

# GRASS applications: an overview

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# Applicazioni di GRASS

## GIS Open Source/Free Software

For Open Source - Free Software projects applications and development are tightly entwined.

An application lead to the development of new modules, which are then used for other applications and so on.

These slides collect recent (as of february 2003) GRASS applications with bibliographic indications. This work is not meant to be definitive but an overview of the GRASS applications is provided.



# GRASS applications

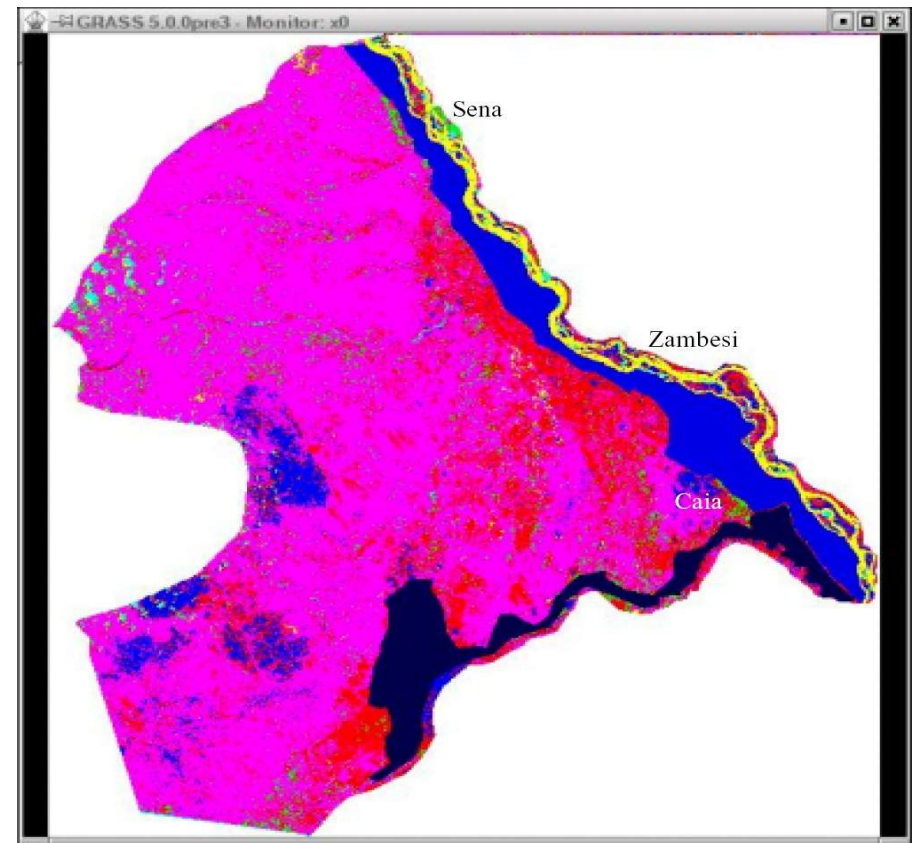
1. Environmental monitoring;
2. Geology;
3. Mathematical models;
4. LIDAR;
5. Solar radiation;
6. Climate and atmospheric models;
7. Landslides risk mapping;
8. Wildfires risk mapping;
9. Glaciers;
10. Geomorphology;
11. Traffic and acoustic pollution;
12. Archeology;
13. Forest management;
14. Avalanches risk mapping;
15. Flood forecasting and management;
16. GPS planning;
17. Wildlife management;
18. GRASS and WebGIS;
19. GRASS and PDAs;



# Environmental modeling

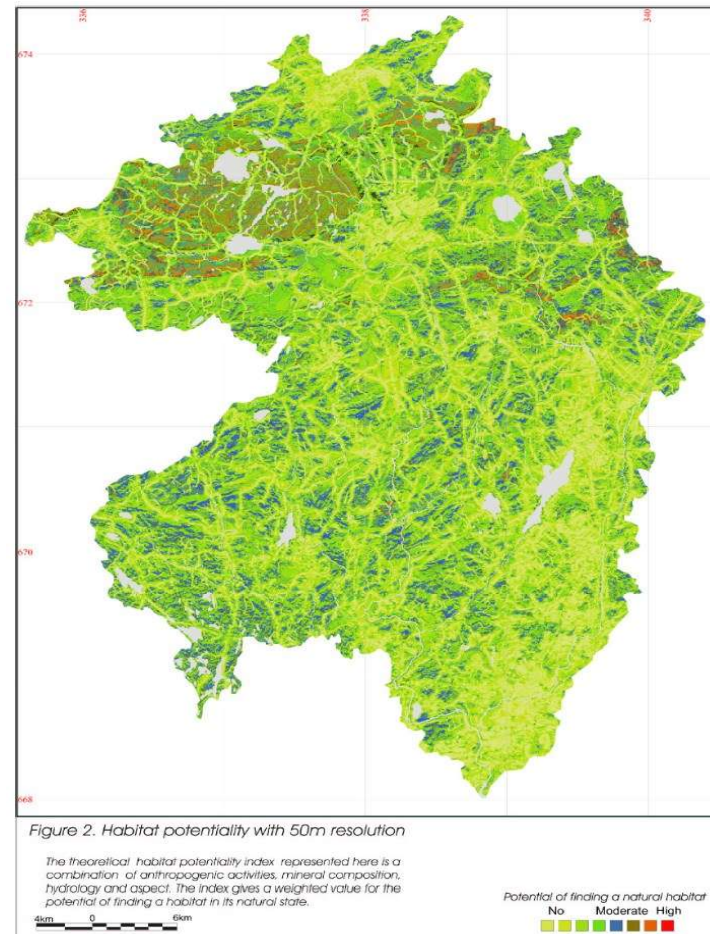
ISOLA project environmental information system (Aime et al., 2001)

Land use change maps in a developing country. Application of GRASS GIS in Caia district (Ciolli et al., 2002)



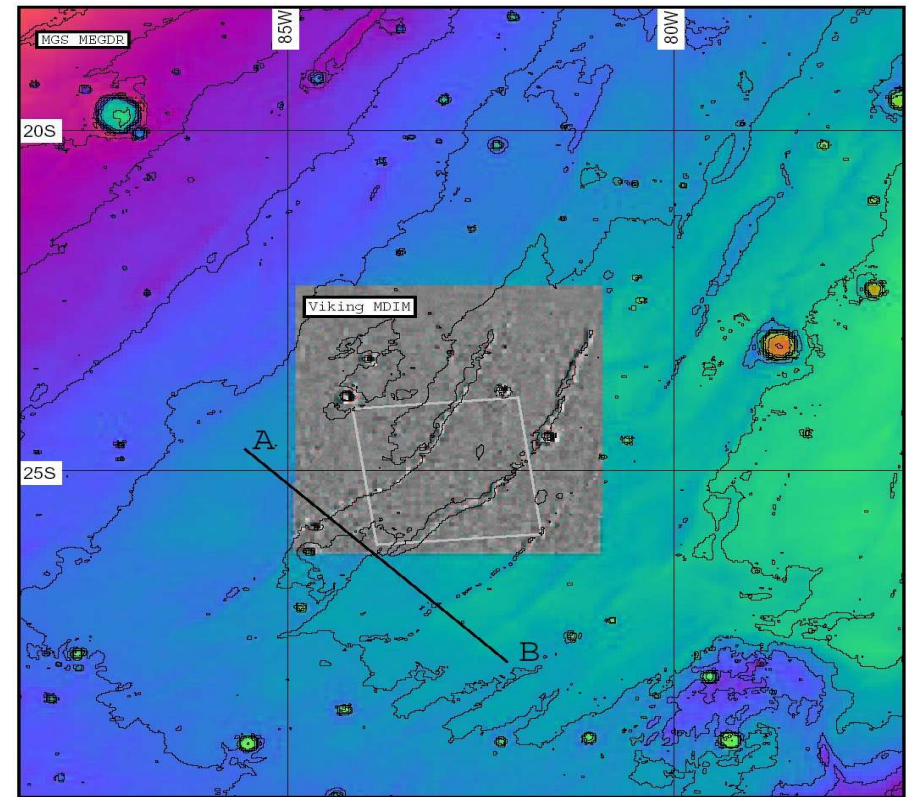
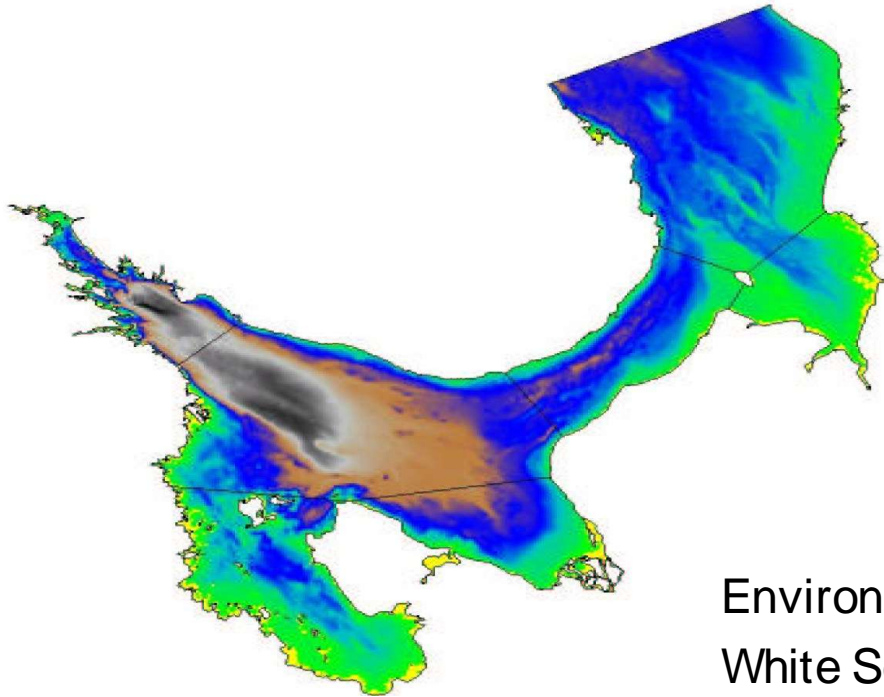
# Environmental modeling

In search of Habitats ~  
testing a GNU approach  
(Nieminem J., 2002)



# Geology and environmental modeling

Identifying wrinkle ridges structures from Mars  
MGS and Viking mission data: using Grass in  
planetary geology (Frigeri et al., 2002)

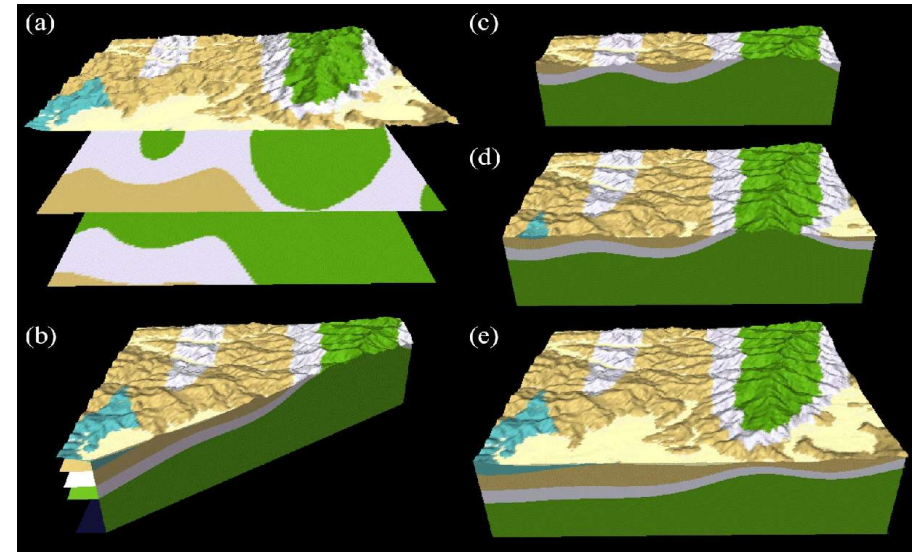
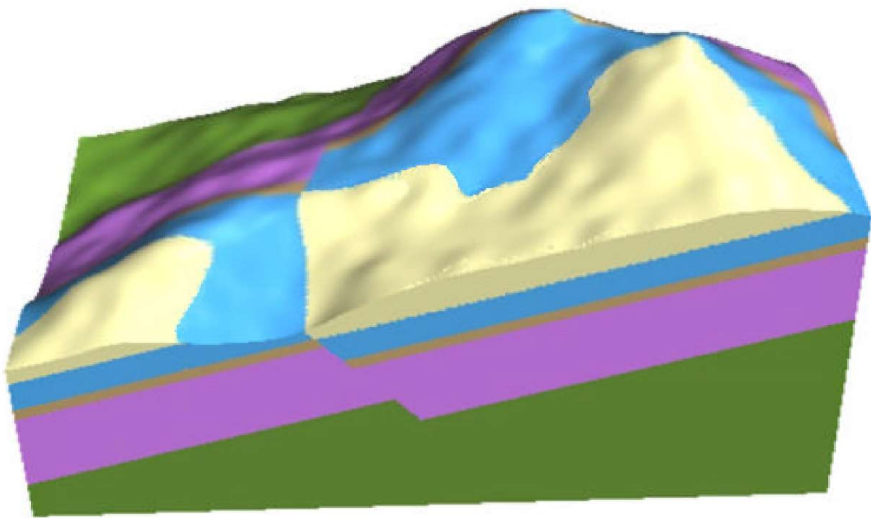


Environmental Gis Database For The  
White Sea (Kaitala et al., 2002)



# Geology

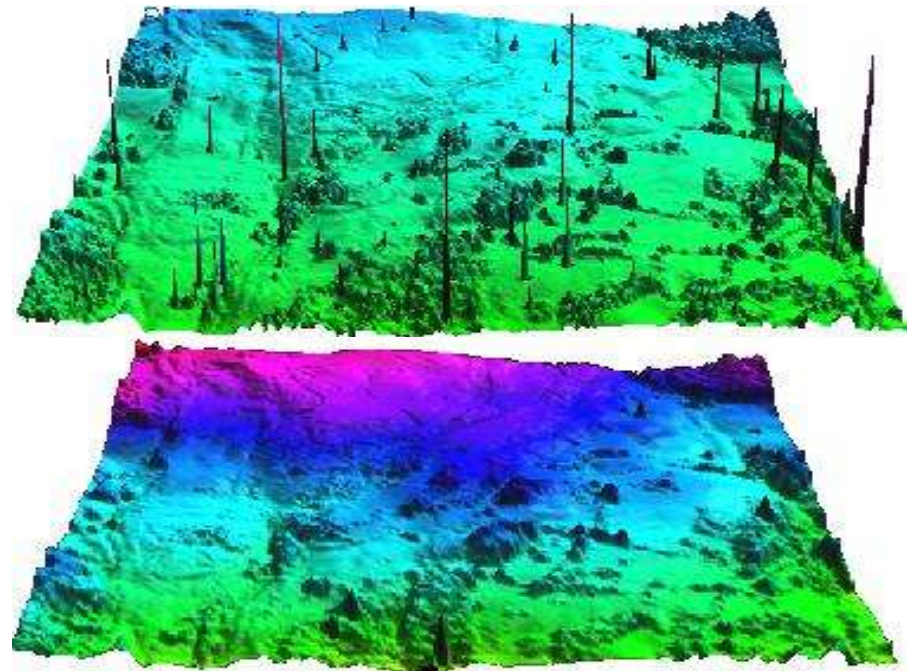
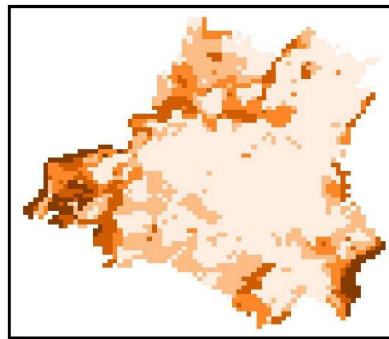
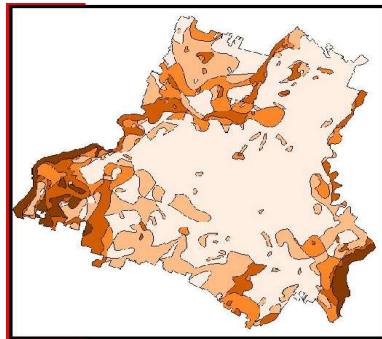
Construction and Visualization of Three Dimensional Geologic Model Using GRASS GIS (Masumoto et al., 2002)



3-D Geologic Modeling and Visualization of Faulted Structures (Yonezawa et al., 2002)

# Mathematical models

New GRASS modules for Multiresolution  
Analysis with wavelets (Zatelli et al., 2002)



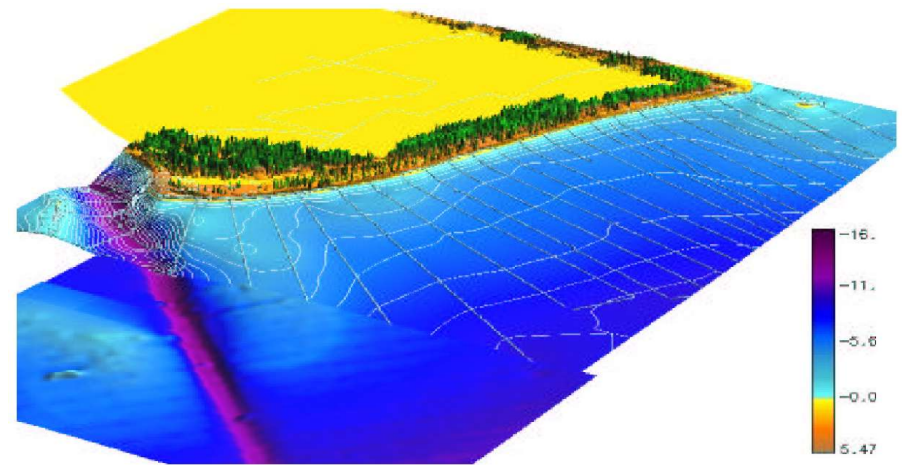
A new approach to the polygons rasterization in  
GRASS (Biagi et al., 2001)



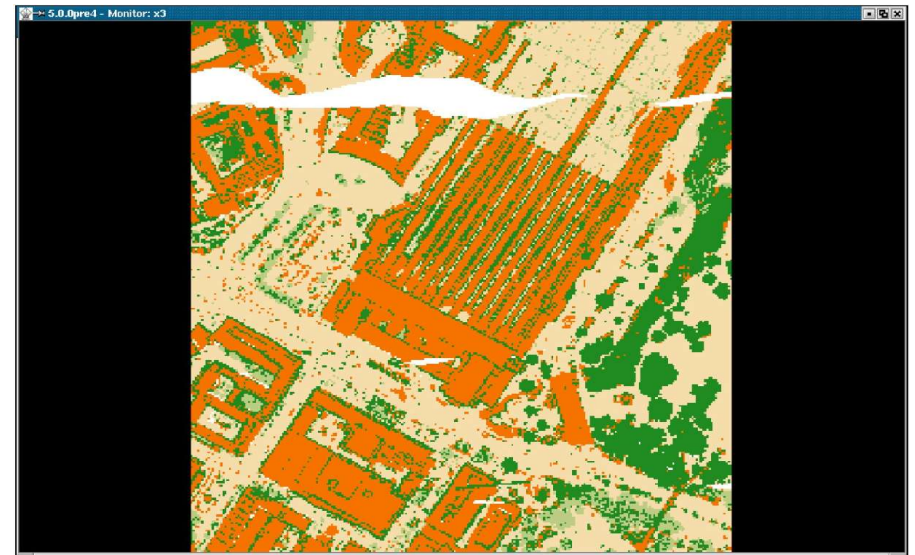


# LIDAR

Spatio-temporal monitoring of evolving topography using LIDAR, Real Time Kinematic GPS and sonar data (Mitasova et al., 2002)

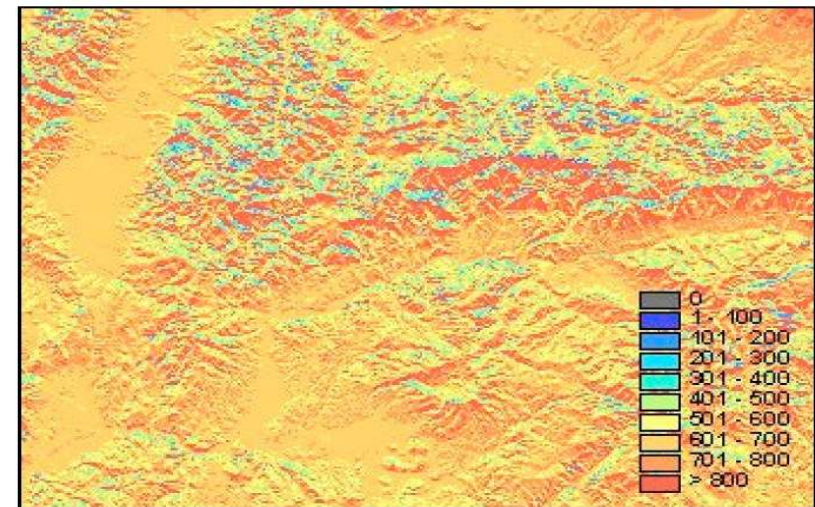
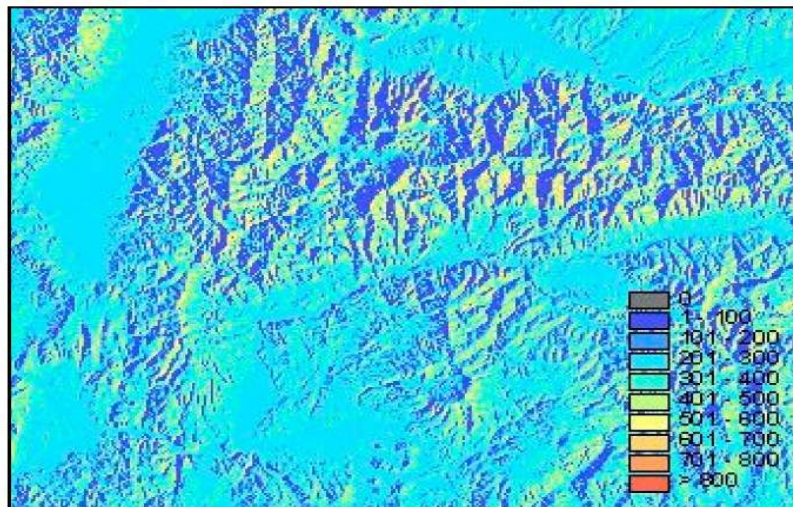


Managing and processing LIDAR data within GRASS (Brovelli et al., 2002)



# Solar radiation

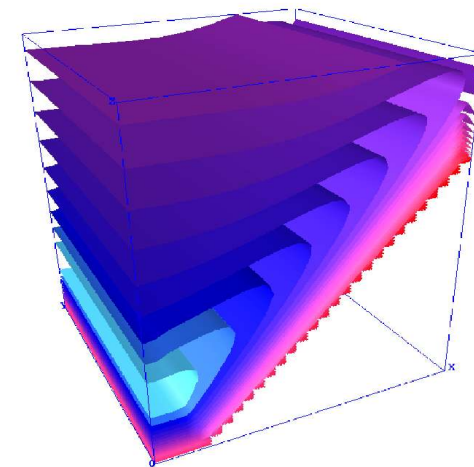
The solar radiation model for Open source GIS: implementation and applications  
(Hofierka et al., 2002)



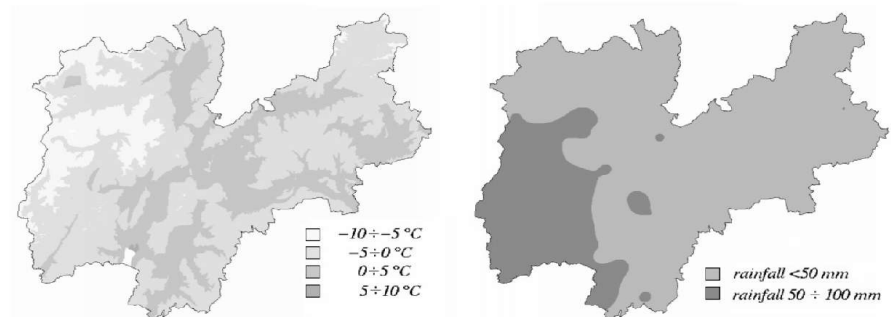
# Climate and atmospheric models

2D/3D GRASS modules use and development for atmospheric modeling (Zatelli et al., 2002)

Modelling of evaporation processes over tilted slopes by means of 3D GRASS raster (Zatelli et al., 2002)



Development of a complete climate database using a new GRASS module (Sboarina, 2002)

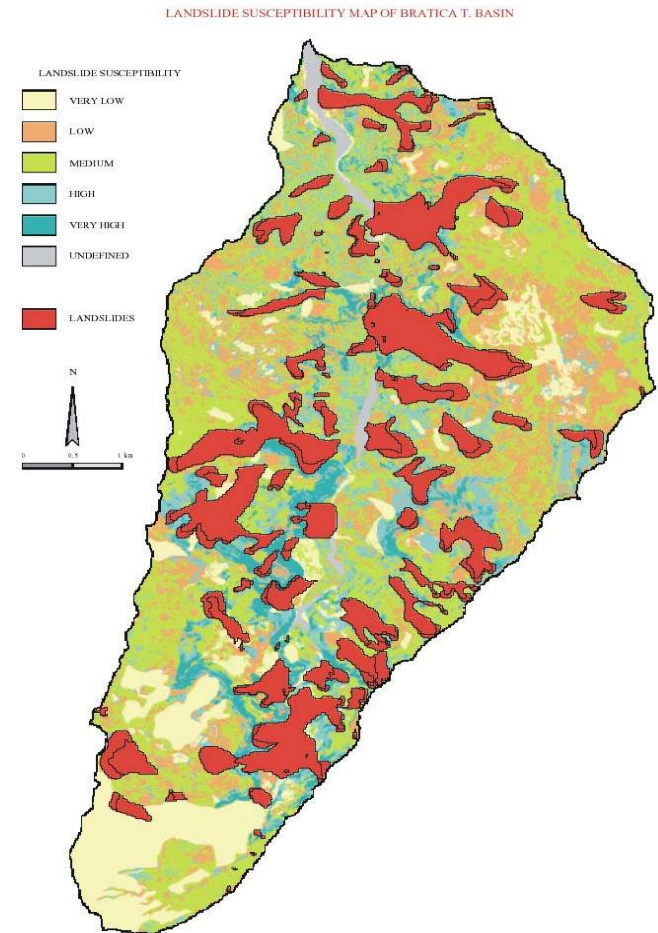
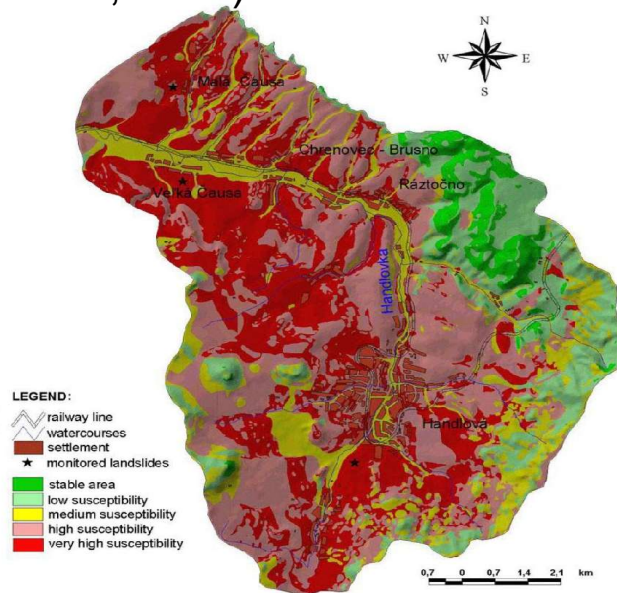




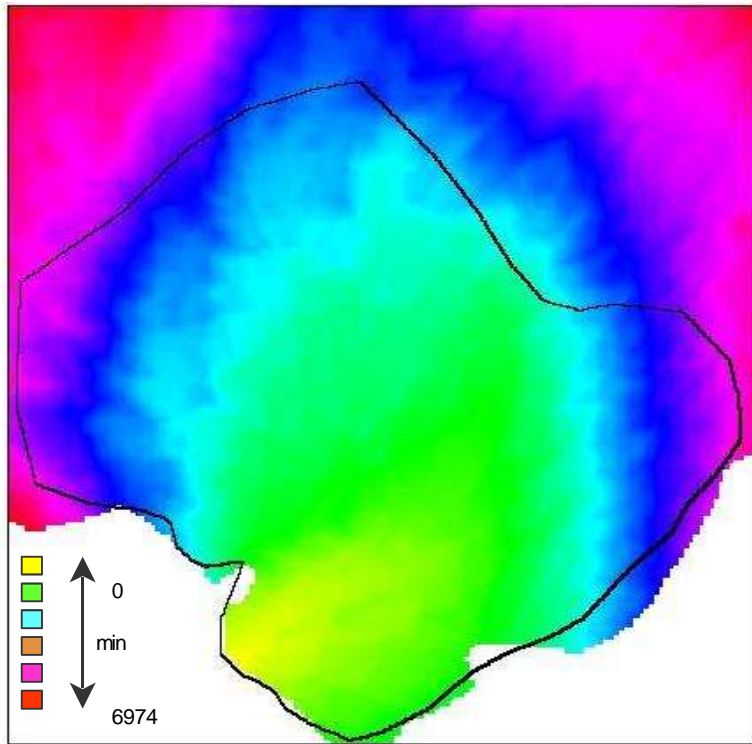
# Landslides risk mapping

A GRASS GIS based Shell script for Landslide Susceptibility zonation (Clerici et al., 2002)

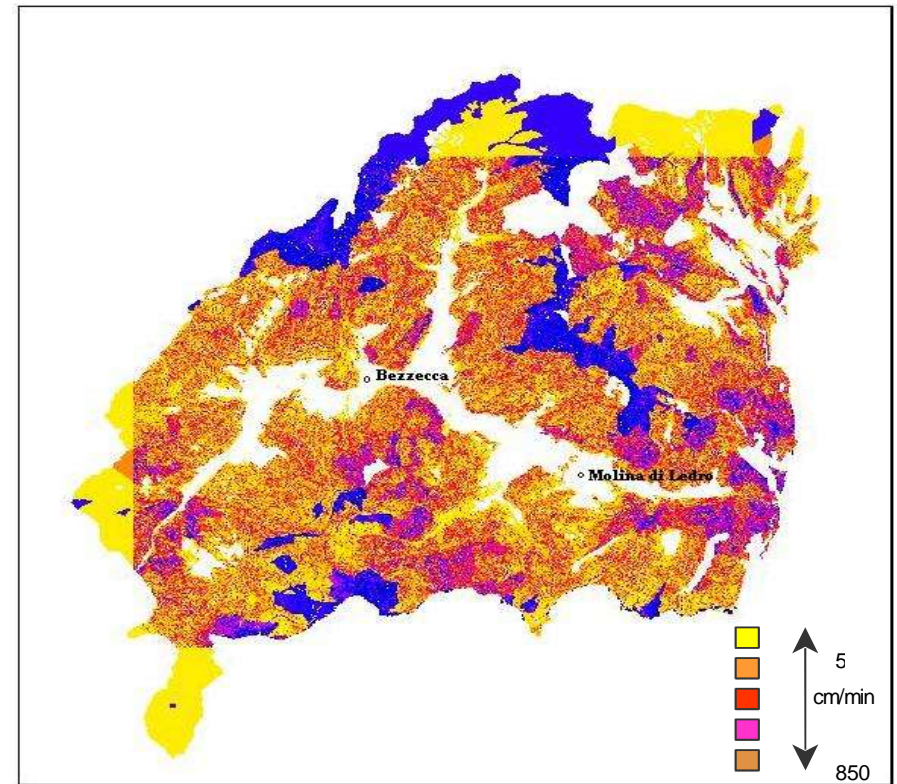
Using GRASS in evaluation of landslide susceptibility in Handlovská Kotlina basin (Paudits et al., 2002)



# Wildfires risk mapping



Wildfire simulation



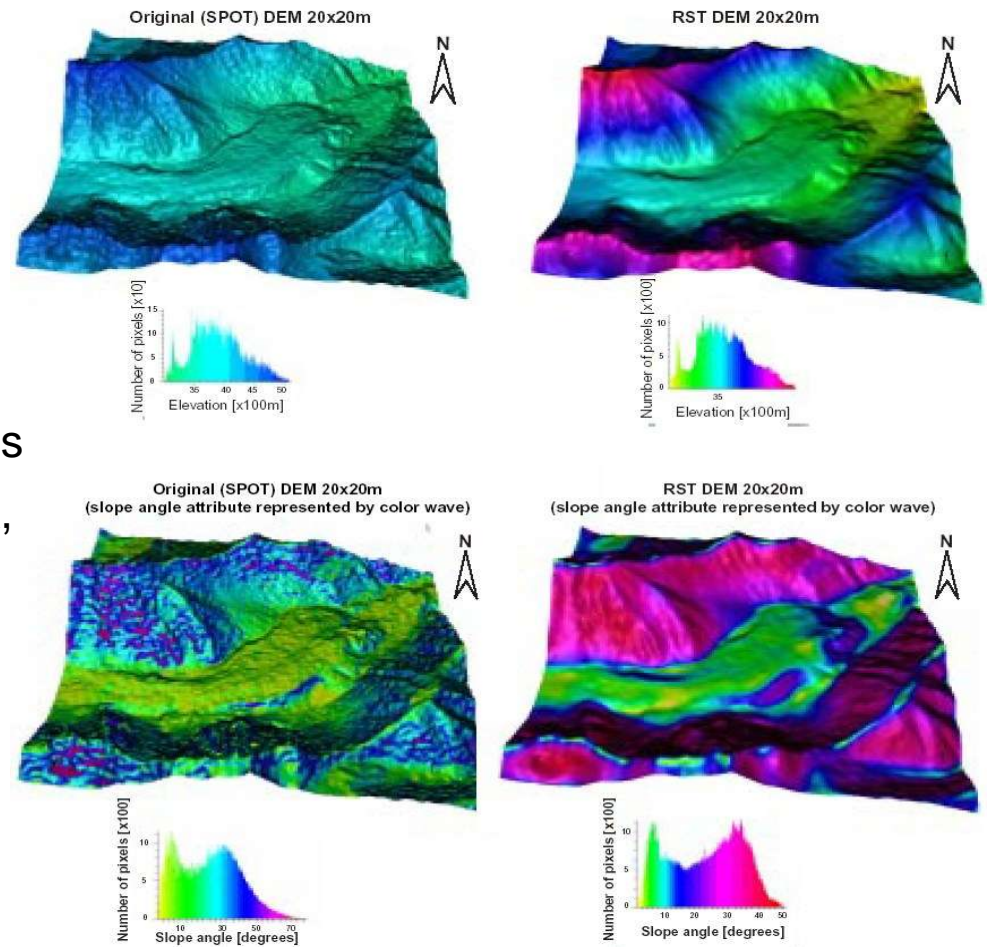
maximum spread velocity

Valutazione del rischio da incendio utilizzando le capacità di analisi dei GIS  
(Ciolli et al., 1999)



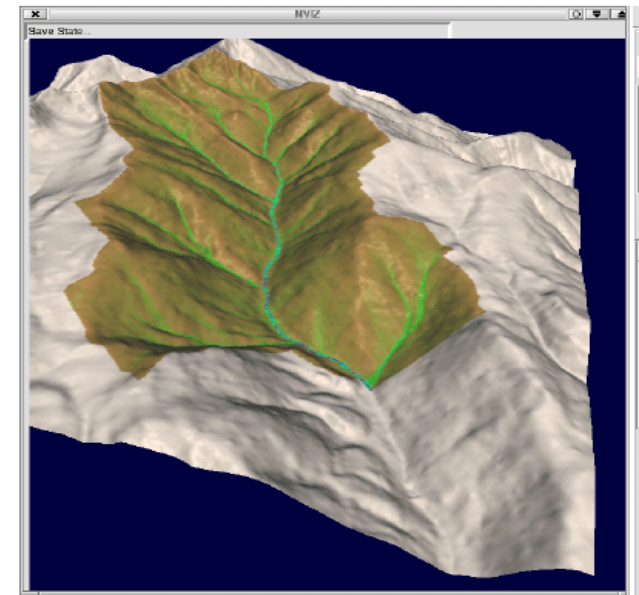
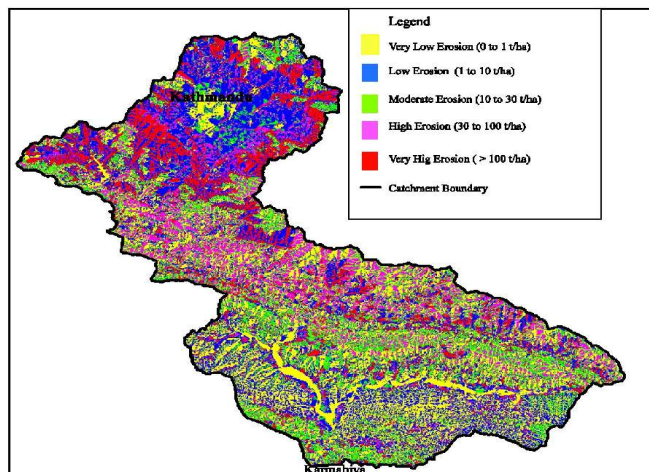
# Glaciers

Scale-dependent geomorphometric analysis  
for glacier mapping at Nanga Parbat (Bonk,  
2002)



# Geomorphology

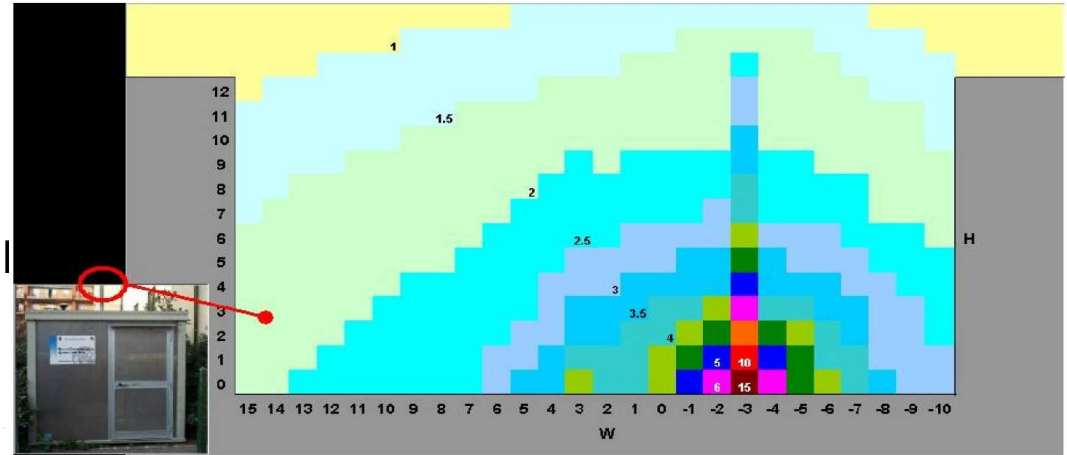
Horton: a new set of tools for geomorphological analysis ported into GRASS (Rigon et al., 2002)



Potential erosion map for Bagmati basin using GRASS (Raghunath, 2002)

# Traffic and acoustic pollution

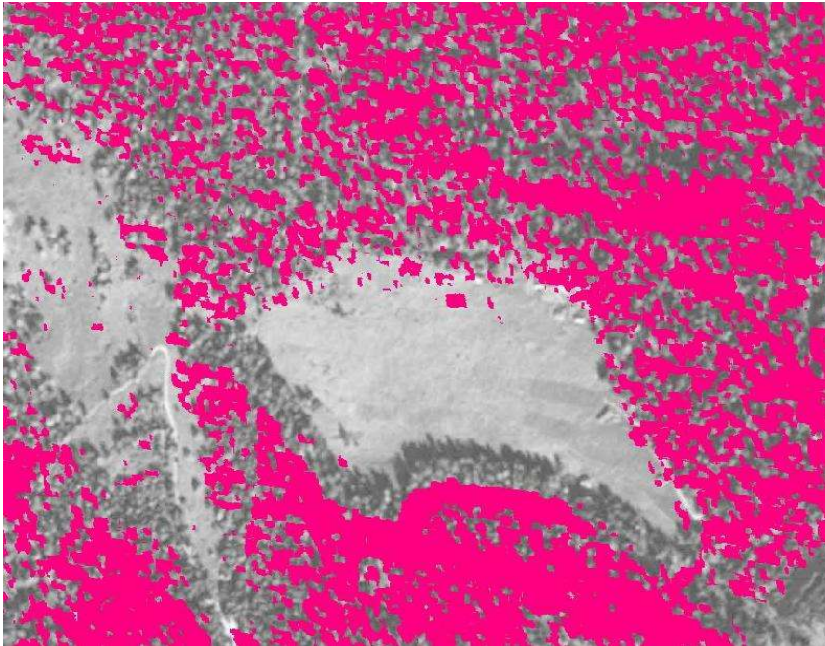
Modelling emission and dispersion of road traffic pollutant for the town of Trento (Cioll et al., 2002)



Uno strumento GIS per l'analisi della sofferenza acustica in territorio urbano (Brovelli et al., 2001)

# Archeology - Forestry

An archaeological web GIS application based on Mapserver and PostGIS (Brovelli et al.)



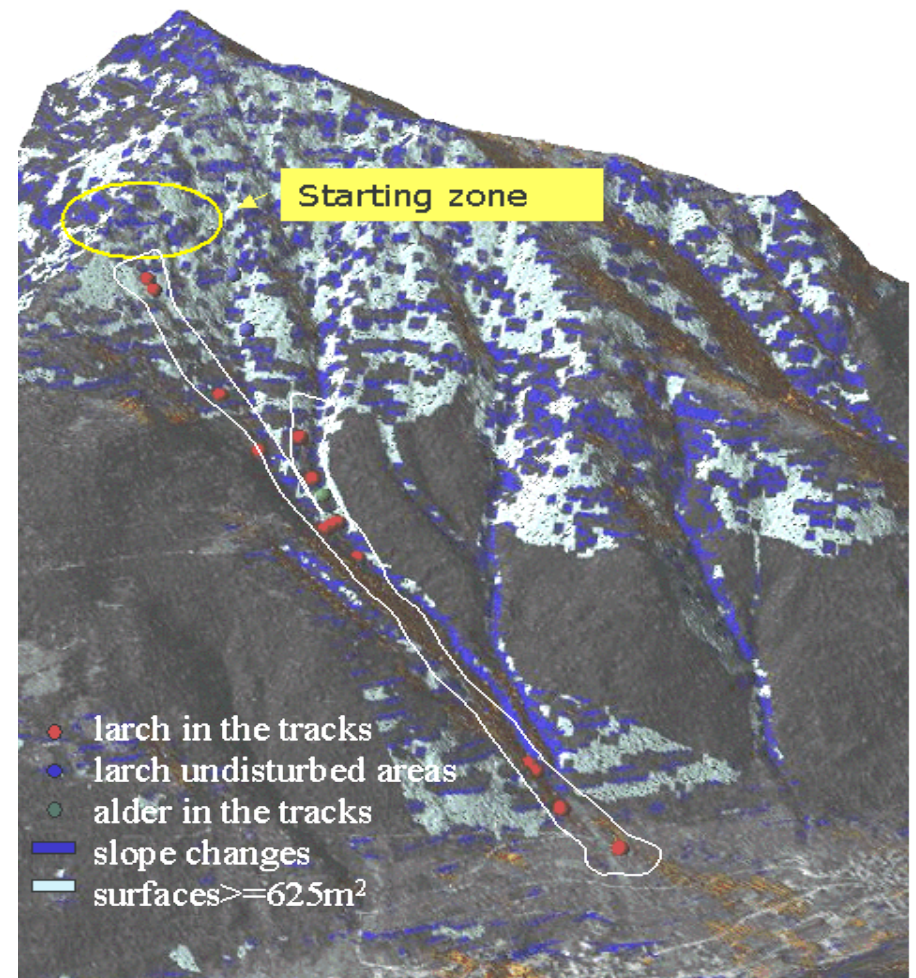
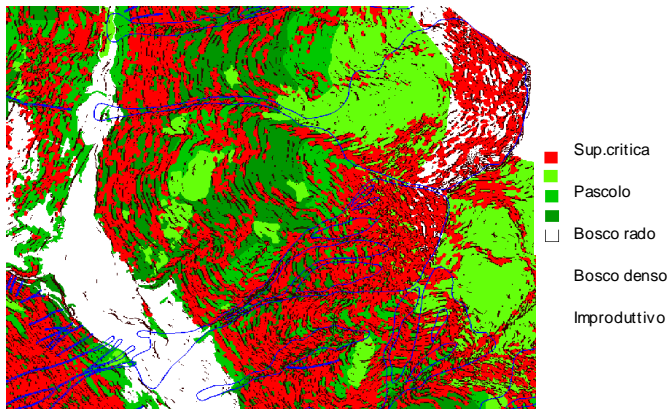
Valutazione tramite fotogrammetria e GIS della dinamica della copertura forestale e della provvigione legnosa (Ciolli et al., 1999)





# Avalanches risk mapping

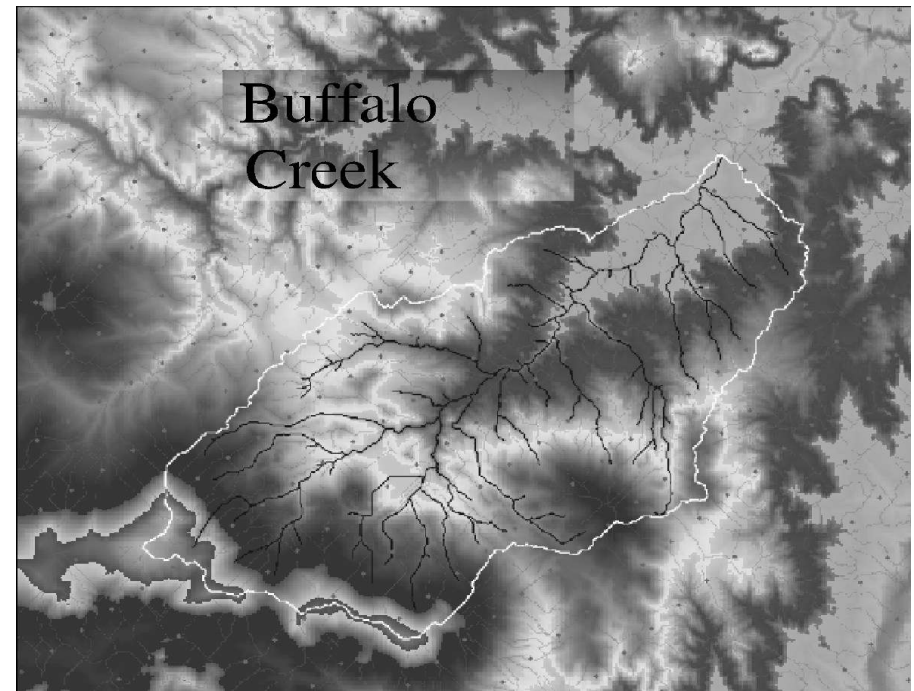
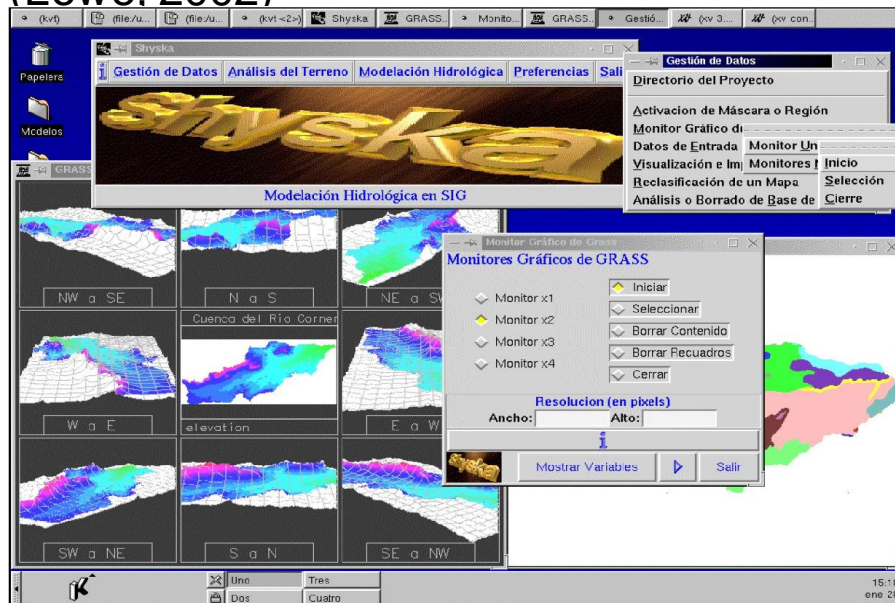
GIS and dendrochronological techniques for  
avalanche hazard mapping with GRASS  
(Bezzi et al., 2002)





# Flood forecasting and management

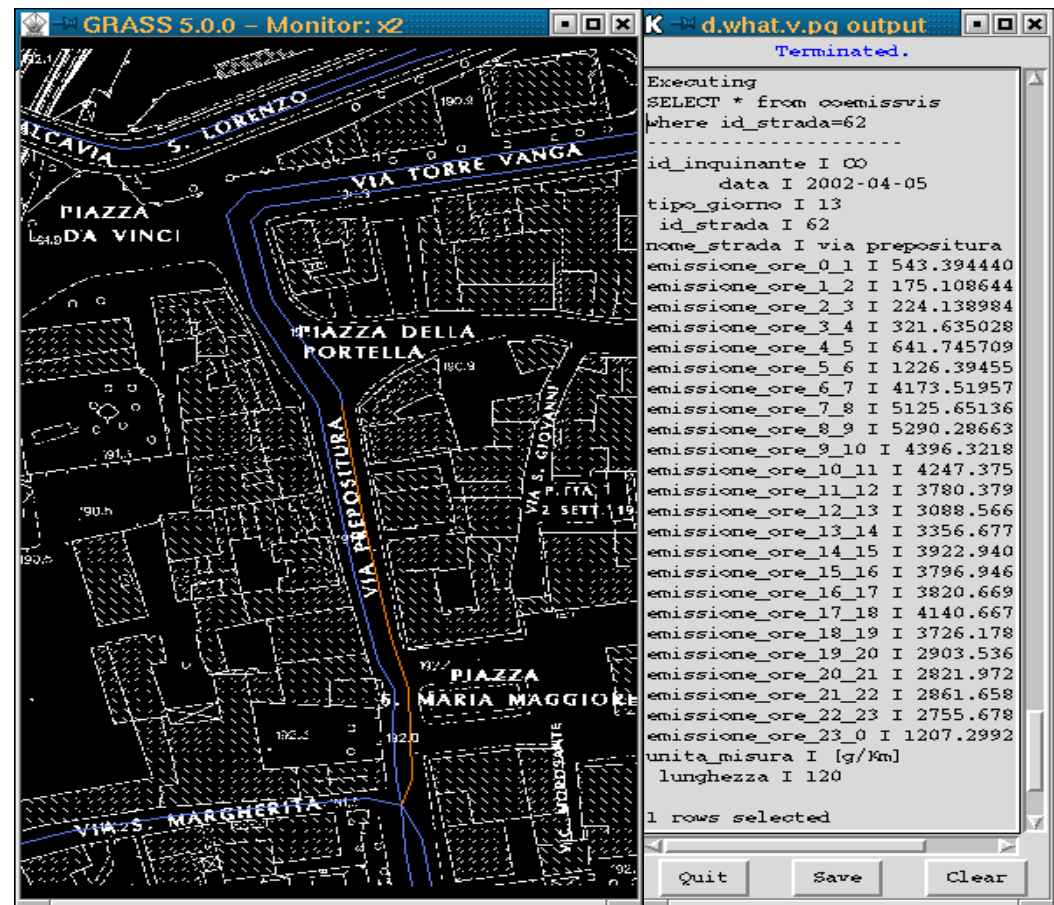
Weather Radar Enhanced Flash  
Flood Forecasting (O'Donnell,  
2002)  
A spatial decision support system for  
radar meteorologic data in South Africa  
(Lowe, 2002)



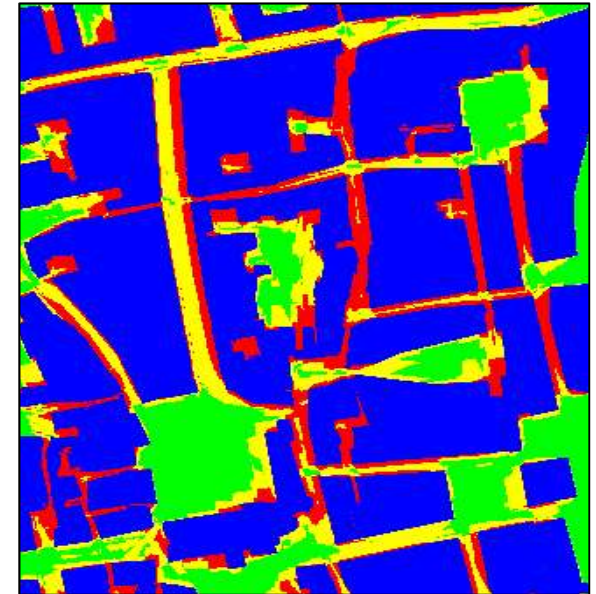
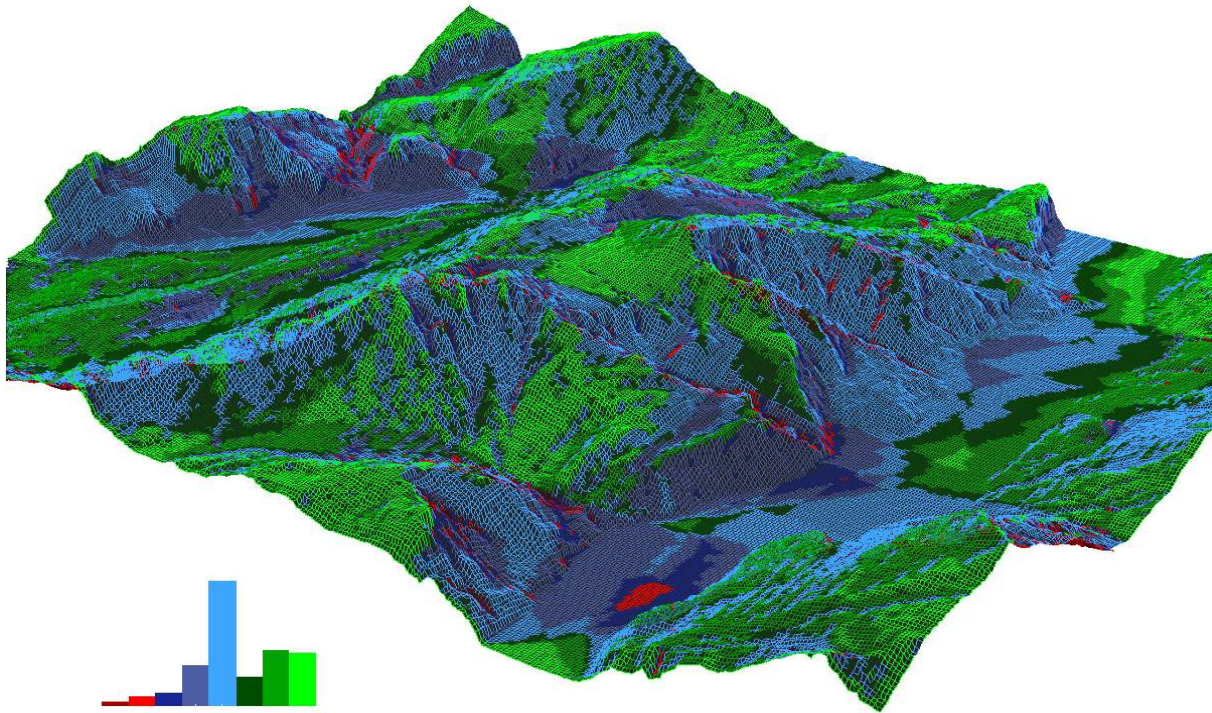
A GIS GRASS-embedded decision support  
framework for flood forecasting (Garcia  
Galliano, 2002)

# Gestione traffico

Gestione di un database del traffico con GRASS e PostgreSQL (Ciolli et al., 2003)



# GPS planning



Number of visible satellites

1- 2 3- 4  $\geq 5$

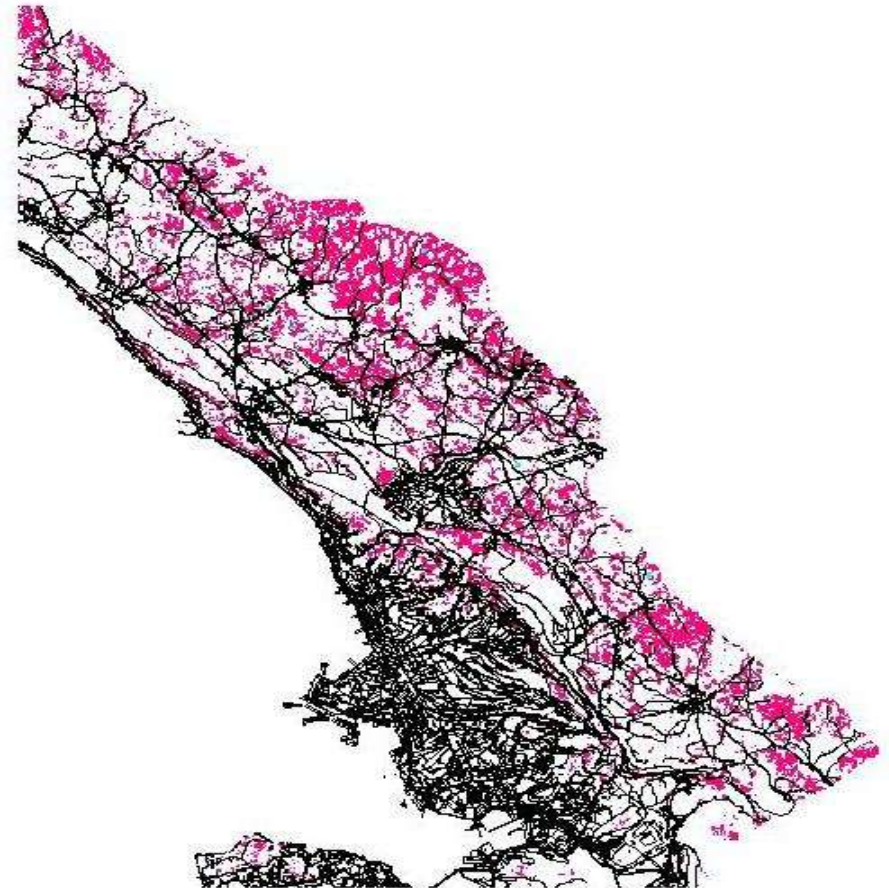
Planning GPS automatico con ostruzioni realistiche (Fruet et al., 1999)



# Wildlife management

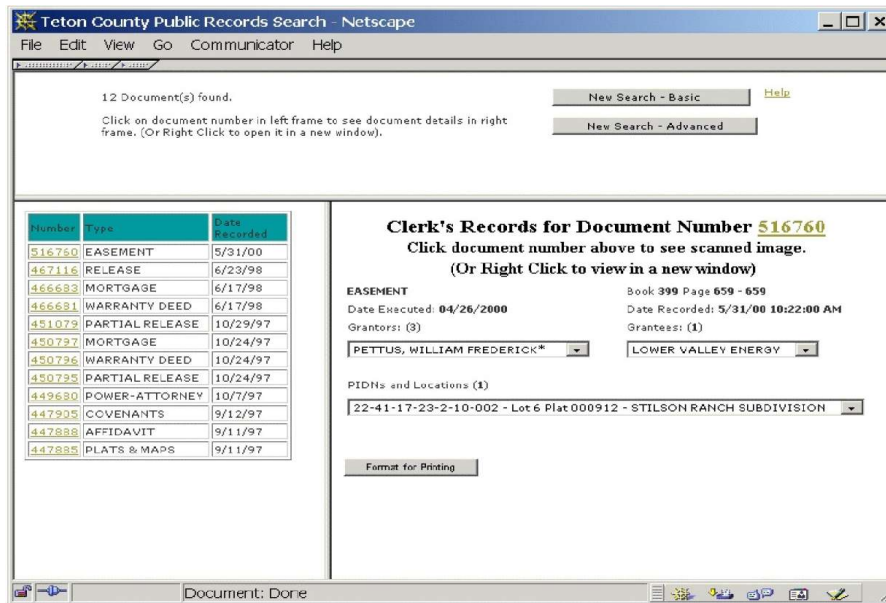
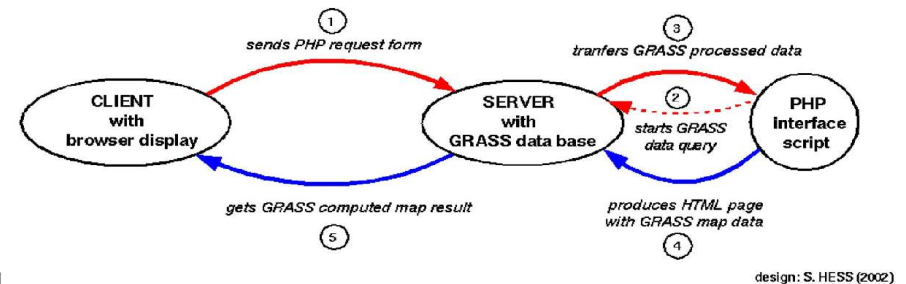
Remote Sensing/GIS techniques for risk assessment of *Borrelia burgdorferi* infection (Altobelli et al., 2001)

Wildlife Management and Landscape Analysis in the GRASS GIS (Menegon et al., 2002)



# WEB GIS

## GRASS on the WEB (Hess, 2002)



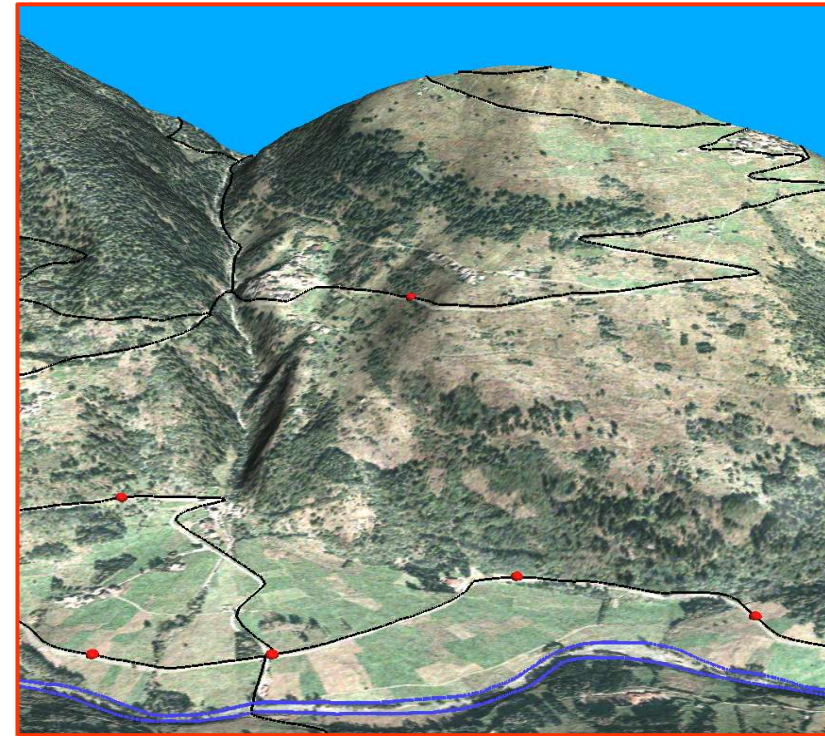
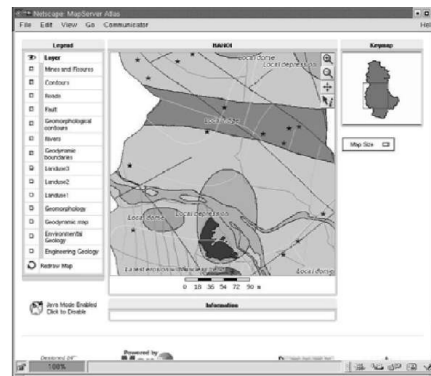
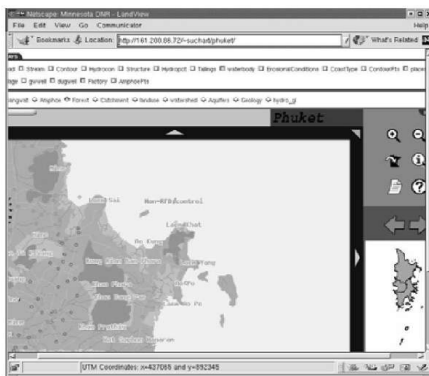
## Using Mapserver to Integrate Local Government Spatial Data (Greenwood, 2002)



# WEB GIS

An archaeological web GIS application based on Mapserver and PostGIS (Brovelli et al., 2002)

Wildlife Management and Landscape Analysis in the GRASS GIS (Merler et al., 2002)

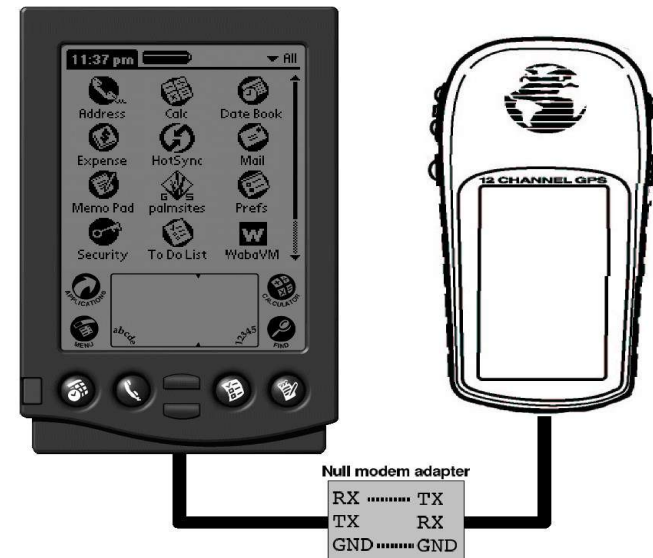
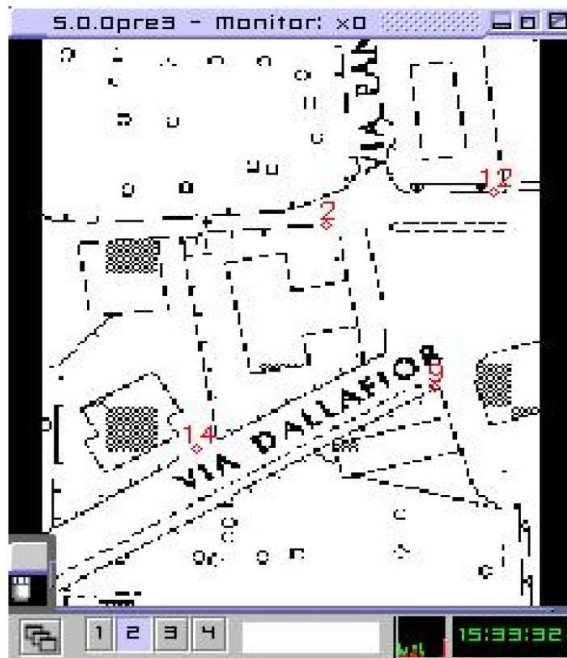


Implementing an online spatial database using the GRASS GIS environment (Raghavan et al., 2002)



# GRASS and PDA

Low cost PDA/Gps based field logging solution for GRASS data (Frigeri et al., 2002)



Experimental Mobile Wireless GRASS based GIS for Handheld computers running GNU/Linux (Stankovic et al., 2002)

Baby- GRASS

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