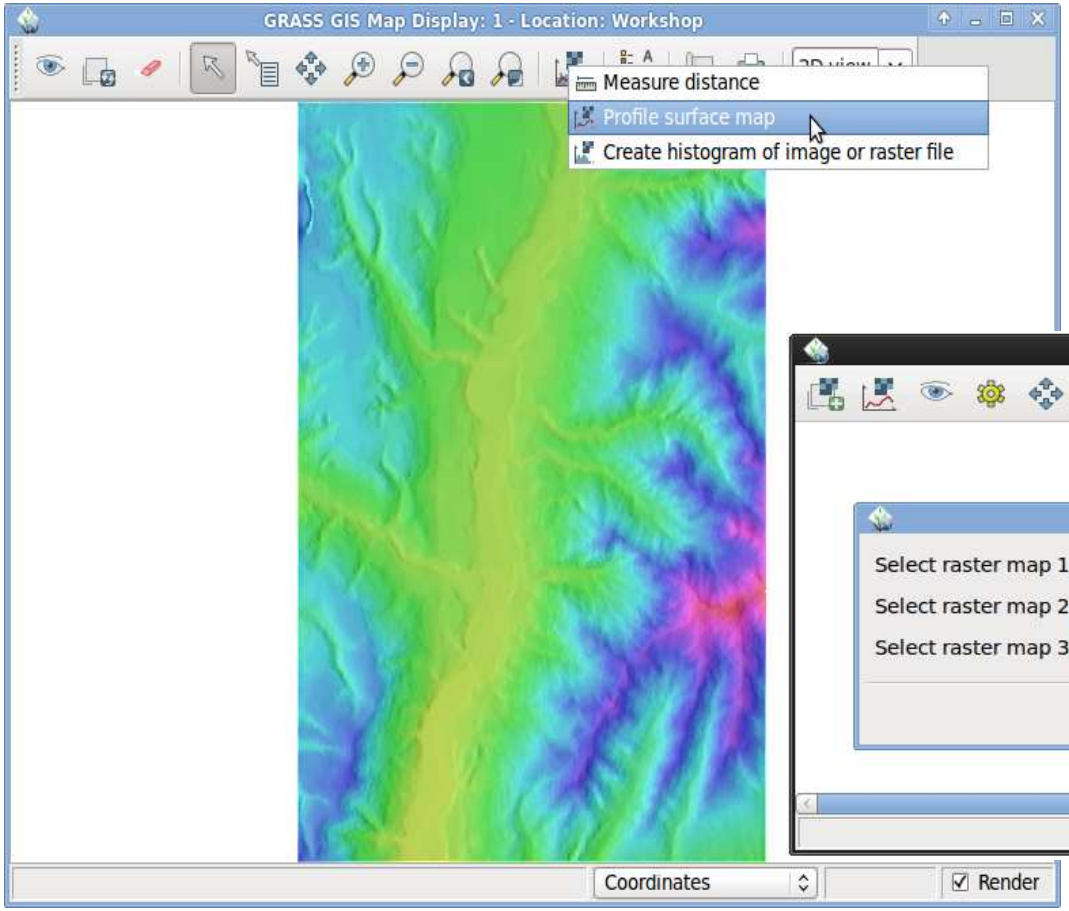
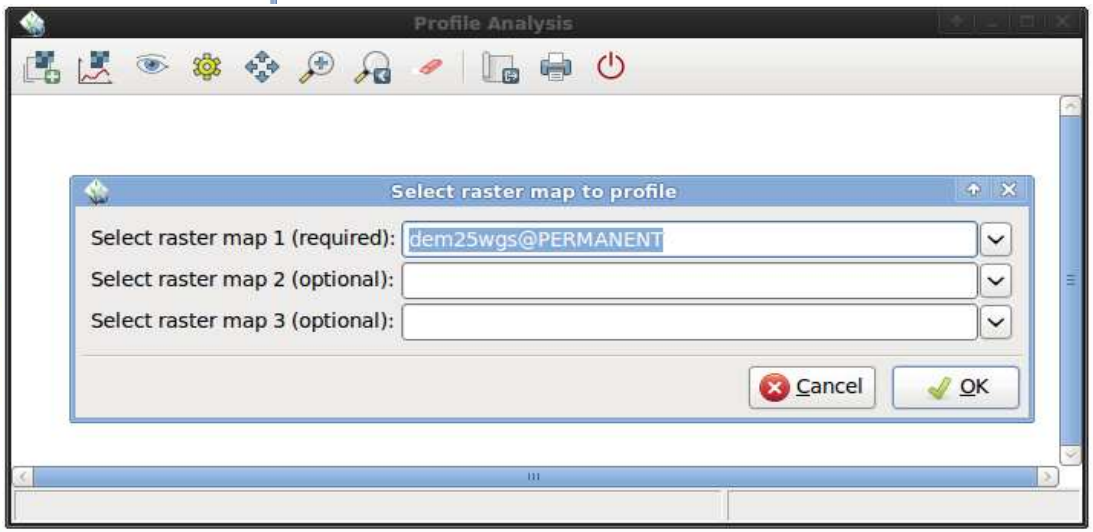
Manipularea datelor in GRASS

Interogarea datelor raster - profile

In fereastra de vizualizare alegem: `Analyze > Profile surface map`



Selectam datele



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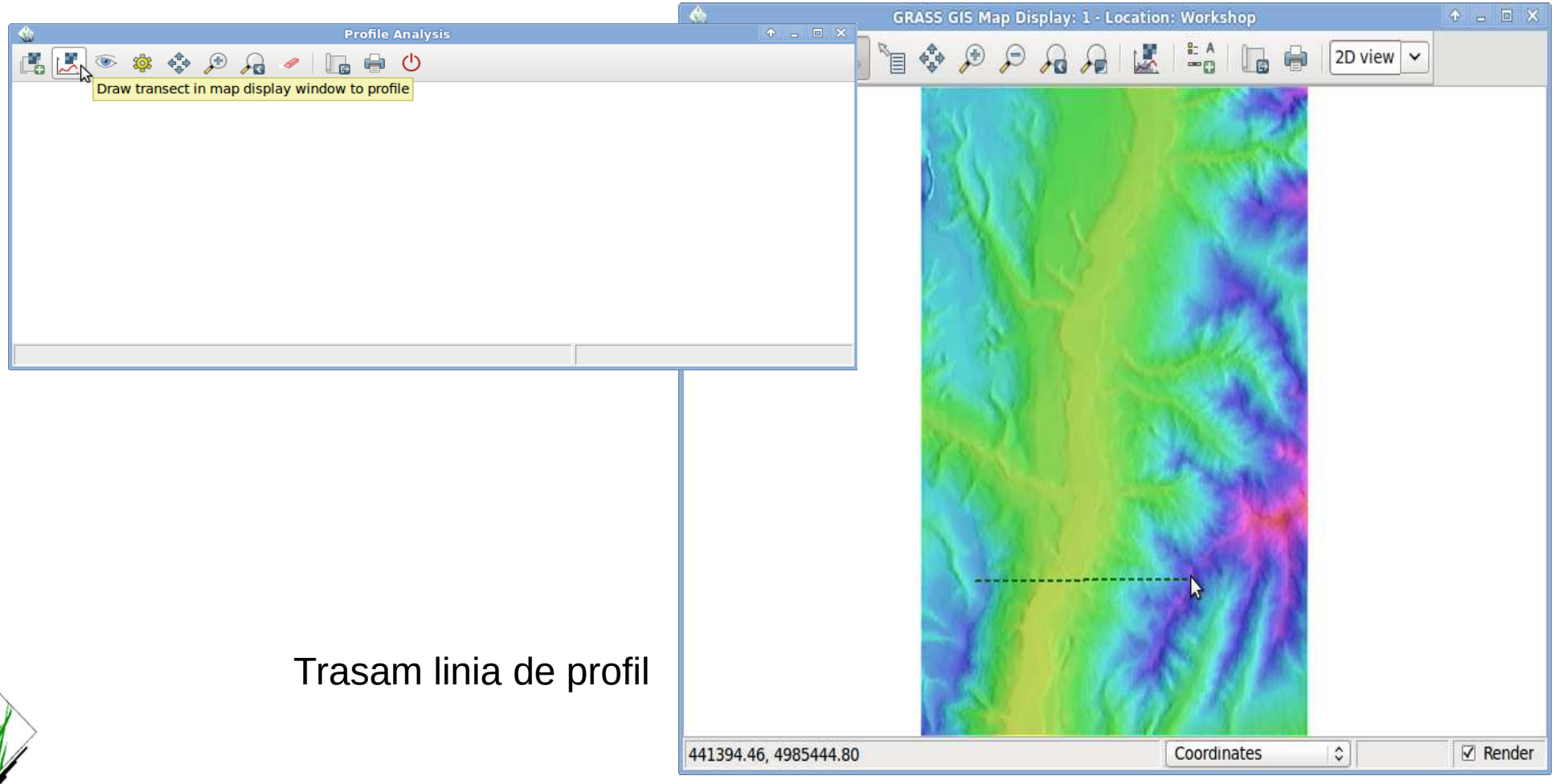
Manipularea datelor in GRASS

Interogarea datelor raster - profile

In `Profile Analysis` alegem: `Draw transect in map display window profile`



Trasam linia de profil

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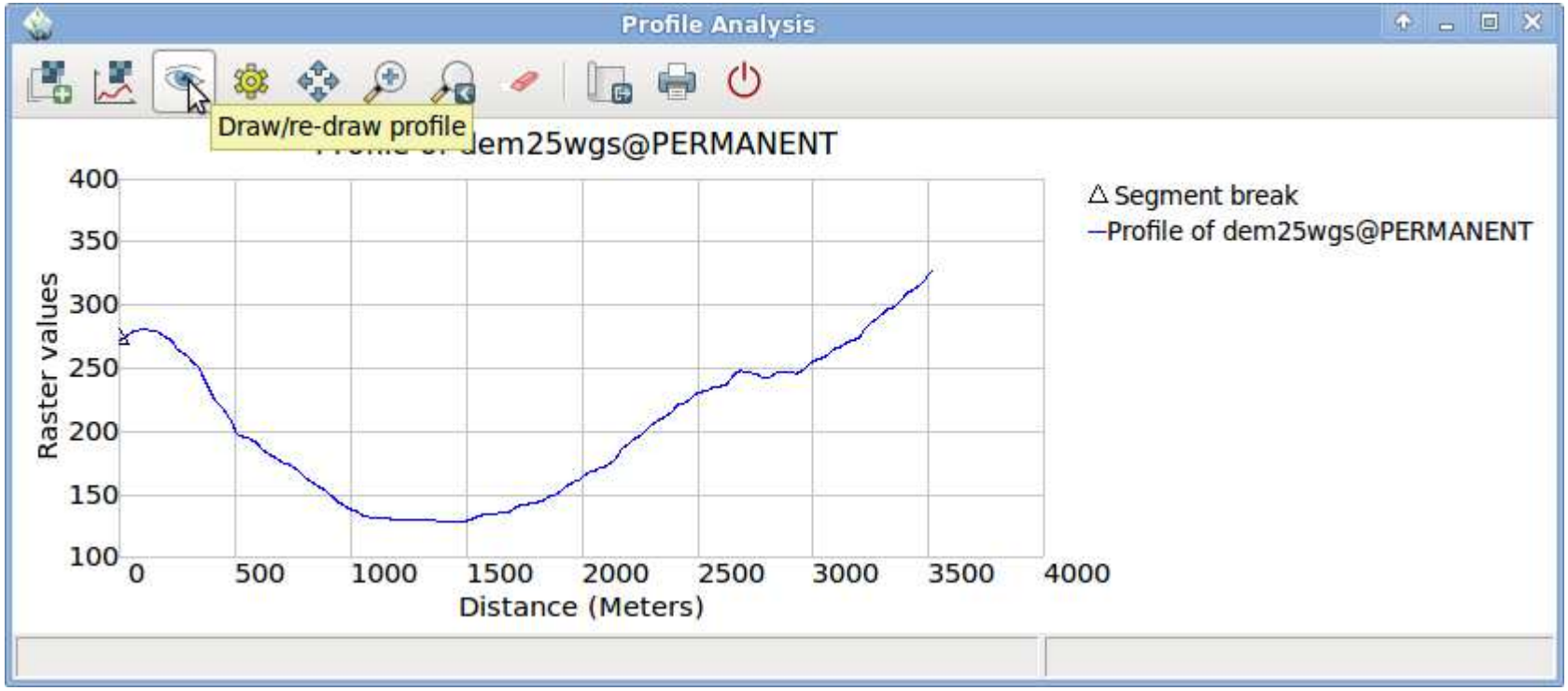
Manipularea datelor in GRASS

Interogarea datelor raster - profile

In fereastra `Profile Analysis` alegem: `Draw/re-draw profile`



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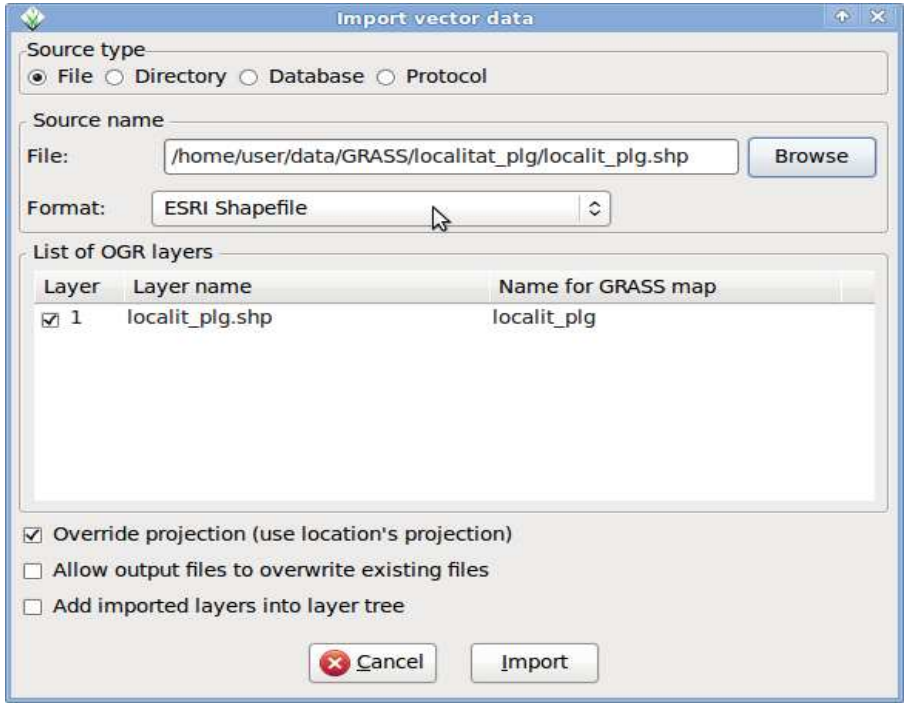
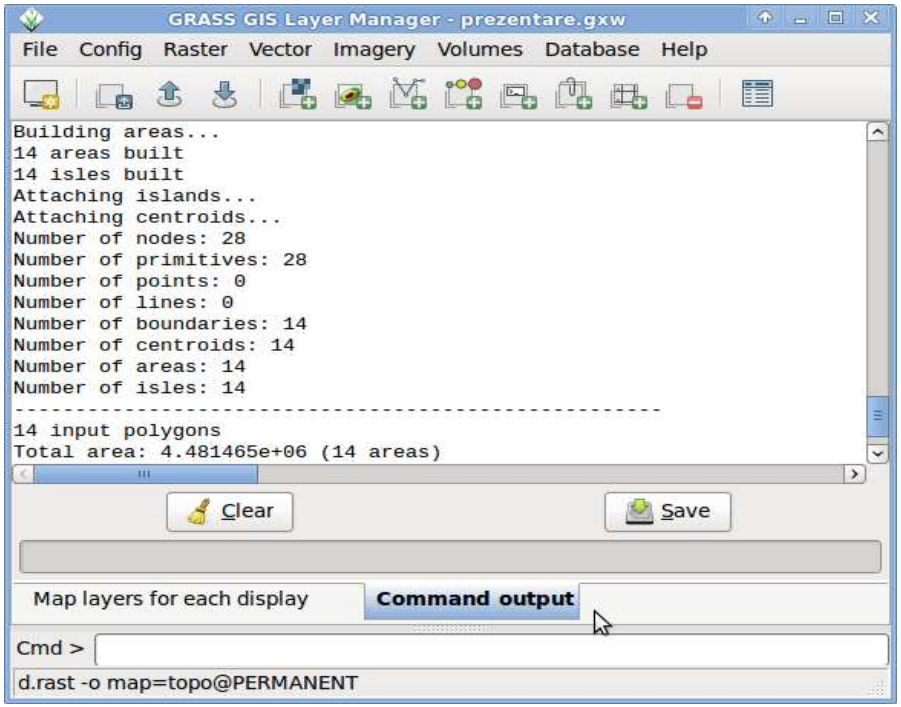
Manipularea datelor in GRASS

Importul datelor vectoriale

1. Selectam tipul de fisier: `ESRI Shapefile`
2. Selectam locatia: `home/user/data/GRASS/localit_plg/localit_plg.shp`
3. Apasam butonul: `Import`



In fereastra GIS Layer Manager, la optiunea `Command output`, va apare urmatorul mesaj:



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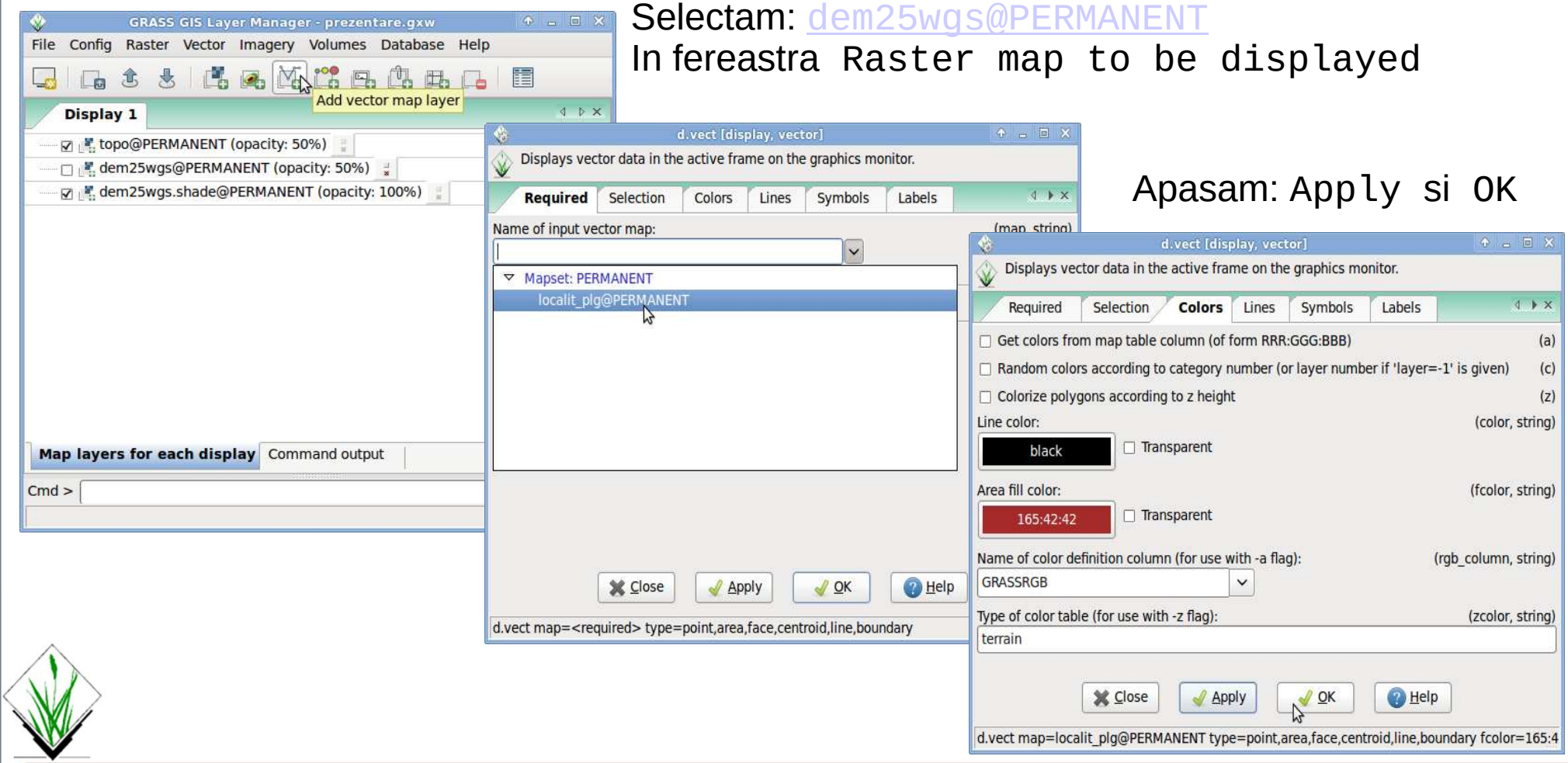
Manipularea datelor in GRASS

Importul datelor vectoriale

Accesam: `Add vector map layer`

Selectam: `dem25wgs@PERMANENT`
In fereastra `Raster map to be displayed`

Apasam: `Apply si OK`



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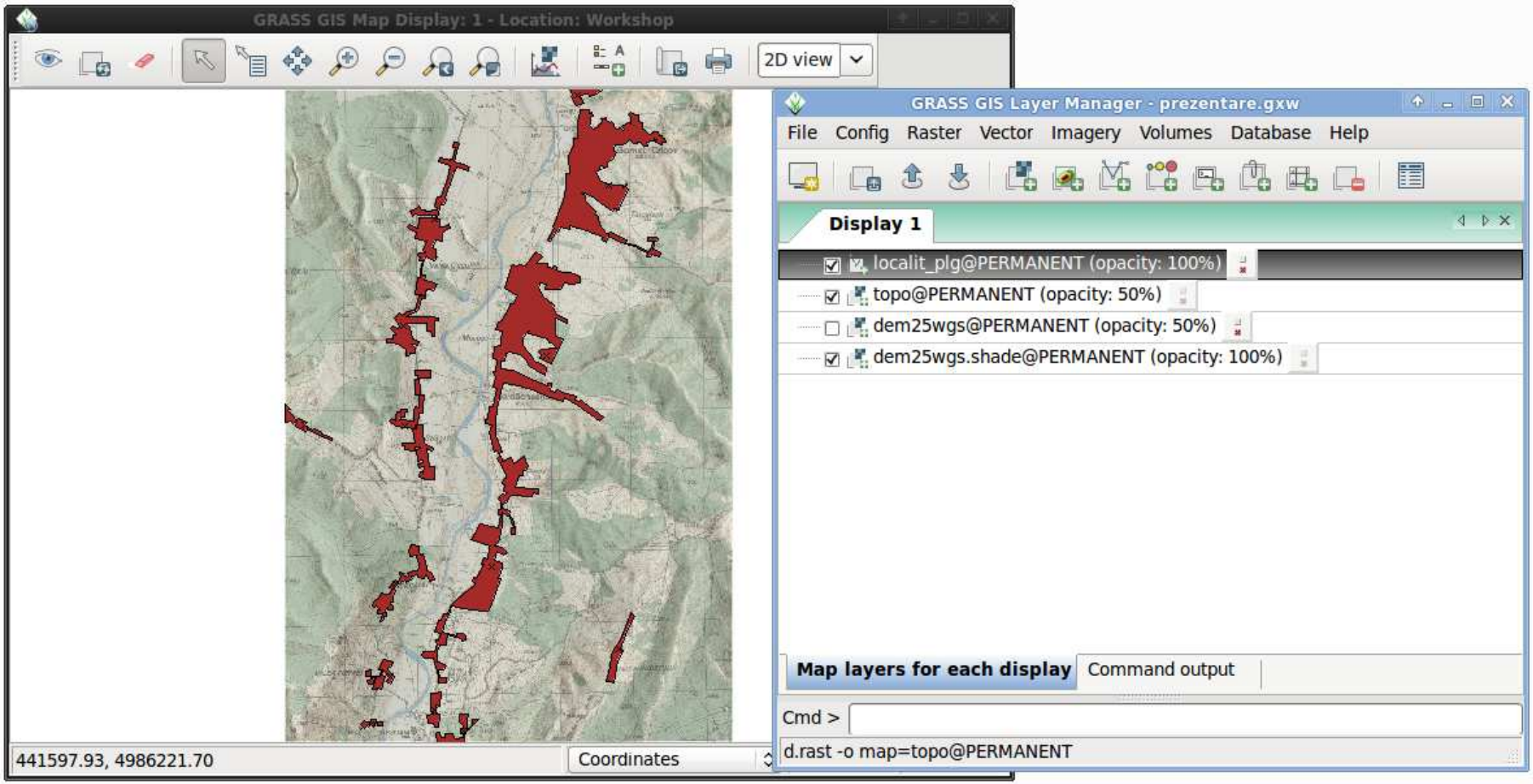
Manipularea datelor in GRASS

Importul datelor vectoriale

Rezultatul final:



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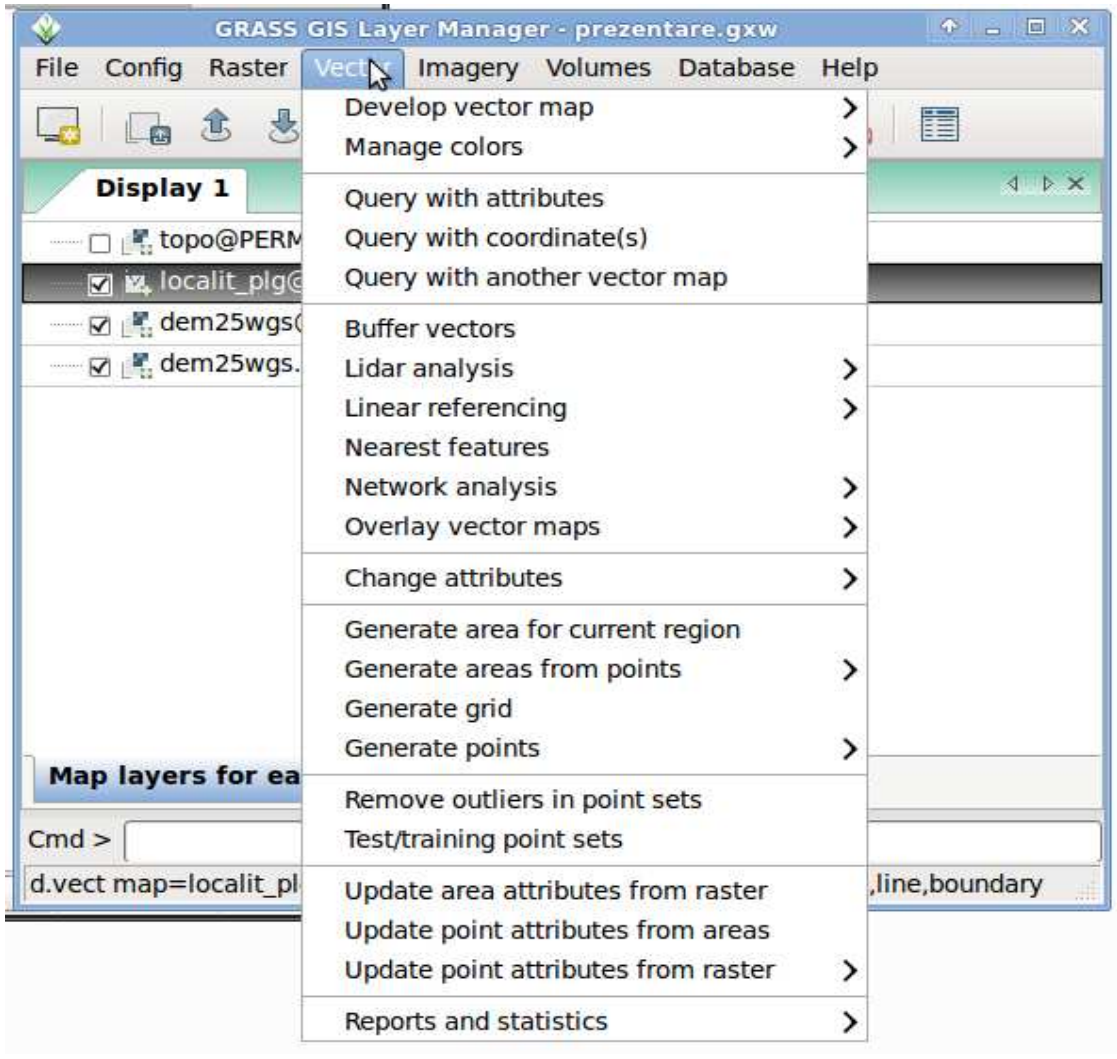
Manipularea datelor in GRASS

Importul datelor vectoriale

Optiuni pentru manipulare:



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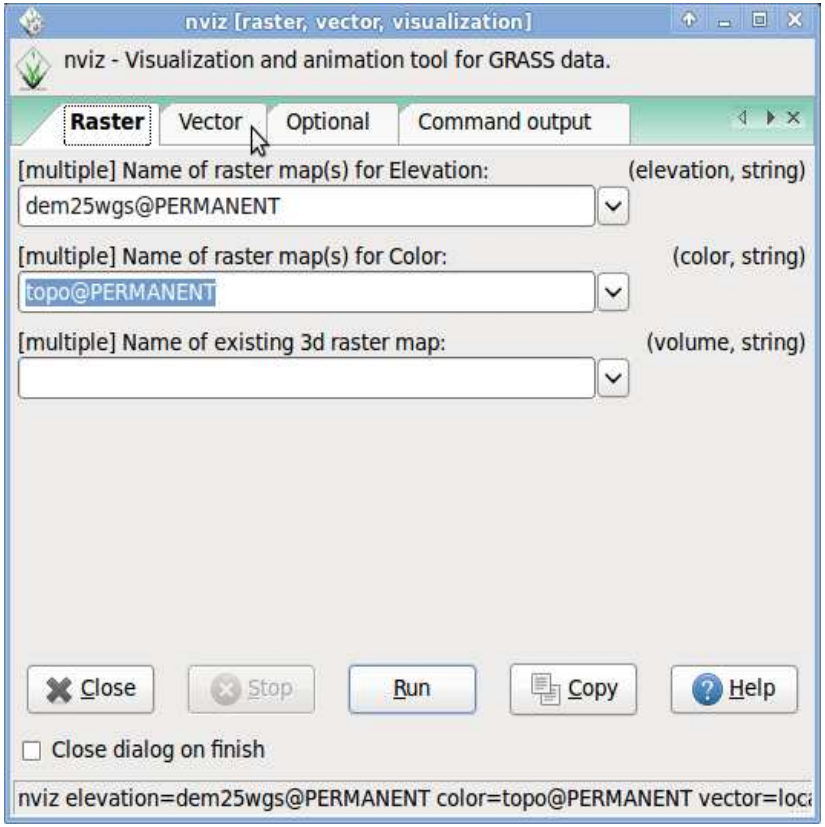
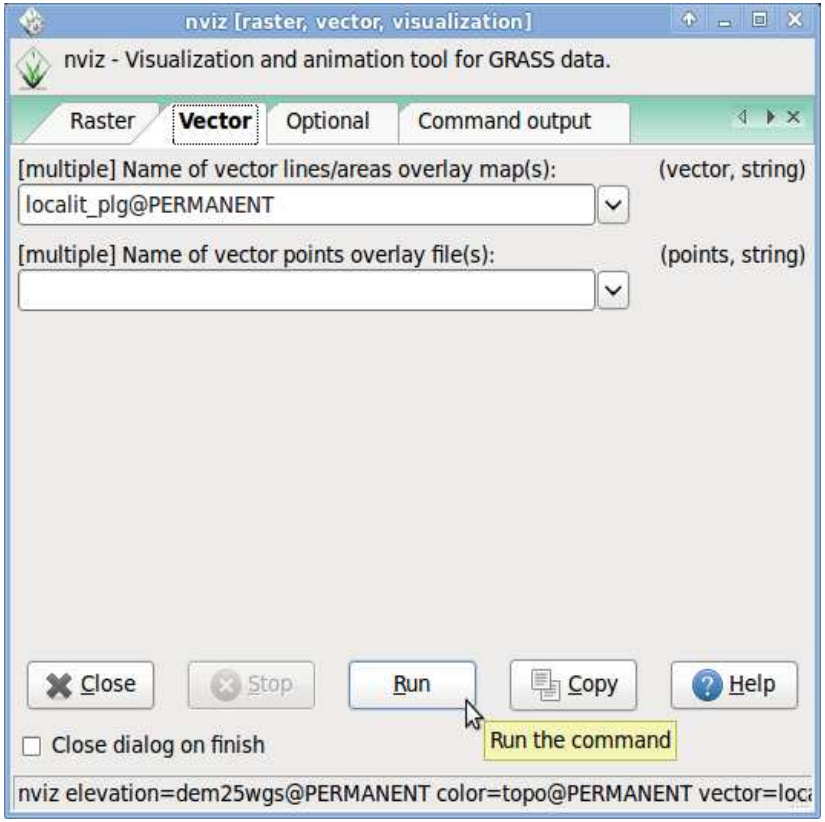
Manipularea datelor in GRASS

Importul datelor vectoriale

Vizualizare 3D – alegerea datelor de intrare:



Selectarea datelor raster:



Selectarea datelor vectoriale:

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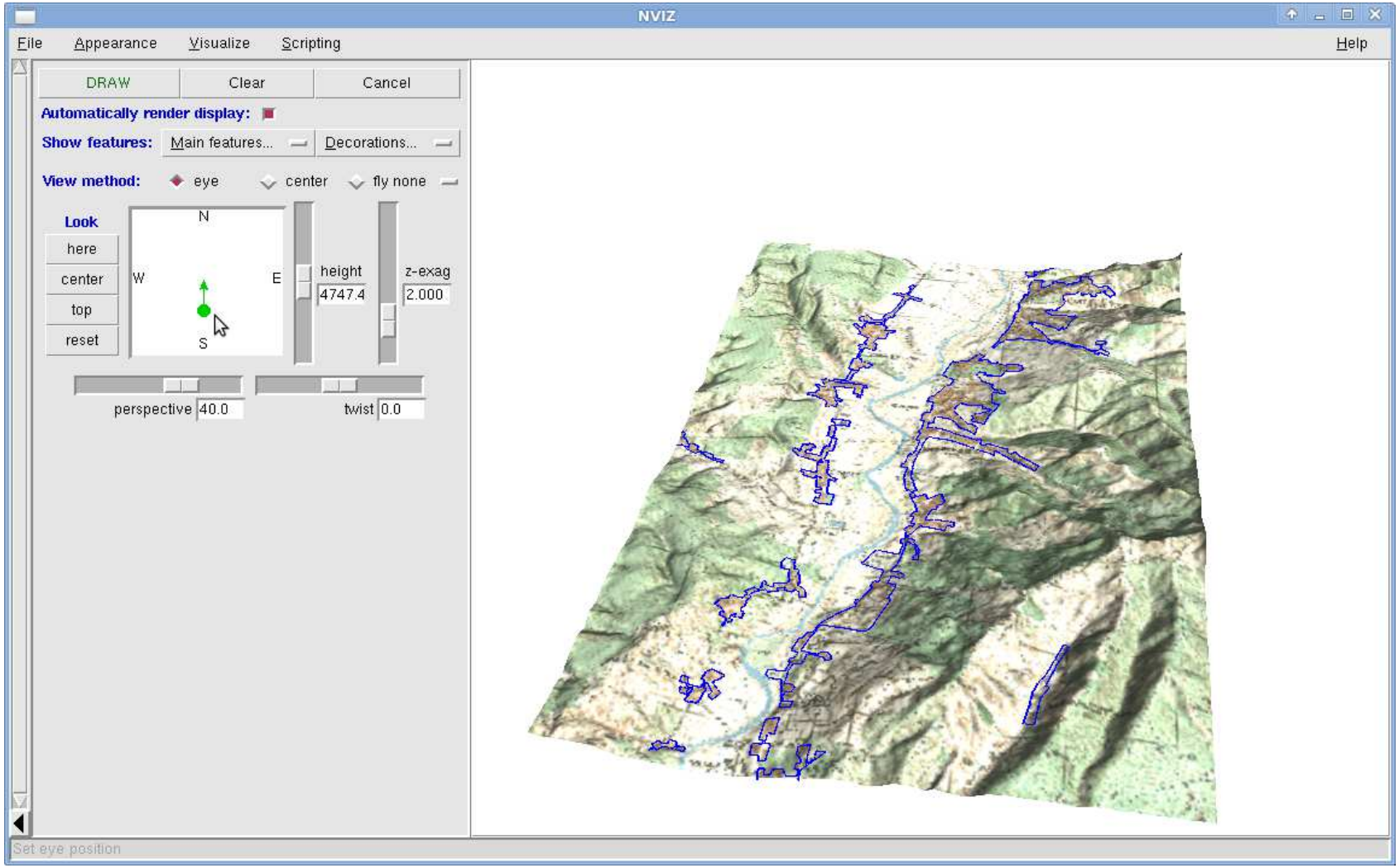
Manipularea datelor in GRASS

Importul datelor vectoriale

Vizualizare 3D – rezultatul final:



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Manipularea datelor in GRASS

Importul imaginilor satelitare

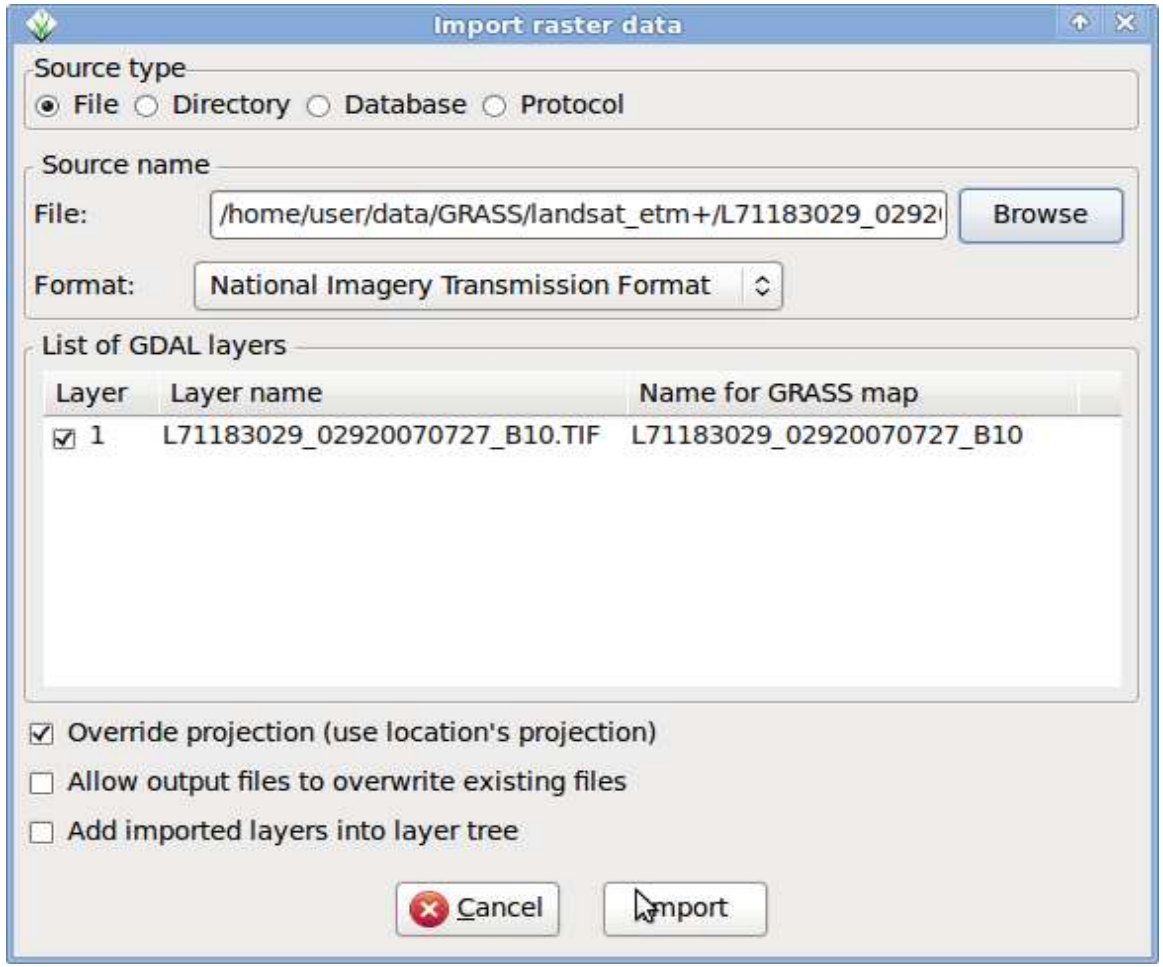
Alegem: `Import raster data > Bulk import of raster data`

Date: `/GRASS/landsat_etm+`

Formatul ales:
`National Imagery Transmission Format`

Importam pe rand benzile spectrale:
1, 2, 3, 4, 5 si 7:

```
L71183029_02920070727_B10.TIF
L71183029_02920070727_B20.TIF
L71183029_02920070727_B30.TIF
L71183029_02920070727_B40.TIF
L71183029_02920070727_B50.TIF
L71183029_02920070727_B70.TIF
```



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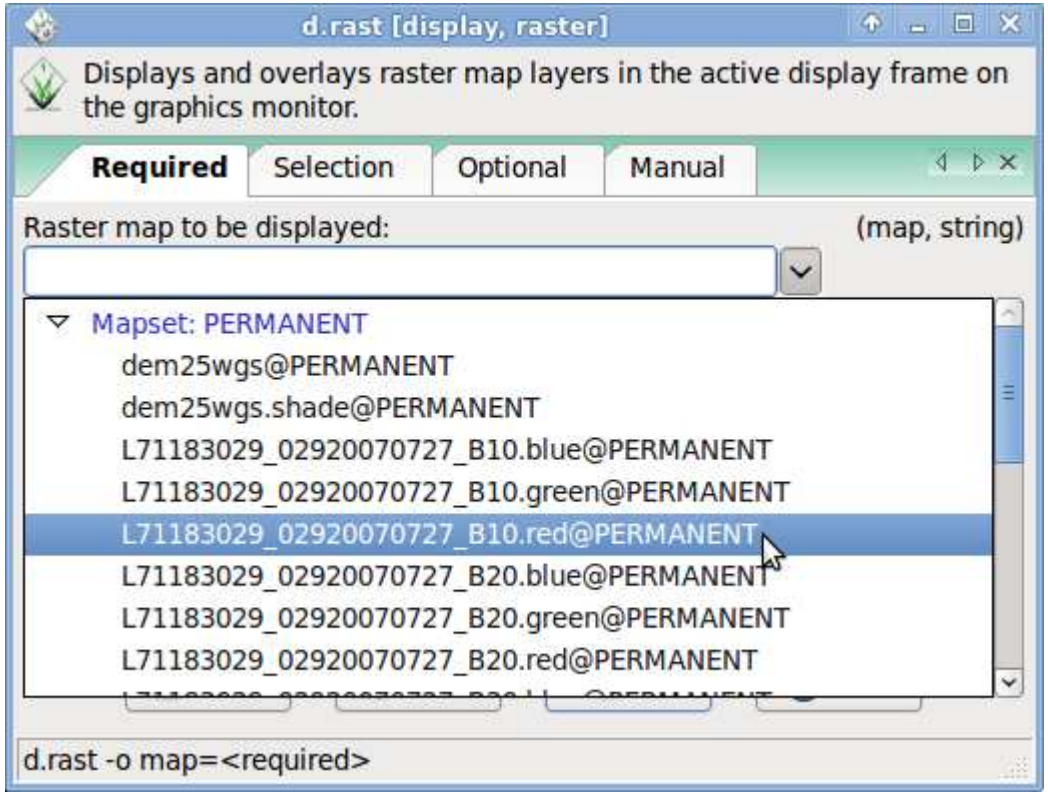
Manipularea datelor in GRASS

Importul imaginilor satelitare

Importul va crea pentru fiecare banda 3 imagini:

```
L71183029_02920070727_B10.blue@PERMANENT
L71183029_02920070727_B10.green@PERMANENT
L71183029_02920070727_B10.red@PERMANENT
```



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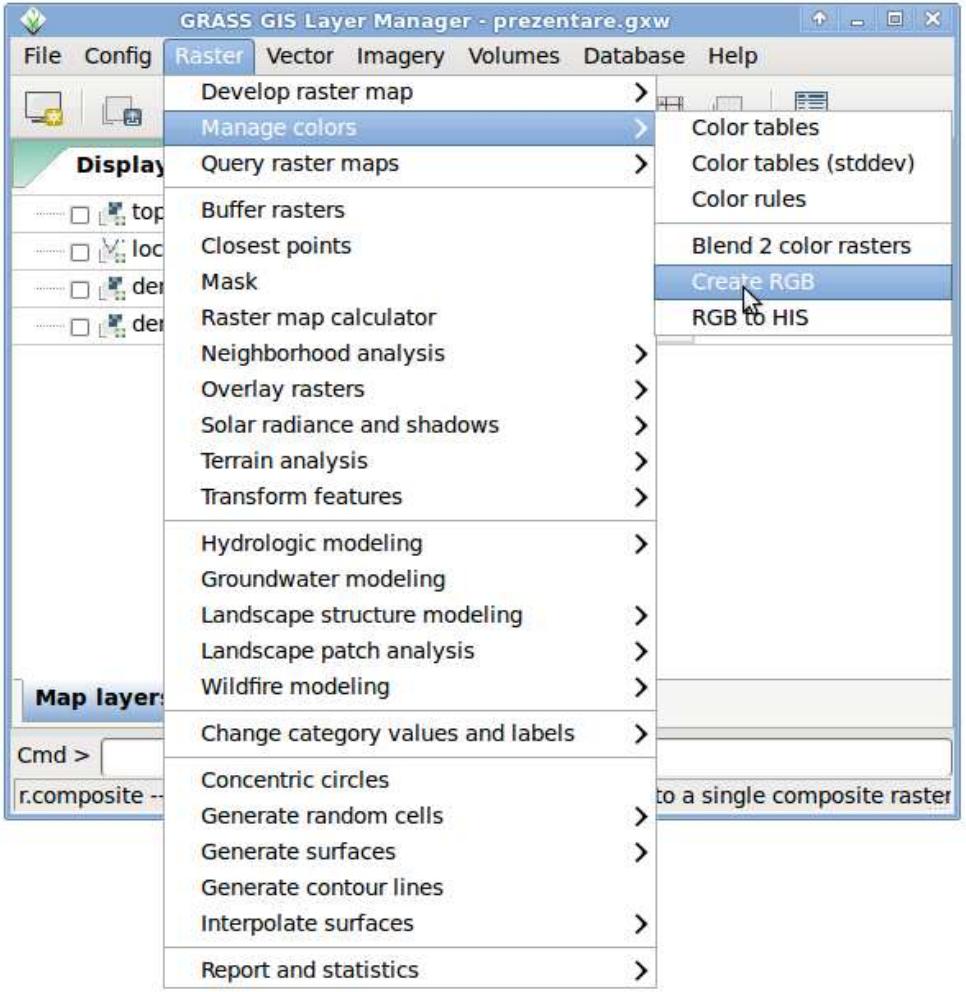
Manipularea datelor in GRASS

Importul imaginilor satelitare

Executam comanda: `Raster > Manage colors > Create RGB`



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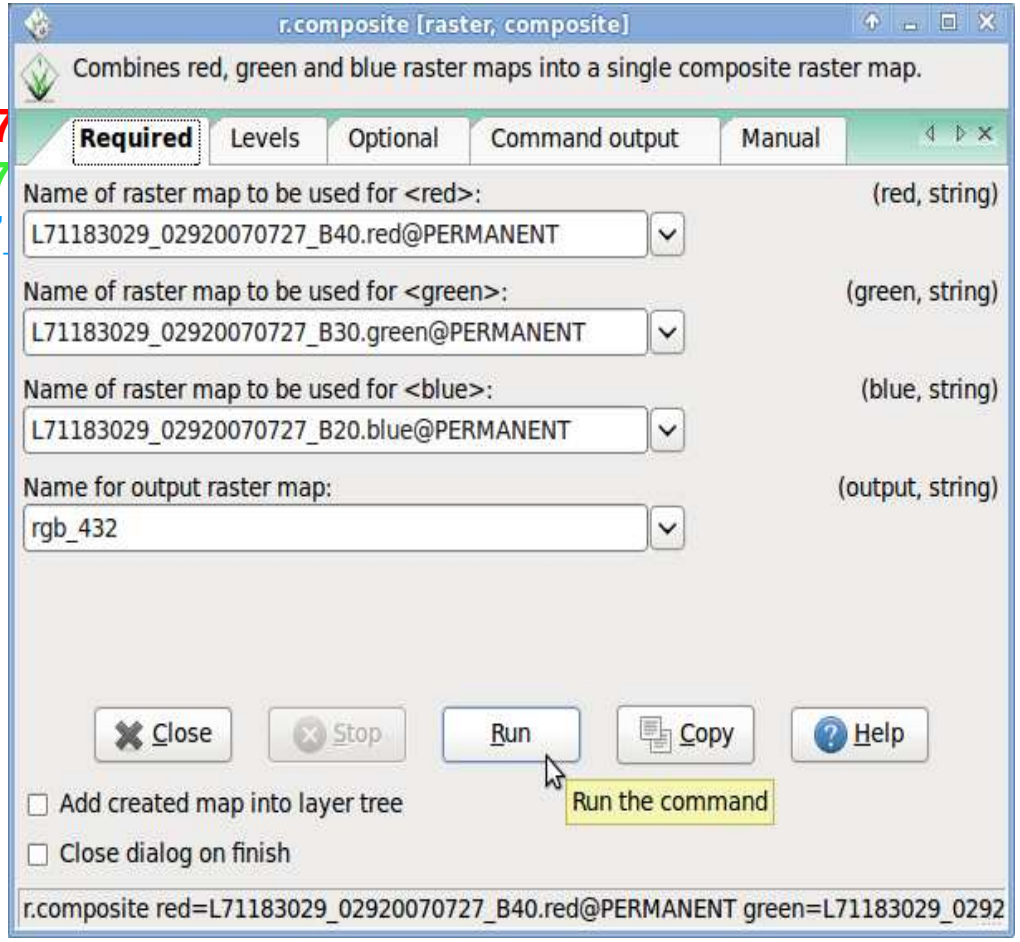
Manipularea datelor in GRASS

Importul imaginilor satelitare

Alegem pentru fiecare strat banda dorit apasand butonul corespunzator.

Exemplu:

Red: L71183029_02920070727
Green: L71183029_02920070727
Blue:L71183029_02920070727_



Completam numele imaginii de iesire:
`> rgb_432`

Adaugam rasterul creat
`> Add raster map layer`

Vizualizam rasterul

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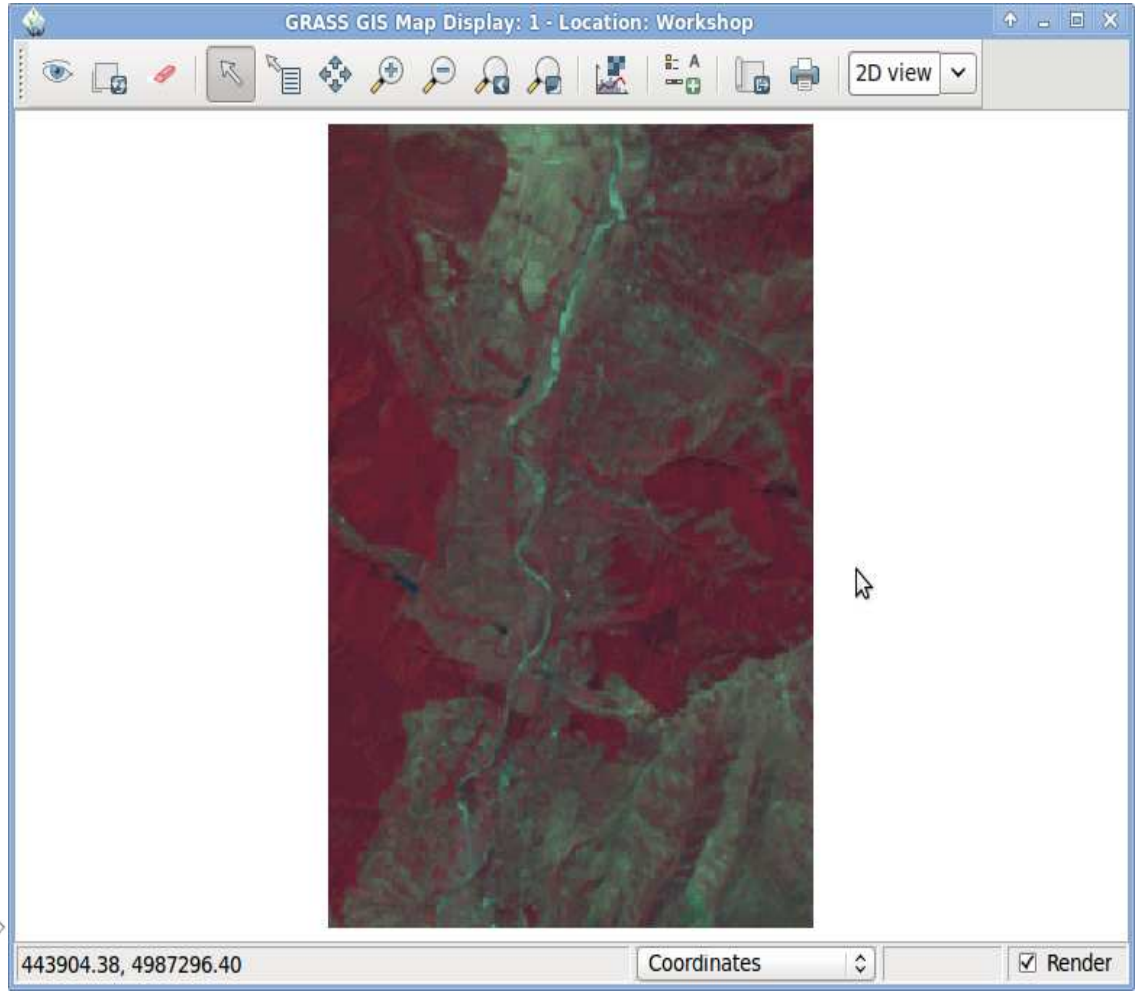
Manipularea datelor in GRASS

Interogarea imaginilor satelitare

Combinatii de benzi:



Combinatia spectrala	Caracteristici
4,3,2	Vegetatie în nuanţe de rosu, zone urbane sunt albastru cyan, solurile cu nuante de maro

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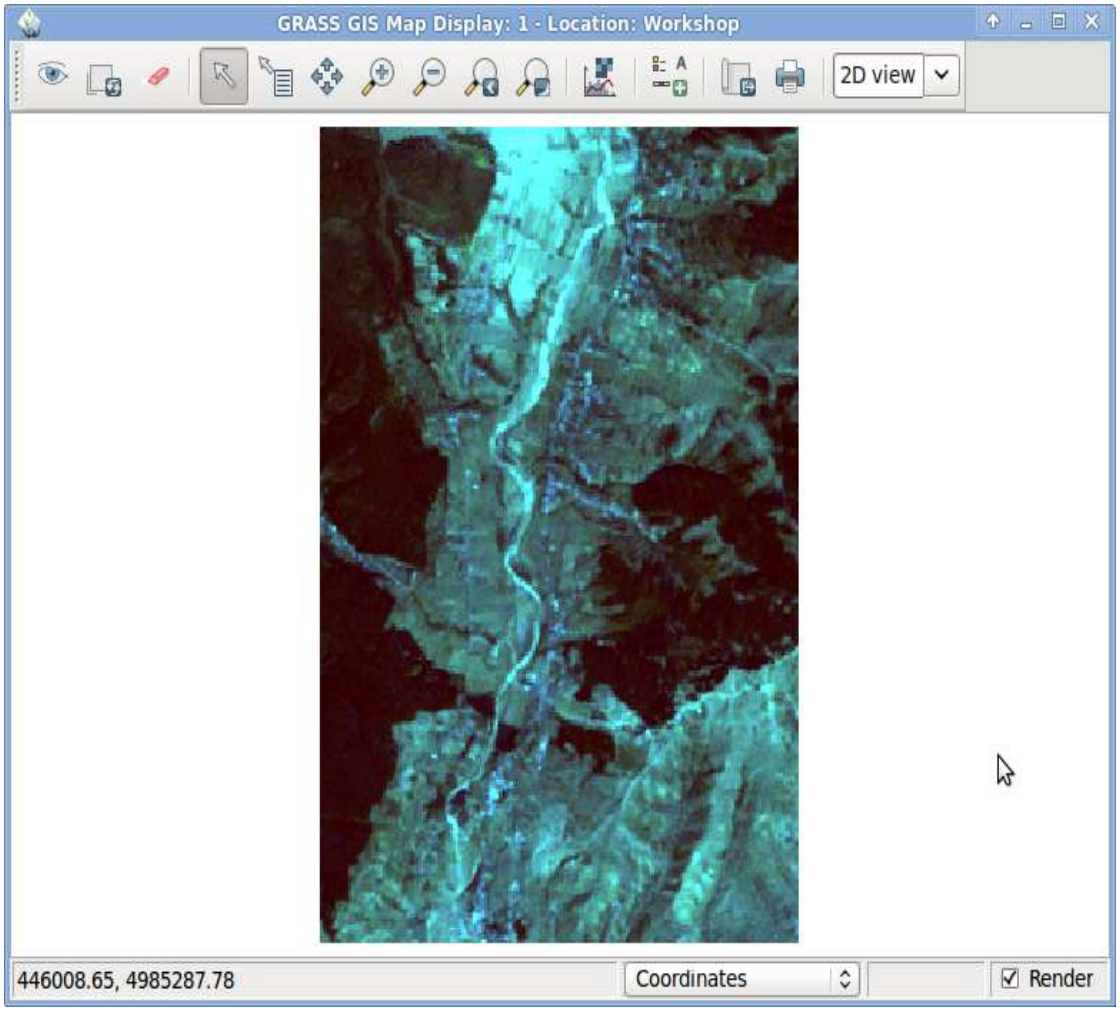
Manipularea datelor in GRASS

Interogarea imaginilor satelitare

Combinatii de benzi:



Combinatia spectrala	Caracteristici
3,2,1	Vegetatie în nuante de verde, zone urbane sunt albastru cyan,

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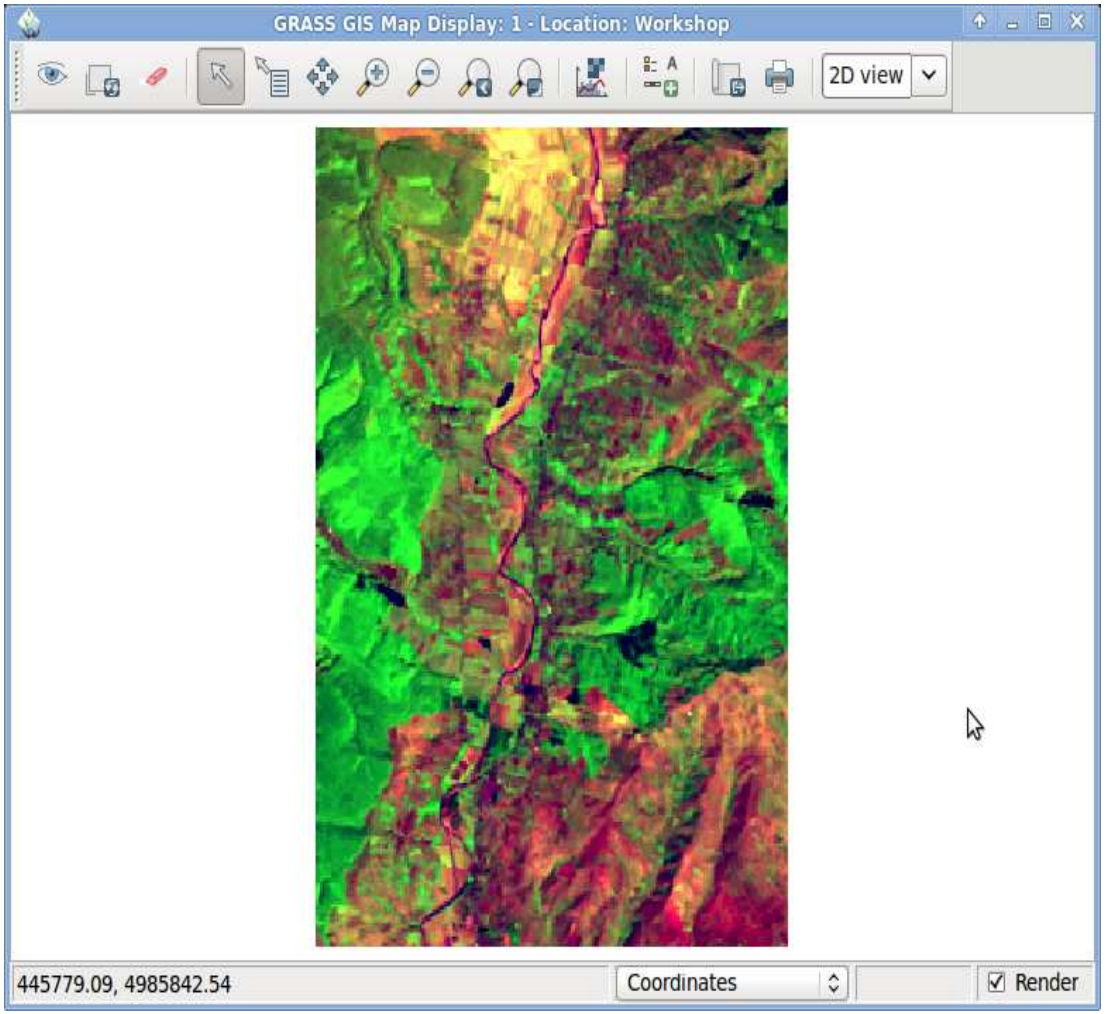
Manipularea datelor in GRASS

Interogarea imaginilor satelitare

Combinatii de benzi:



Combinatia spectrala	Caracteristici
7,4,2	Vegetatie în nuante de verde, aprins. Incendiile apar in rosu.

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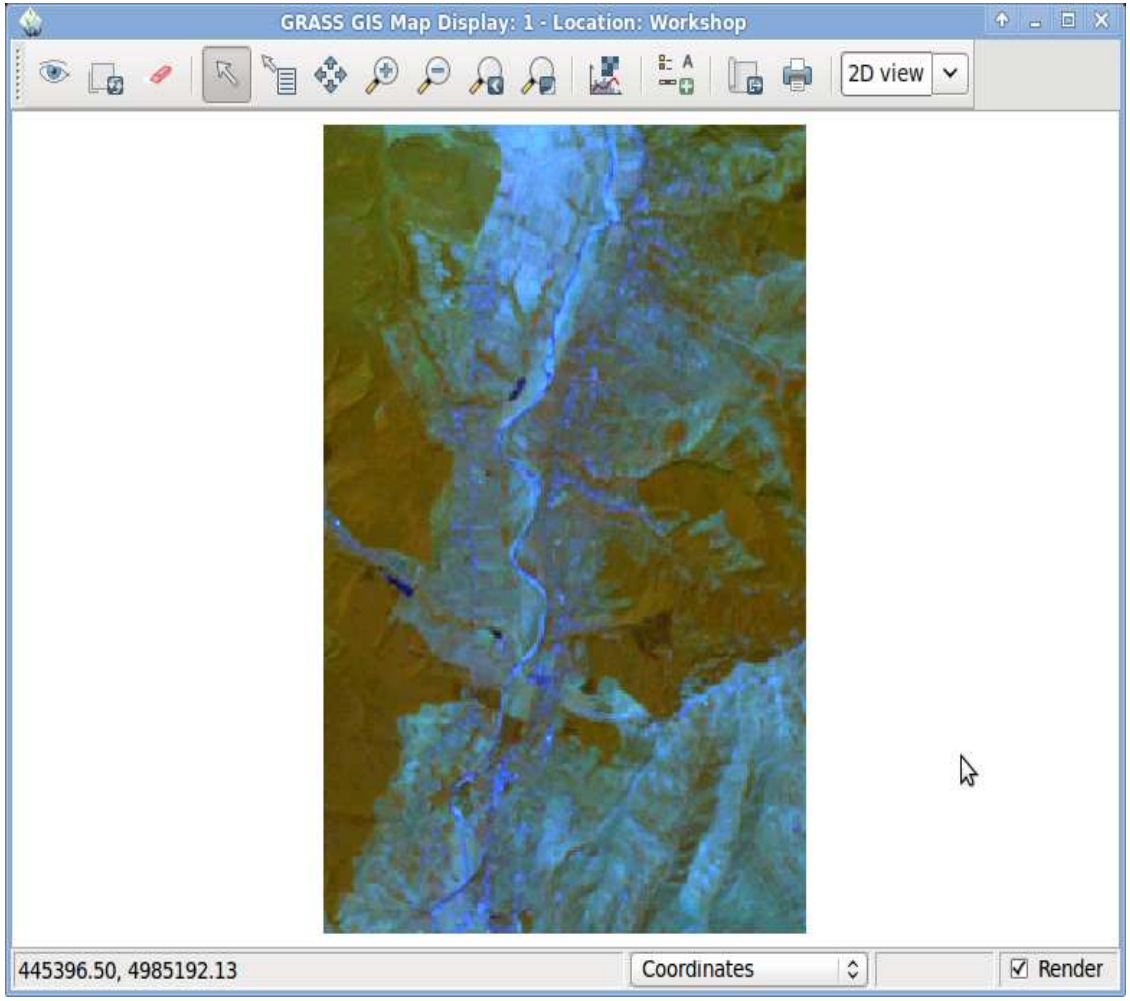
Interogarea imaginilor satelitare

Combinatii de benzi:



Combinatia spectrala	Caracteristici
4,5,1	Vegetatie în nuante de maro. Apa apare in albastru.

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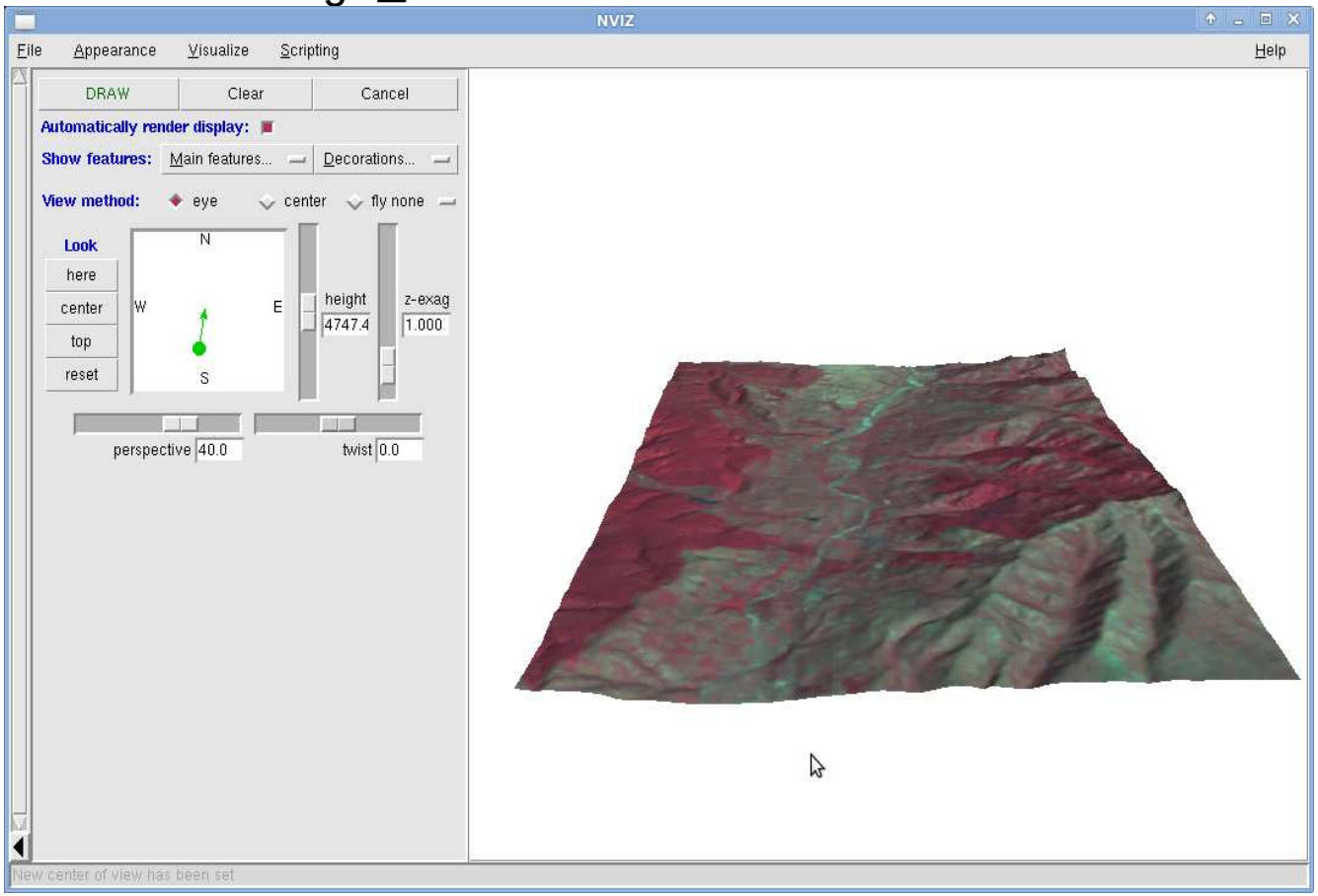
Interogarea imaginilor satelitare

Combinatia de benzi se poate vizualiza si in dormat 3D cu `NVIZ`
Elevation raster: `dem25wgs`
Color raster: `rgb_432`



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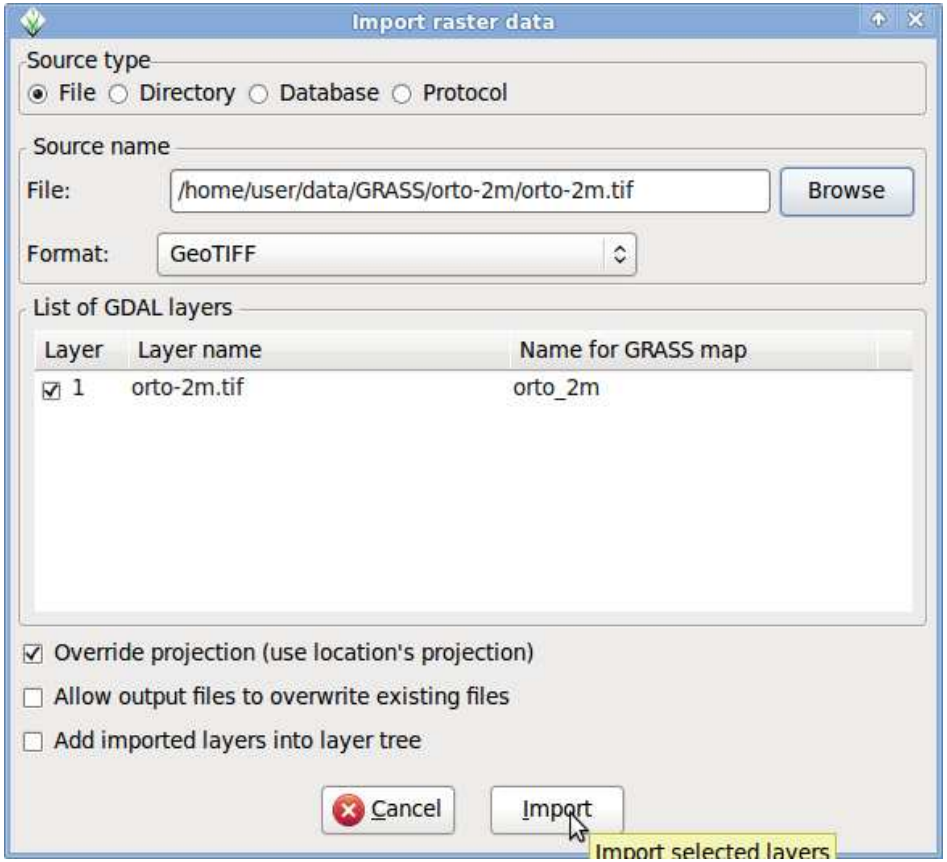
Manipularea datelor in GRASS

Explorarea 3D a realitatii geografice

Importare ortofotoplan:
`File > Import raster data > Bulk import of raster data`



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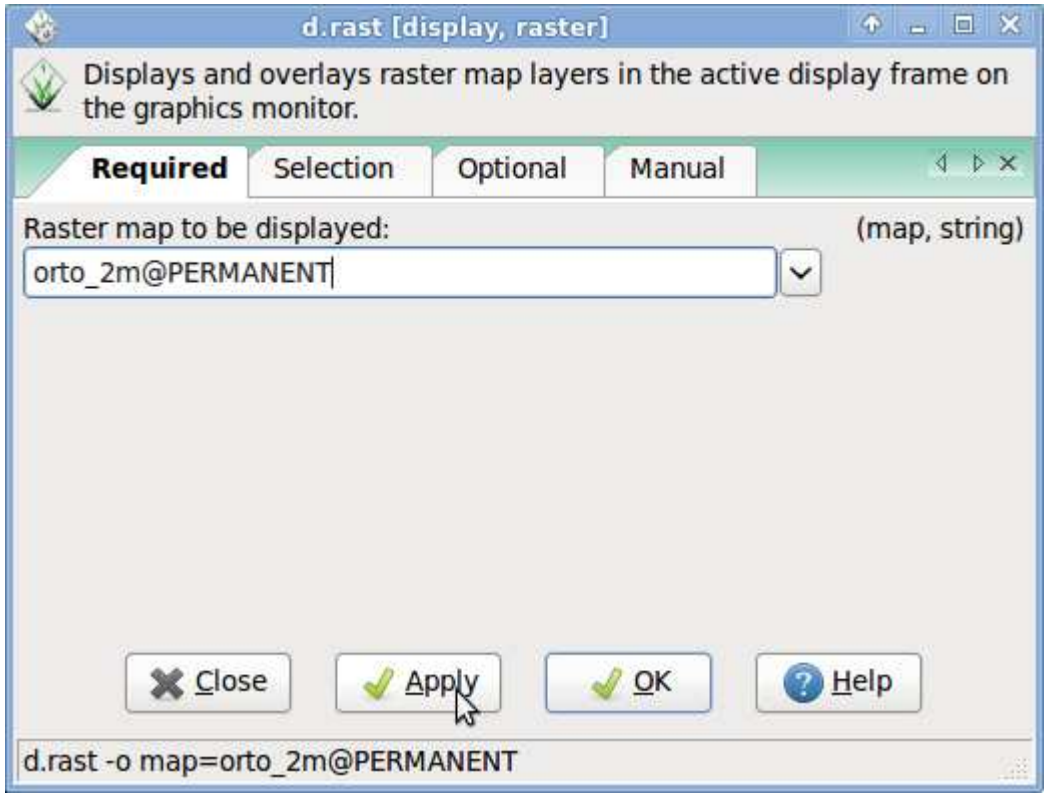
Explorarea 3D a realitatii geografice

Vizualizare ortofotoplan: `Add raster map layer`



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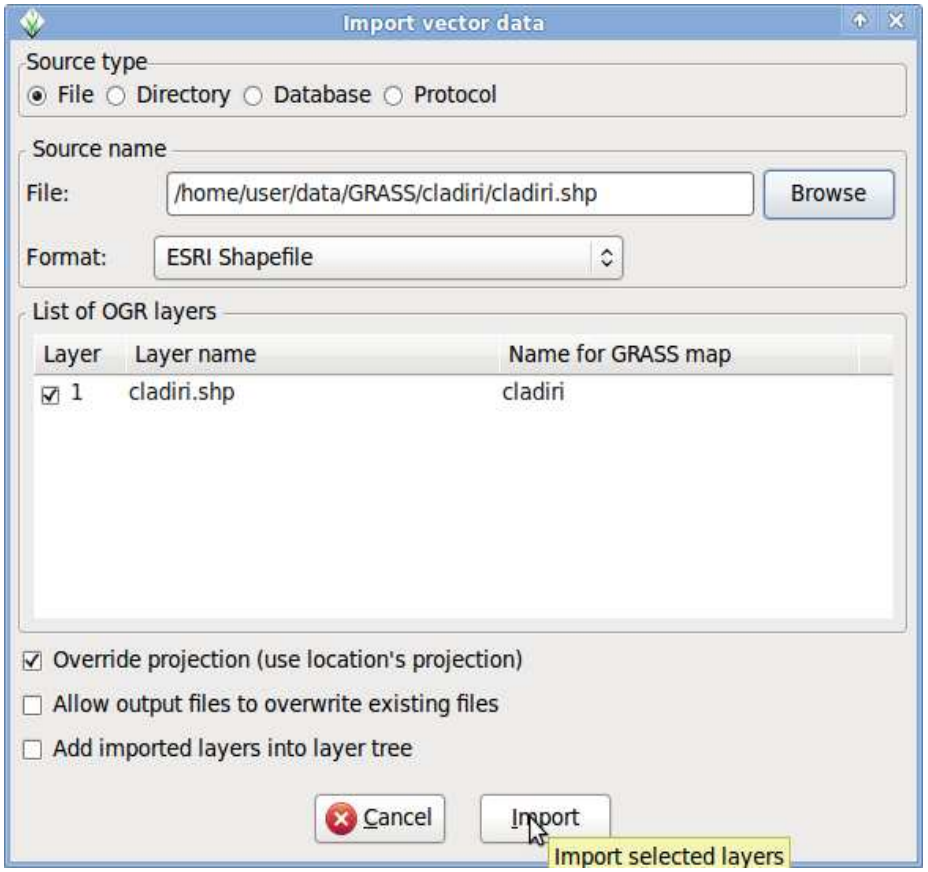
Manipularea datelor in GRASS

Explorarea 3D a realitatii geografice

Importare cladiri:
`File > Import vector data > Bulk import of vector data`



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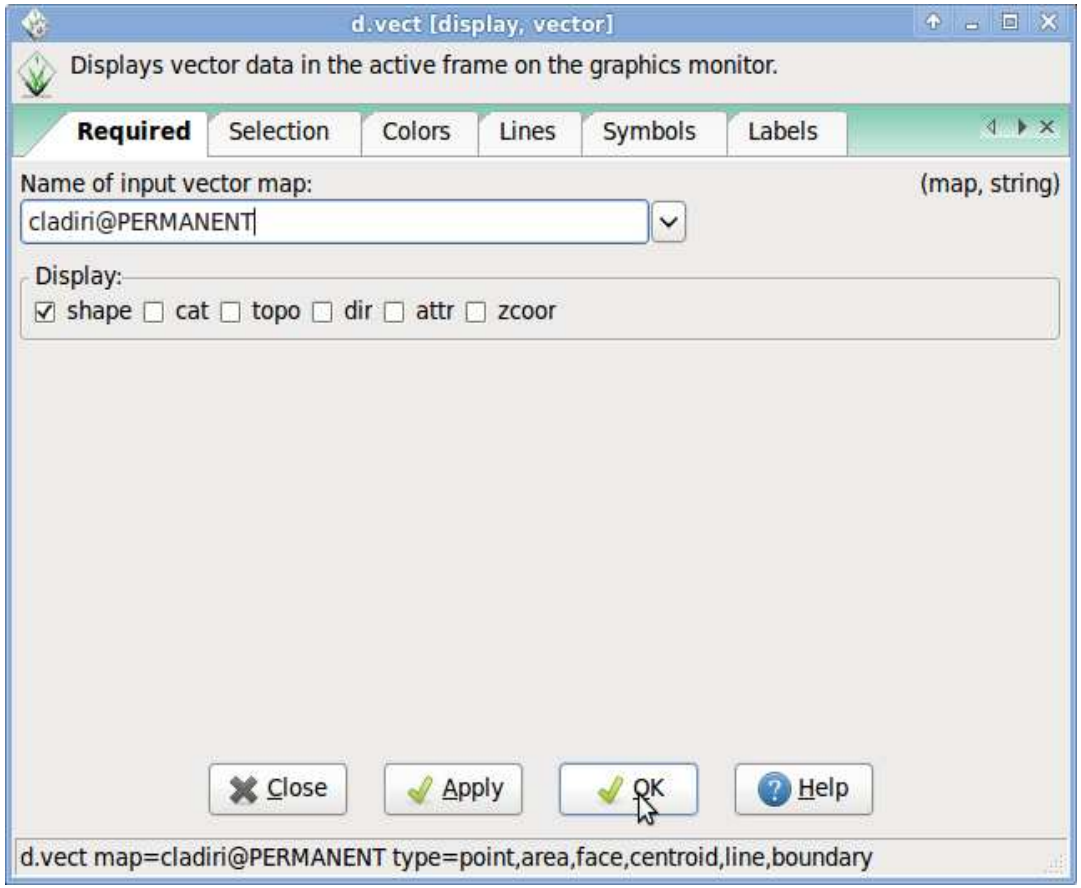
Explorarea 3D a realitatii geografice

Vizualizare cladiri: `Add vector map layer`



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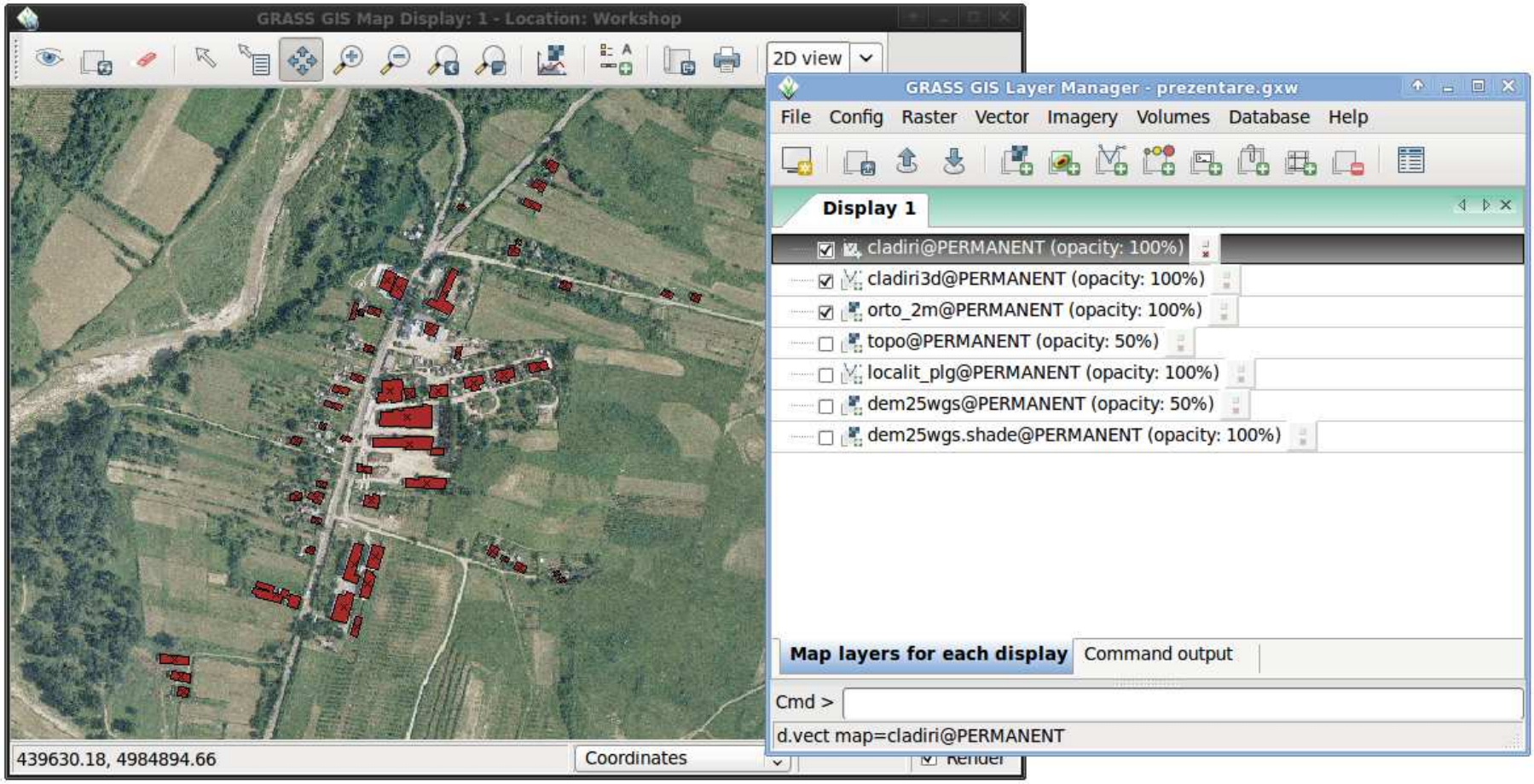
Explorarea 3D a realitatii geografice

Rezultat:



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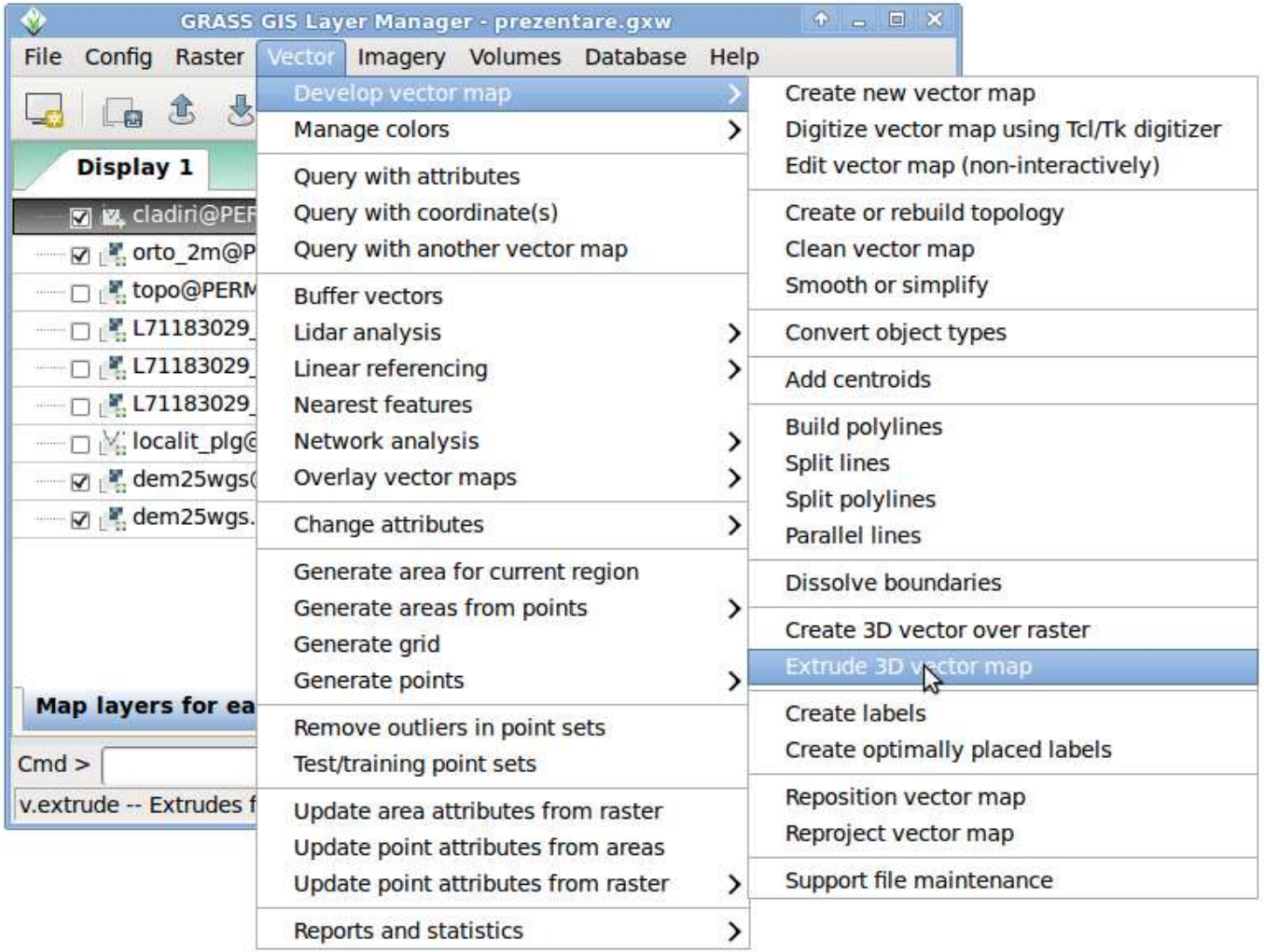
Explorarea 3D a realitatii geografice

Realizarea cladirilor in 3D:

```
> Vector

> Develop vector map

> Extrude 3D vector map
```



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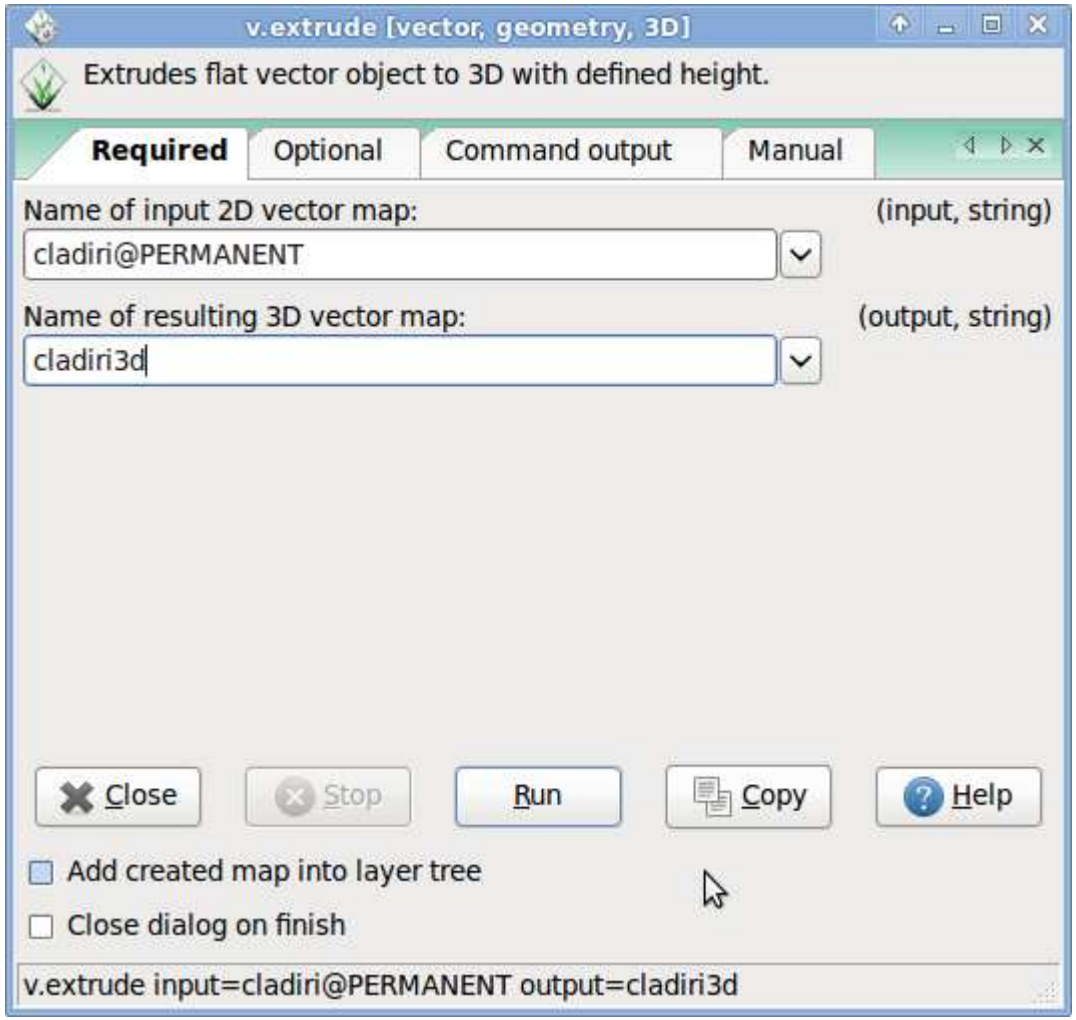
Explorarea 3D a realitatii geografice

In fereastra v.extrude completam cerintele obligatorii:

Name on imput vector map:
`> cladiri@PERMANENT`

Name of resulting 3D vactor map
`> cladiri3d`



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Explorarea 3D a realitatii geografice

... precum si cerintele obtionale:

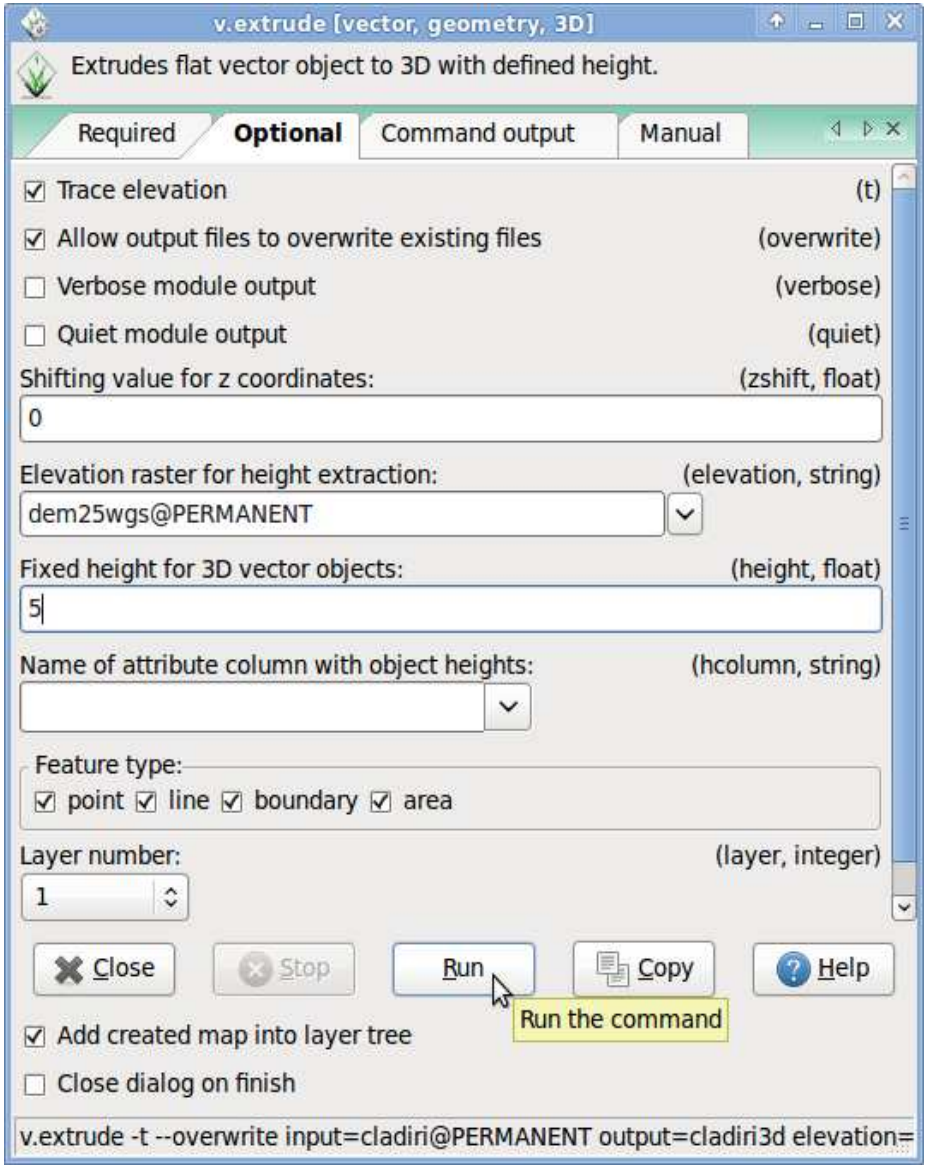
Bifam:
> `Trace elevation`

Elevation raster of height extraction
> `dem25wgs@PERMANENT`

Fixed height for 3D vector objects:
> `5`

Bifam:
> `Add created map into layer tree`

Rulam comanda



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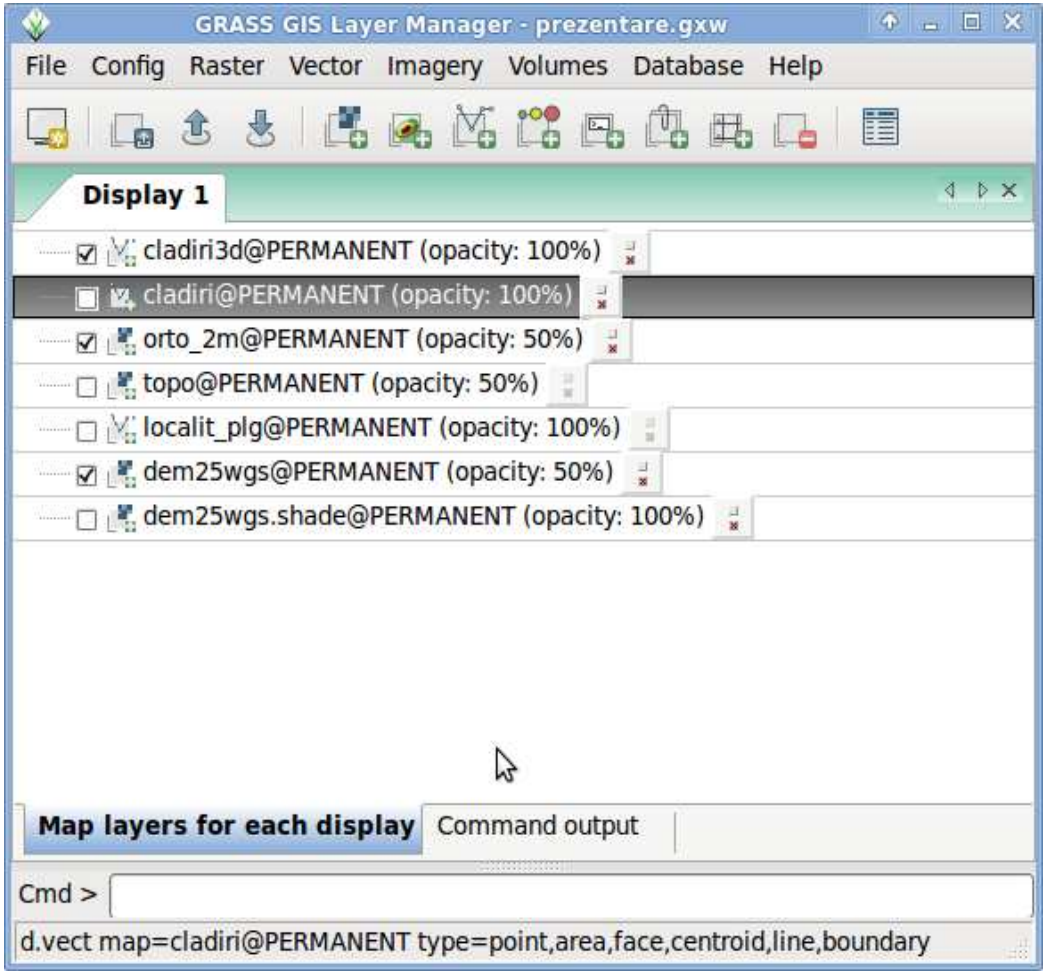
Manipularea datelor in GRASS

Explorarea 3D a realitatii geografice

In fereastra `GRASS GIS Layer Manager` avem elementele:



Display1:

```
> cladiri3d@PERMANENT

> orto_2m@PERMANENT

> dem25wgs@PERMANENT
```

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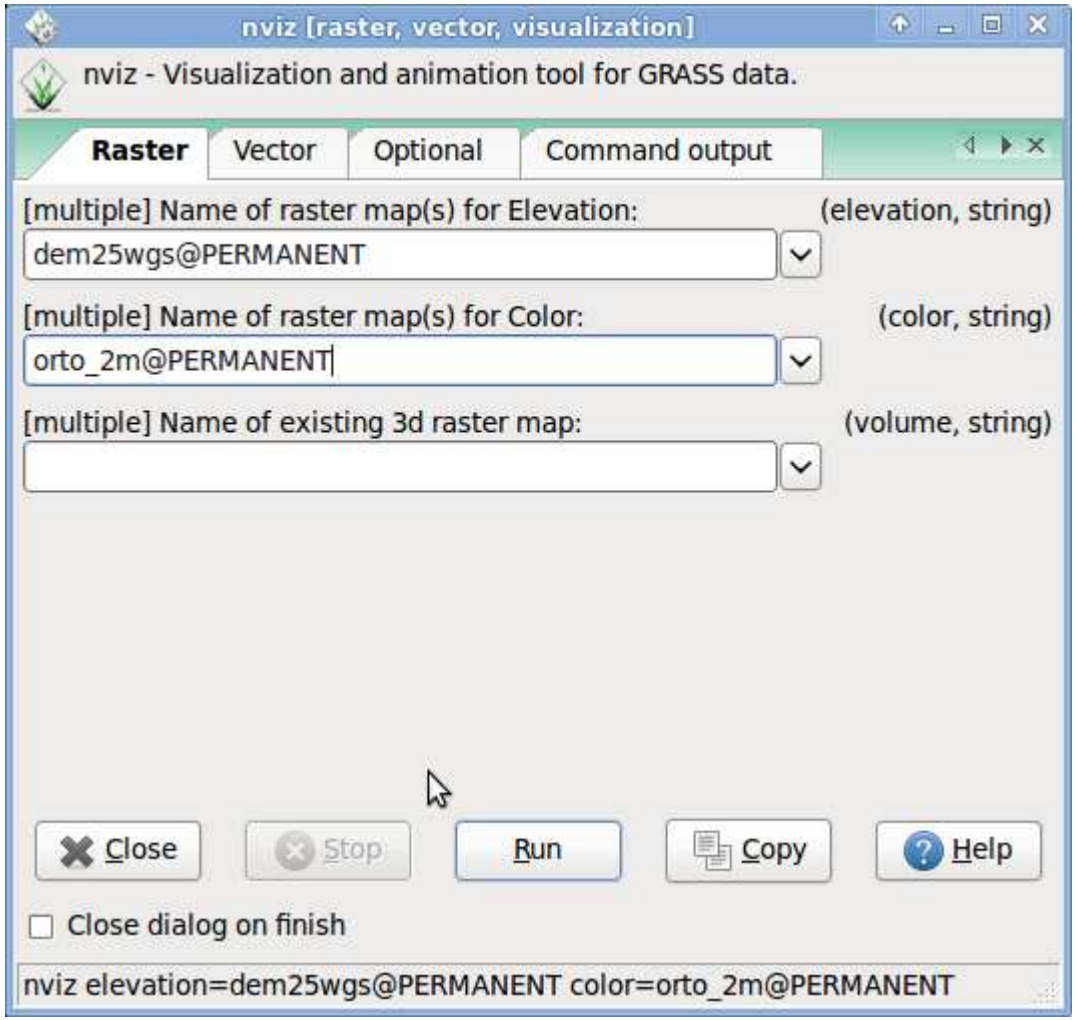
Manipularea datelor in GRASS

Explorarea 3D a realitatii geografice

Vizualizarea 3D: `File > NVIZ`



Completam datele raster:

Name of raster map(s) for Elevation:
`> dem25wgs@PERMANENT`

Nameof raster map for Color:
`> orto_2m@PERMANENT`

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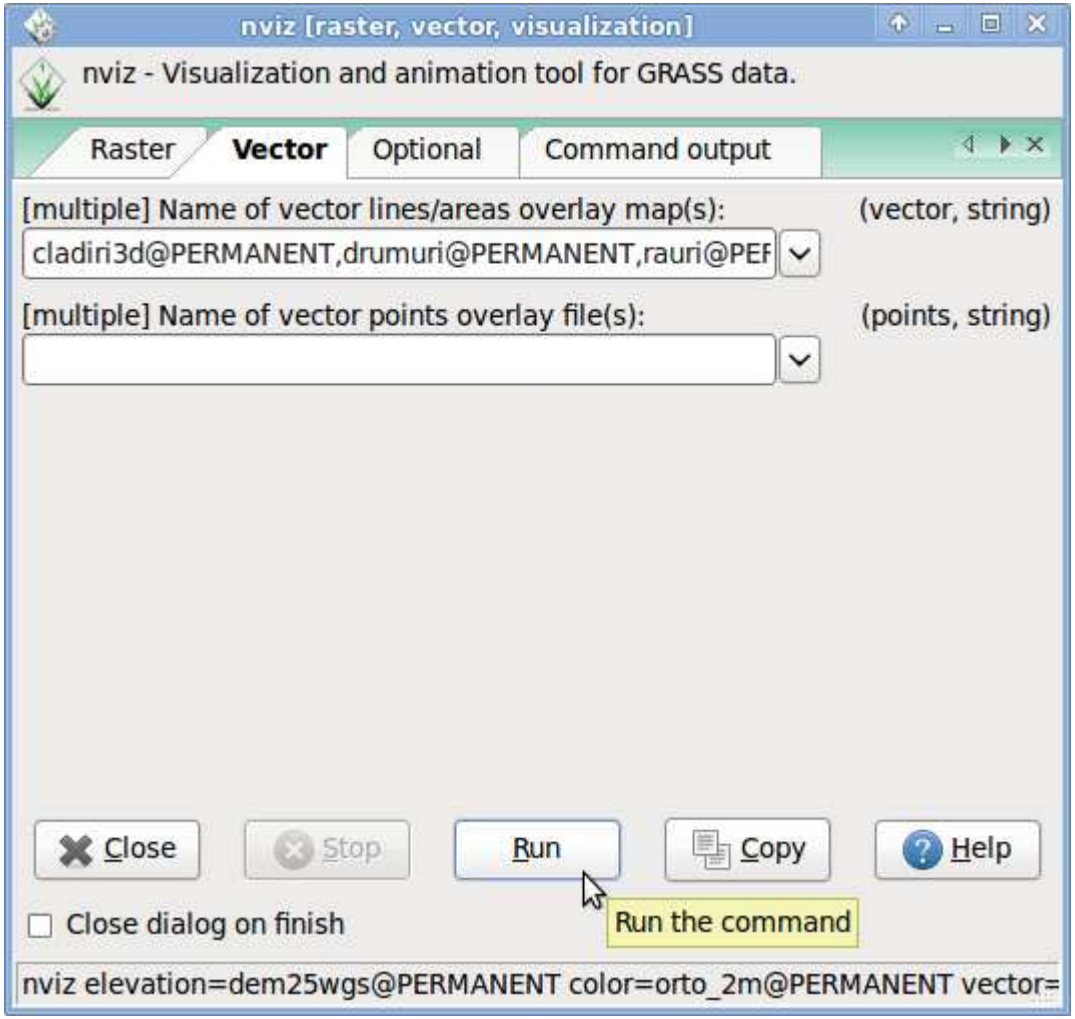
Manipularea datelor in GRASS

Explorarea 3D a realitatii geografice

Vizualizarea 3D: `File > NVIZ`



Completam datele Vector:

Name of vector overlay map(s):
```
> cladiri3d@PERMANENT
> drumuri@PERMANENT
> rauri@PERMANENT
```

Rulam comanda

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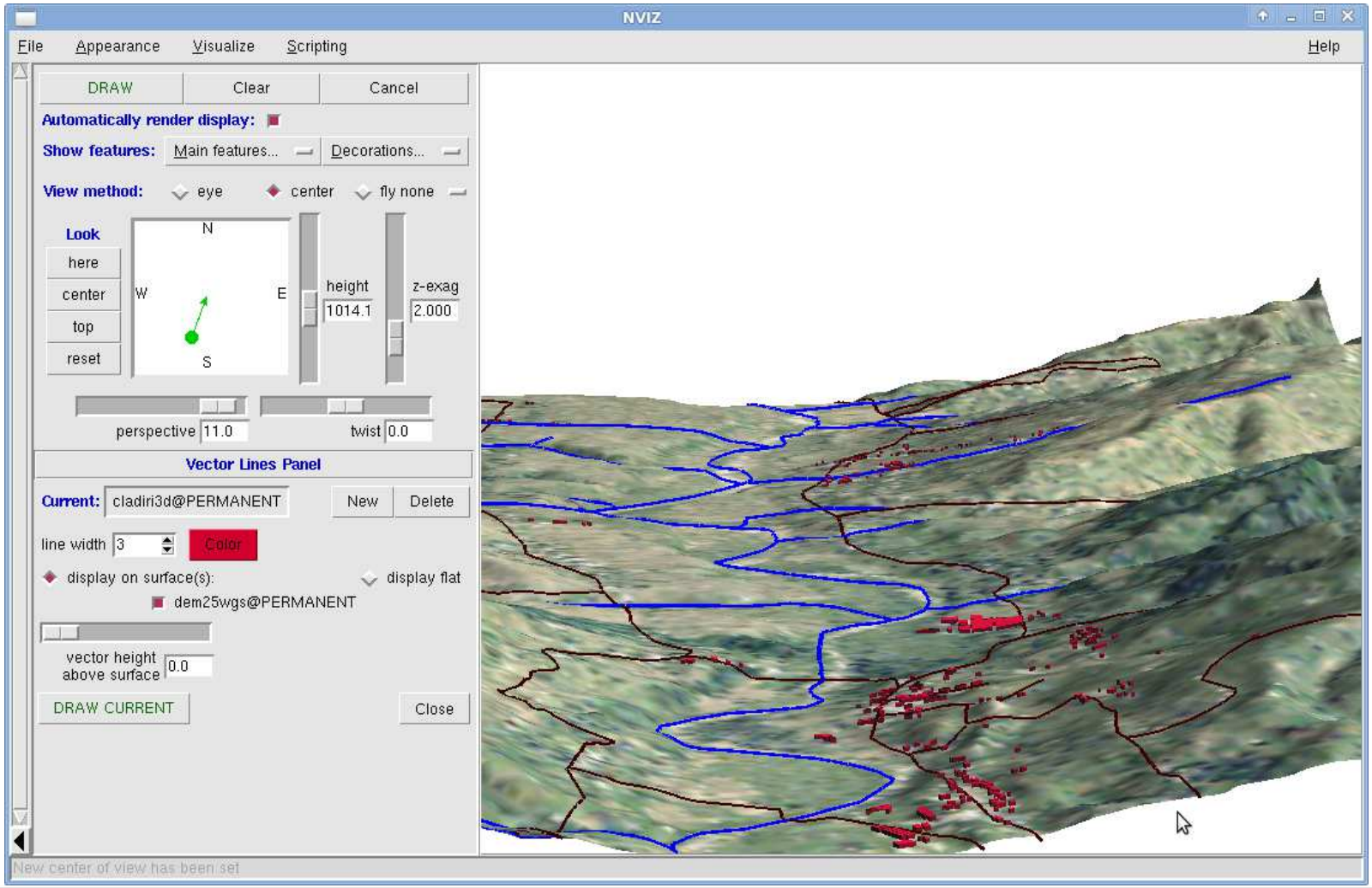
Manipularea datelor in GRASS

Explorarea 3D a realitatii geografice

Fereastra `NVIZ` are urmatorul aspect:



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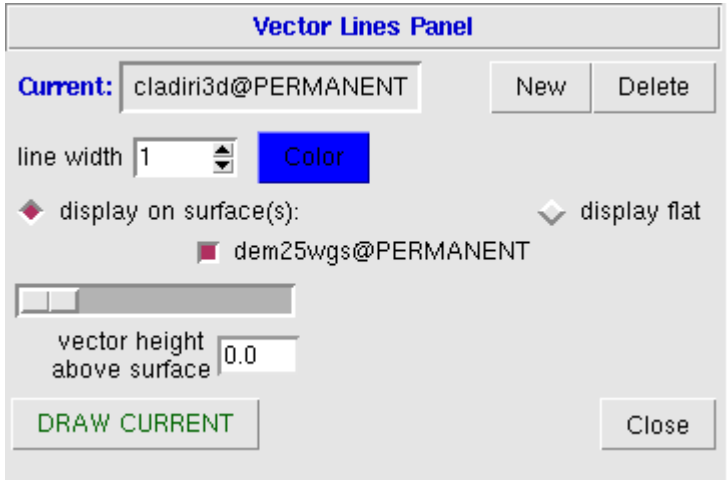
Manipularea datelor in GRASS

Explorarea 3D a realitatii geografice

Modificarea proprietatilor cladirilor se face cu optiunea `Vector Lines Panel:`
Executam in fereastra `NVIZ: Fisualize > Vector Line/3D Polygons`



`Line width:` dimensiunea liniilor
`Color:` culoarea cladirilor

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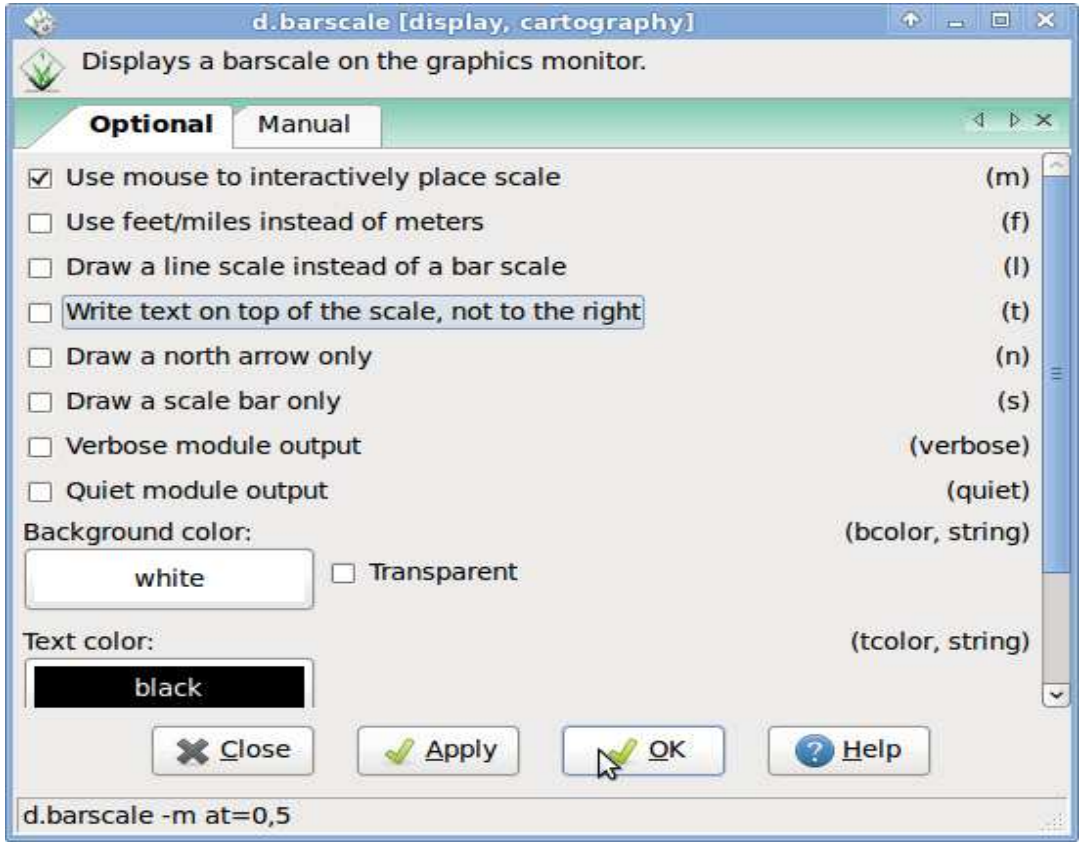
Manipularea datelor in GRASS

Pregatirea de imprimare/exportare

Pentru scara hartii

Executam in `fereastra de vizualizare`:

`Add map elements > Add scale bar and north arrow`



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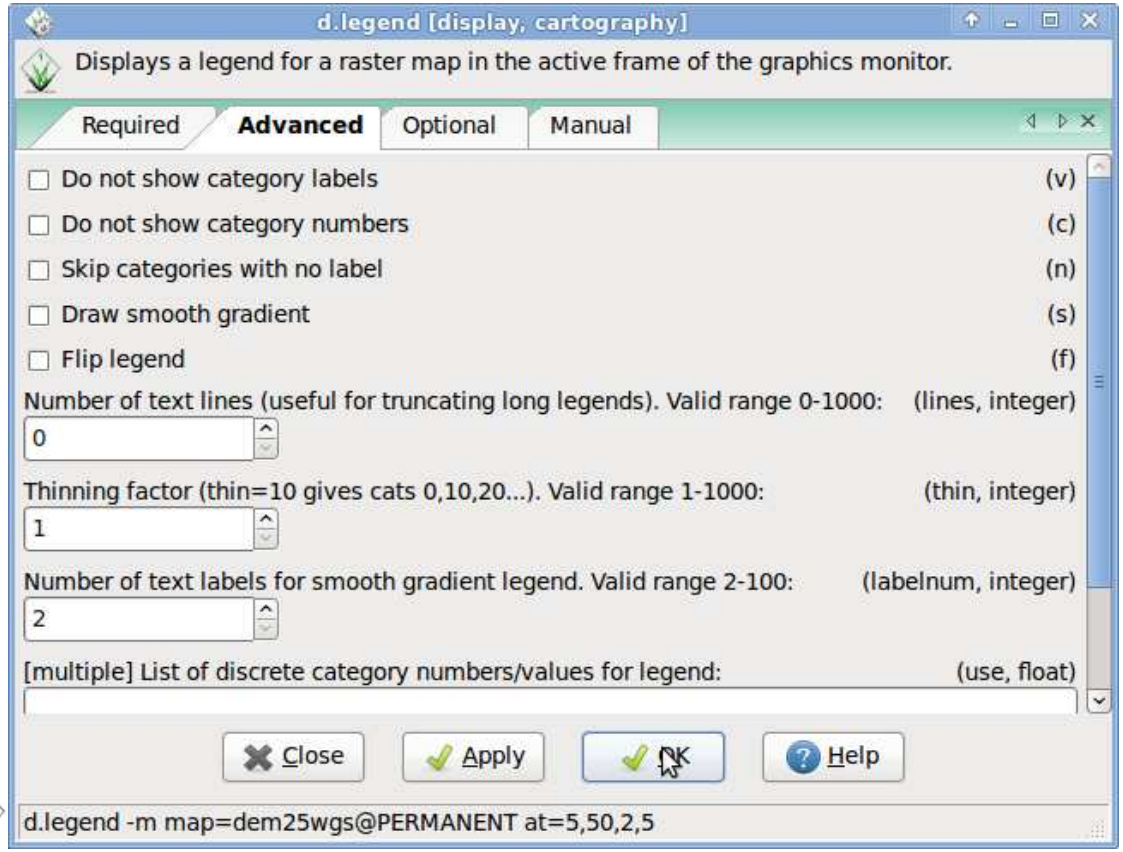
Manipularea datelor in GRASS

Pregatirea de imprimare/exportare

Pentru legenda

Executam in fereastra de vizualizare:

`Add map elements > Add legend`



Cu completare la
`List of discrete`

Cu completare la
`List of discrete`
A valorilor:
`450, 350, 250, 150`

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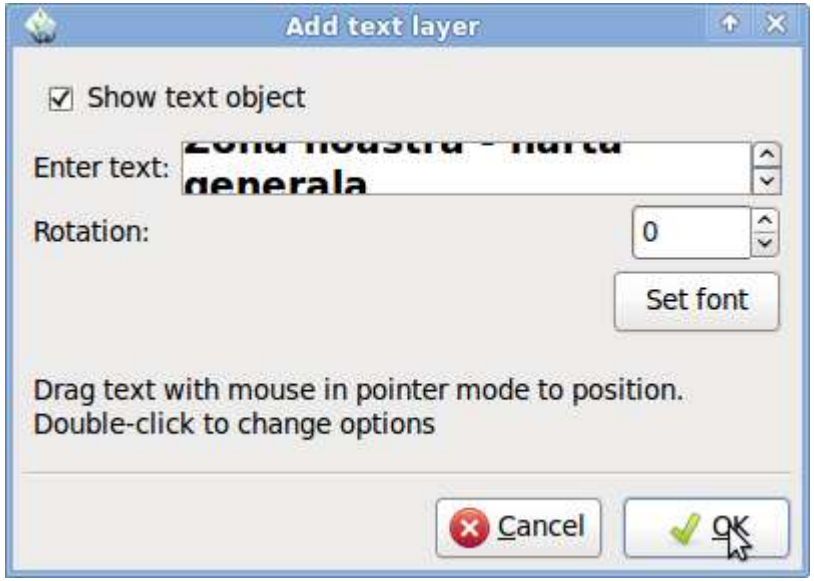
Manipularea datelor in GRASS

Pregatirea de imprimare/exportare

Pentru Titlu

Executam in fereastra de vizualizare:

`Add map elements > Add text layer`



Se seteaza si proprietatile fontului: `Set fornt`

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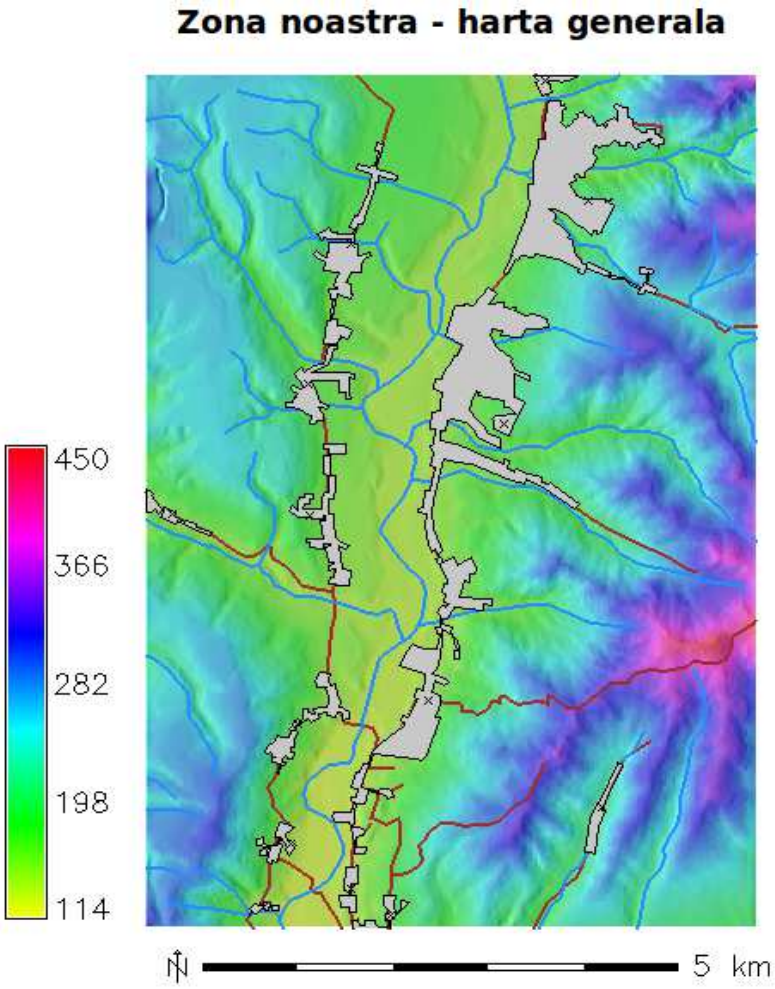
Manipularea datelor in GRASS

Pregatirea de imprimare/exportare

Rezultatul final pentru salvare imagine: `Save display to graphic file`



VA MULTUMIM!

contact@corneltudose.ro
ionut@ovejanu.eu

http://www.geo-spatial.org
http://www.freegis.ro