

# **FOSS GIS**

Free and Open Source  
GIS Software

# What's happening in SA?

- Government open source and interoperability policy [www.oss.gov.za](http://www.oss.gov.za)
- SAEON
  - SAEOS, SARVA, GBON
- NSIF
  - SDDF, CSI
- Public Access to Information Act
- SDI Act

# THE Global Earth Observation System of Systems



# GEOSS technical architecture

- GEOSS defines the Use Cases for an SDI
- SAEOS is SA's response
- Requirements
  - Service-oriented architecture
  - Open standards
  - Open Source wherever possible

[Home](#) [Communities](#) [Metadata](#) [Documentation](#) [Sample Data](#)You are here: [Home](#)

## Navigation

[SAEON](#)[Communities](#)[Metadata](#)[Documentation](#)[Sample Data](#)

## Partners



CSIR

Marine and Coastal Management

SAEON

SANPARKS

SANBI

## The SAEON Data Portal and Meta-Data Clearinghouse



### What is CoGIS?

CoGIS is a collaborative platform for the sharing of spatial data and its meta-data. It is also capable of handling non-spatial data and document content, and provides support for additional domain-specific meta-data standards. It provides extensive search capabilities that can be tailored to specific user requirements.



### What is SAEON?

The South African Earth Observation Network (**SAEON**) is a major user of the CoGIS portal. SAEON consists of a number of biome-specific nodes, located throughout South Africa. SAEON's mandate includes long-term earth and environmental observation,



### CoGIS Stakeholders

In addition to **SAEON** the **CSIR** is a major contributor to the development, maintenance and extension of the CoGIS platform. Past contributors include the Department of Mineral and Energy Affairs (DME) and the National Research Foundation (**NRF**).

## Searches

[Spatial Search](#)  
[Advanced Search](#)



advanced fire information system

0.00000, 0.00000

Choose...

Lon:

Lat:

Zoom:

Go

RESET VIEW

POWERED BY  
GoogleTerms of Use 2010 Tele Atlas Europa Technologies - [Terms of Use](#)

## Sponsors and Contributors



EUMETSAT



## Fire Information

144 fire pixels in Southern Africa the last 48 hours  
 57 fire pixels in Southern Africa the last 24 hours  
 0 fire pixels your area (<10km) the last 24 hours

## Layer Manager

## Query Results

## Date Range Selection

## Quick View (MODIS Fires Archive)

## Search

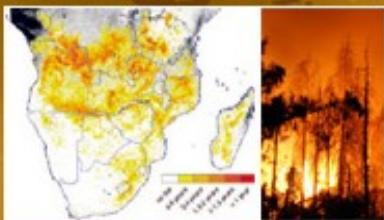
## Map Legend

| Fire Intensity (MW/km <sup>2</sup> ) |            |
|--------------------------------------|------------|
| ■                                    | 0 to 30    |
| ■                                    | 31 to 80   |
| ■                                    | 81 to 150  |
| ■                                    | 151 to 300 |
| ■                                    | 301 plus   |
| Eskom National Towers                | *          |
| Eskom National Lines                 | /          |
| MSG A.F. Arcive                      | ■          |
| MSG A.F.P. Arcive                    | ■          |
| Fire Protection Associations         | □          |

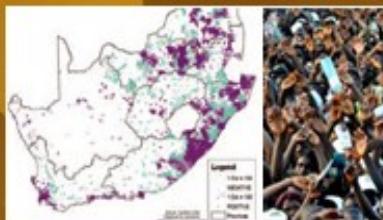
- CLICK + DRAG - Pan the map
- WHEEL ROLL - Zoom in/out around center
- SHIFT + CLICK + DRAG - Draw zoom box
- We recommend using [Firefox 3](#)

# SA RISK AND VULNERABILITY ATLAS

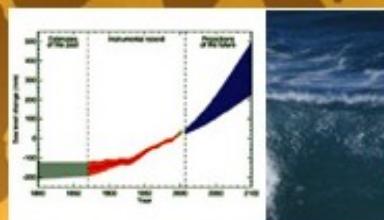
Equipping decision-makers with information on the impact and risk of global change in the region



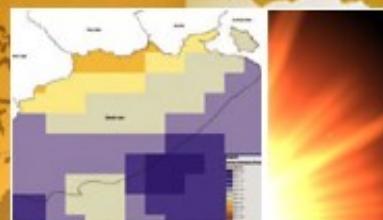
Fire return period



Population growth



Sea level increase



Temperature increase



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[Users' Workshop](#)

[Media room](#)

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SARVA, a new atlas of local risk and vulnerability in the context of global environmental change, will be launched in January 2010. The Atlas is aimed at equipping decision-makers with information on the impact and risk associated with global change in the region.

## News

### [Climate risk and vulnerability atlas to be launched](#)

*Engineering News, 22 January 2010* - A new atlas of local risk and vulnerability in the context of global environmental change will be launched in March, in electronic, as well as in a hard-copy format.

### [Southern Africa to feel greater effects of climate change, says enviro organisation](#)

*Engineering News, 22 January 2010* - The impacts of climate change will be considerably worse in

## eNewsletter

Read the [December 2009](#) issue now!

## Stakeholder engagement

### [Users' Workshop 17 June 2009](#)

Download the Workshop presentations and read the presenter's biographies.

# What is Open Source?

Also called FLOSS or FOSS

Free, Libre and Open Source Software

It won't

Check the licence – 'Freeware' or 'shareware'

bite you!

is NOT FLOSS

Licences: GPL, BSD style, Mozilla style, and others

You all use Open Source software – Linux servers, Apache web servers, Firefox browser.

CSIR & UWC need special permission NOT to use OS anything!

# How does it work?

**Typical:**

**Users have a problem to solve!**

Core group manages and develops

'Trusted developers' contribute

Users use and give feedback

# Disadvantages

- Often unfamiliar or different
- Not always as easy to use
- Can require more time to get productive
- Not yet as functional for the average desktop user

# Advantages

- Lots to choose from
  - Use the best tool for the job
- Usually fast and accurate
  - Developed to solve real-world problems
- Rapid updates and bug fixes
- Huge user and support networks
  - Ask a question and you might get ten free answers five minutes later
- No licence fees
- Develop local skills and capacity and enterprise
- Free to use or modify source code
- Support and develop with generic IT skills

# Where do you fit in?

Decision maker

User – many levels

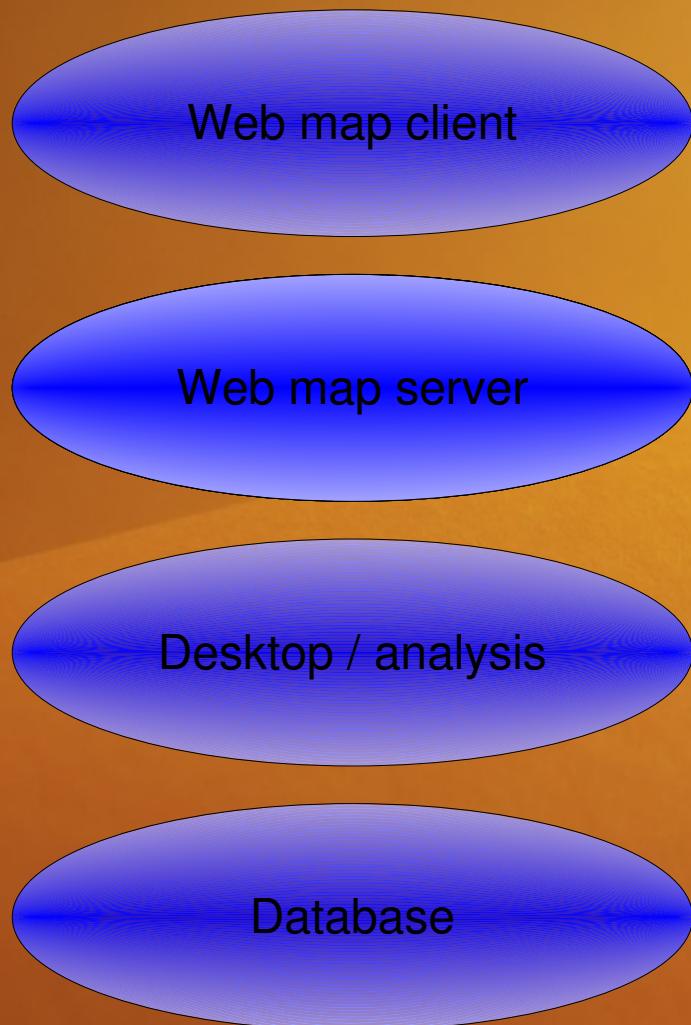
Contributor

Leader / manager

Developer

Support

# The GIS 'stack'



There are FLOSS and proprietary solutions to all of these and they can be mixed and matched

Interoperability  
makes this easy

Standards enable  
interoperability

**OSGeo4W Setup - Select Packages**

Select Packages  
Select packages to install

Keep  Prev  Cur  Exp  View  Category

| Category                      | Current                               | New | B... | S...    | Size   | Package |
|-------------------------------|---------------------------------------|-----|------|---------|--|---------|
| All Default                   |                                       |     |      |         |  |         |
| Commandline Utilities Default |                                       |     |      |         |  |         |
| Desktop Default               |                                       |     |      |         |  |         |
| 6.4.0svn-6                    | <input checked="" type="radio"/> Keep | n/a | n/a  | 25,098k | grass: The GRASS Raster/Vector GIS System  |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 8,027k  | openev: OpenEV - a high performance image viewer                                 |         |
| 1.0.2-2                       | <input checked="" type="radio"/> Keep | n/a | n/a  | 7,502k  | qgis: Quantum GIS (LTS release)  |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 11,346k | qgis-dev: Quantum GIS nightly builds of the trunk                                |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 1k      | qgis-full: Quantum GIS full (meta package for LTS release with Python and GRASS) |         |
| 1.4.0-2                       | <input checked="" type="radio"/> Keep | n/a | n/a  | 9,662k  | qgis-unstable: Quantum GIS (cutting-edge releases)                               |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 56,478k | udig: User-friendly Desktop Internet GIS   |         |
| Libs Default                  |                                       |     |      |         |  |         |
| Web Default                   |                                       |     |      |         |  |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 2,396k  | apache: Apache Web Server  |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 2,128k  | apache-manual: Apache Web Server (manual)  |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 117k    | mapscript-dev-python: Python MapScript interface to MapServer (dev)              |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 310k    | mapscript-java: Java MapScript interface to MapServer                            |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 115k    | mapscript-python: Python MapScript interface to MapServer                        |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 993k    | mapserver: A CGI Web Map Server, including a variety of OGC web Services         |         |
|                               | <input checked="" type="radio"/> Skip | n/a | n/a  | 973k    | mapserver-dev: A CGI Web Map Server, including a variety of OGC web Services     |         |

Hide obsolete packages

< Back



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Planet

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# UbuntuGIS

Your Ubuntu is ready for daily, professional GIS work. Getting started it's just a matter of minutes. After adding the UbuntuGIS repository corresponding to their distribution (in sources.list), you can easily install on your machine each of the GIS applications listed below (in brackets the *package name*), through the Synaptic Package Manager or typing *sudo apt-get install program-name* from the command line, just like any other package.

## Contents

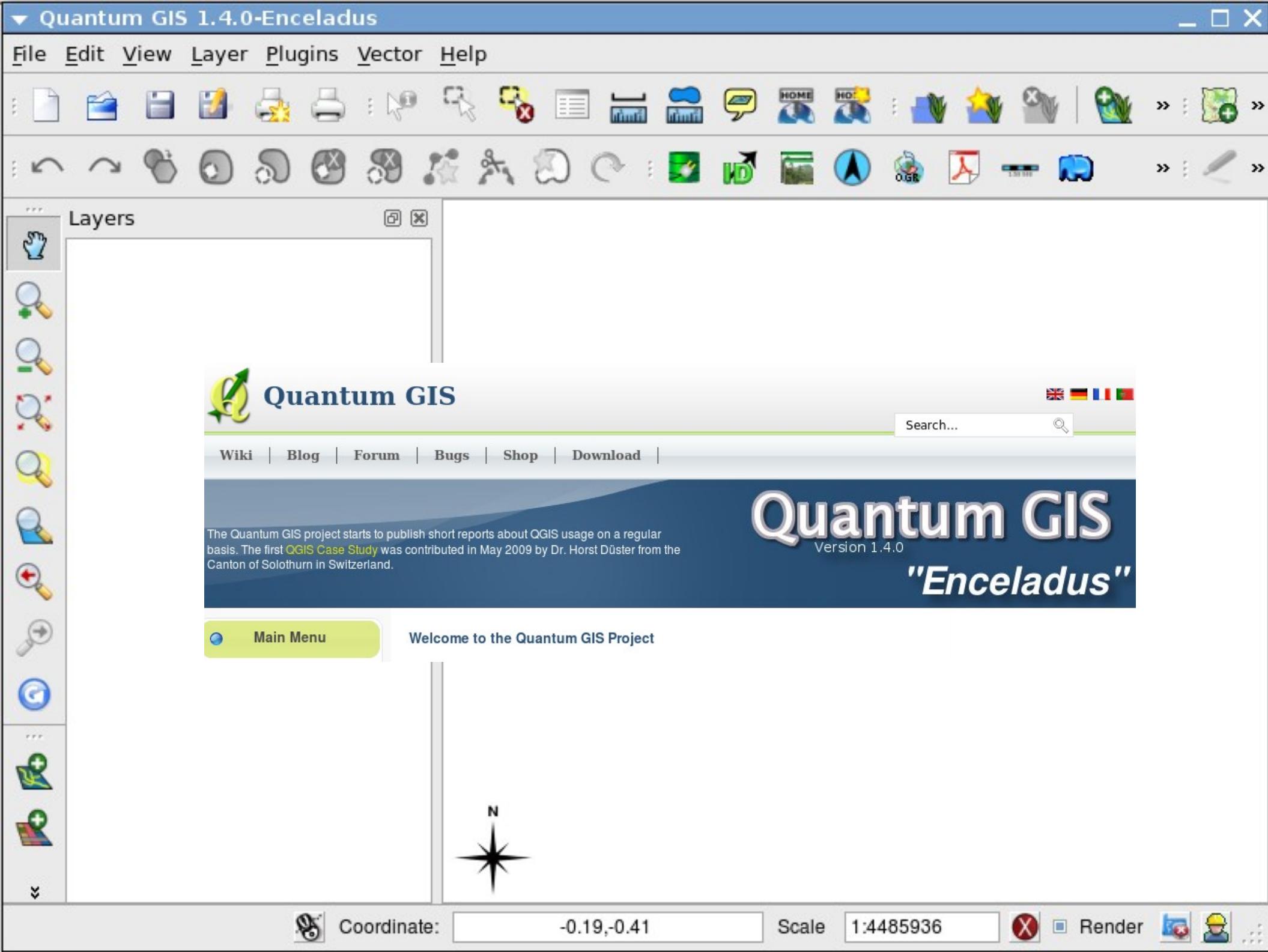
1. [General Contents](#)
2. [For users](#)
  1. [UbuntuGIS FAQ](#)
3. [For developers and packagers](#)
4. [See also](#)

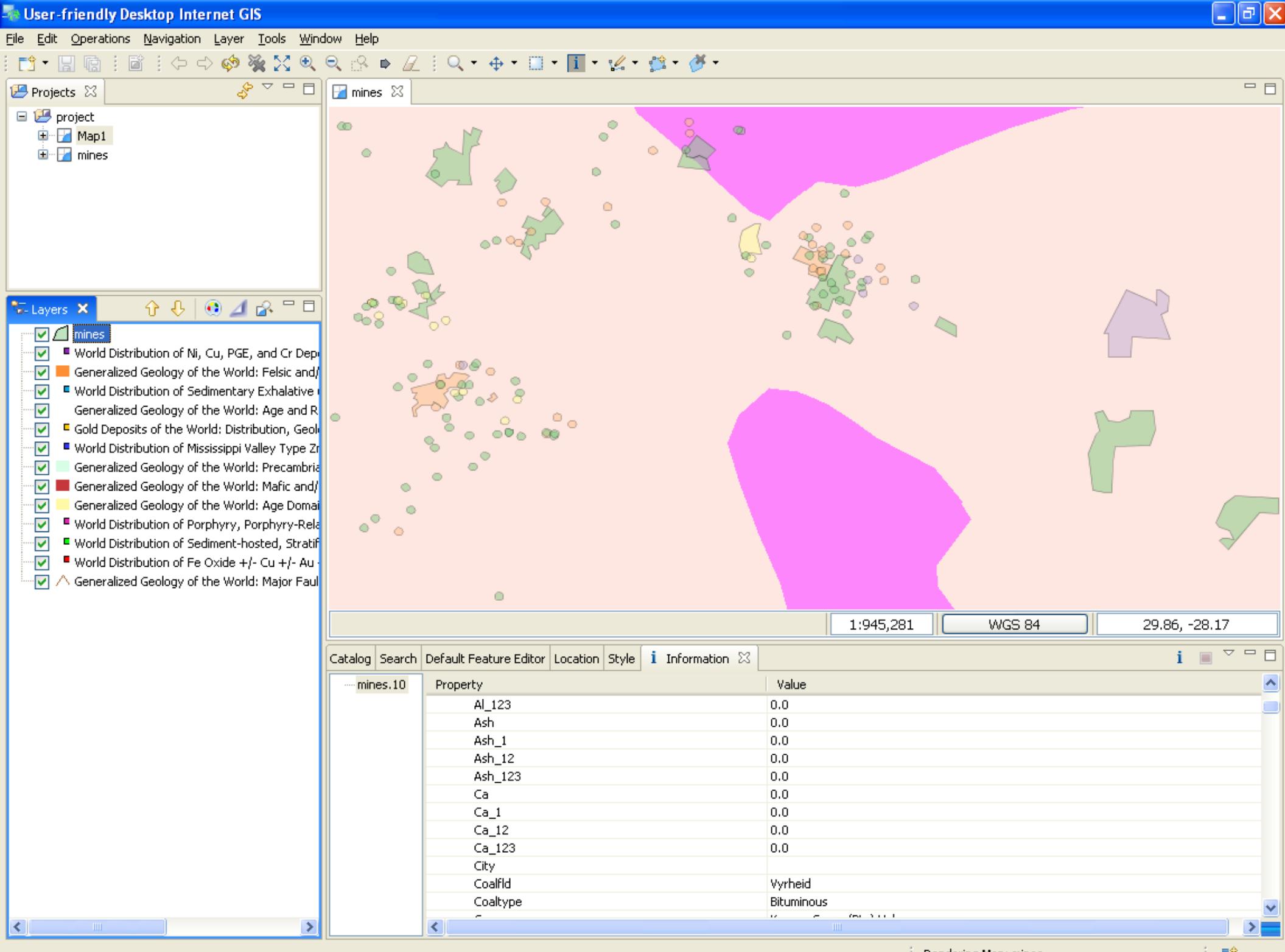
## General Contents

- **Issue Tracker and Official Wiki**
  - <http://trac.osgeo.org/ubuntugis/wiki>
- **PPA (Personal Package Archives):**
  - Stable: <https://launchpad.net/~ubuntugis/+archive/ppa/>
  - Unstable: <https://launchpad.net/~ubuntugis/+archive/ubuntu/ubuntugis-unstable>
- **Mailing List:**
  - Public list: <http://lists.osgeo.org/mailman/listinfo/ubuntu>
  - Old list [archives](#) (now limited to Ubuntugis committers)
- **IRC** -- We share the <irc://irc.oftc.net#debian-gis> channel with the Debian GIS project.
- **Packages List** -- list of packages in, or proposed for, Ubuntu

- QGIS (with GRASS)
- uDIG (with JGRASS)
- GvSIG (with Sextante)
- Spring
- Kosmo
- OpenJUMP
- SAGA
- others

Desktop GIS





# 'Professional' GIS

- Serious analysis
  - GRASS
  - OSSIM
  - ILWIS
  - Terraview
  - PostGIS
  - SAGA
  - Sextante

Welcome - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.ossim.org/ ossim

Getting Started Latest Headlines Windows Update Customize Links Pick'n Pay - Home Sh... ESSA St Davids email

Question Breakfasts Breakfasts microISV: ... Junk Mail ... GRASS GI... Welcome...

# AWESOME IMAGE PROCESSING

WELCOME ABOUT OSSIM SCREENSHOTS NEWS DOWNLOADS DOCS  
ARTICLES OSSIMPLANET OSSIM SUPPORT

The screenshot shows the OSSIM website homepage. It features several satellite images: one with a green box labeled "Dubuque Iowa Area", another of a coastal area with a green box, and a third of a city with coordinates 75275N 276039E 5 123790. To the right, there's a text block about OSSIM's capabilities, a link to the ossimPlanet media wiki, and a link to join the irc channel #ossimPlanet. Below this is a "Welcome to OSSIM" section with a decorative flourish. At the bottom, there are links to OSSIM Screenshots, Downloads, and Documentation.

OSSIM provides advanced geo-spatial processing capabilities through a state of the art C++ software library. A number of tools, applications, and examples are included with the distribution.

NEW - ossimPlanet media wiki

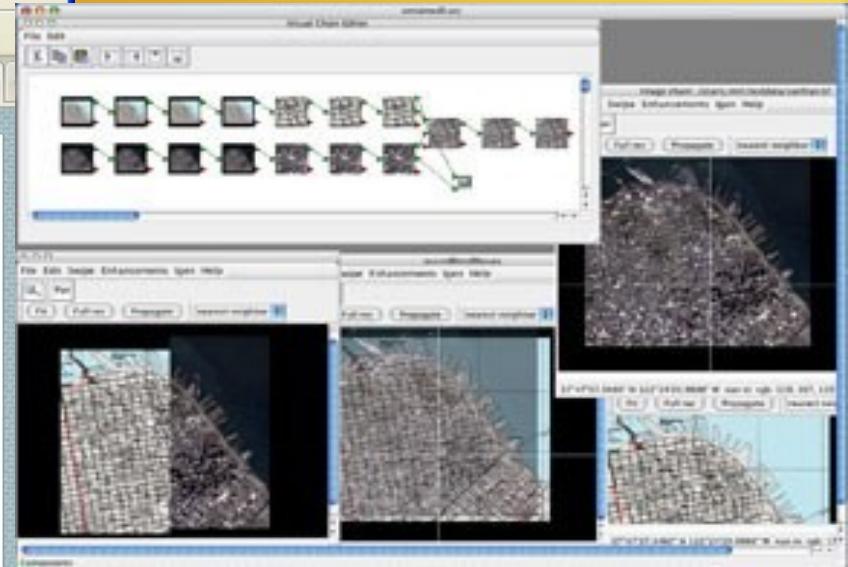
join irc channel #ossimPlanet at irc.freenode.net

### Welcome to OSSIM

OSSIM provides advanced geo-spatial image processing for remote sensing, photogrammetry, and Geographic Information Systems. Backed by an active open source software development community, OSSIM solutions have been deployed on a number of critical commercial and government systems. Listed below are a number of links to help you get started:

OSSIM Screenshots  
OSSIM Downloads  
OSSIM Documentation and Tutorials

 OSGeo  
Your Open Source Compass





File Edit View History Bookmarks Tools Help



http://grass.itc.it/



ossim



Getting Started Latest Headlines Windows Update Customize Links Pick 'n Pay - Home Sh... ESSA St Davids email Standard Bank Mailbox  
ef... YouTube ... Question Breakfasts Breakfasts microISV: ... Junk Mail ... GRAS... (Untitled) GRASS GI...



## Welcome to GRASS GIS

You are at the official GRASS site in Italy (or a [mirror site](#))

This site is updated daily: 07 Mar 2007

Search

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[About GRASS](#)

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[Translating](#)

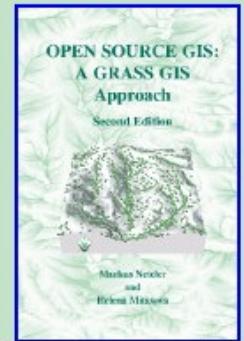
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[Get involved!](#)

[GRASS in the Press](#)

[Bug/Feature trackers](#)

[ADD DELICIOUS](#)



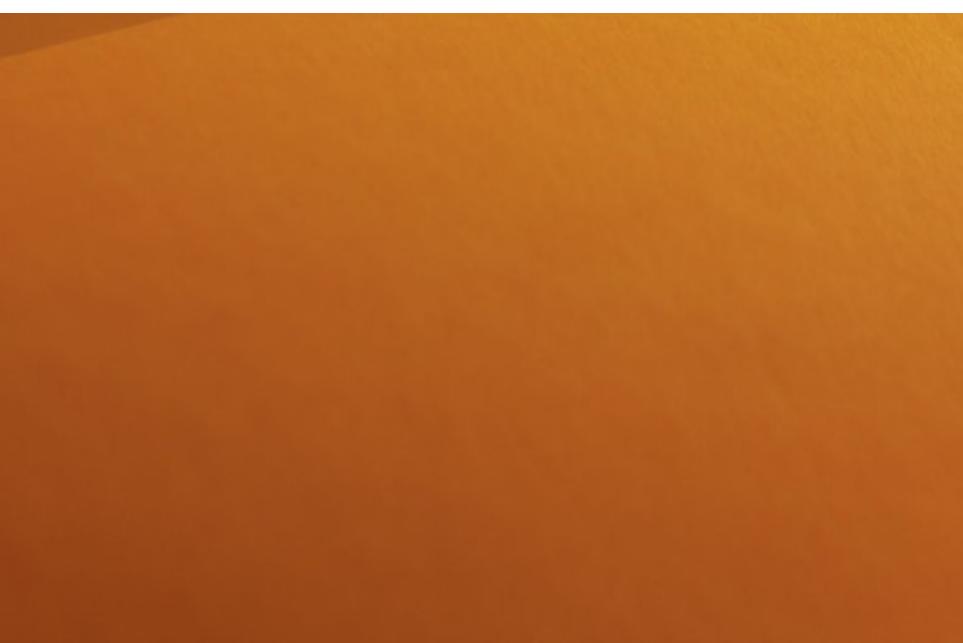
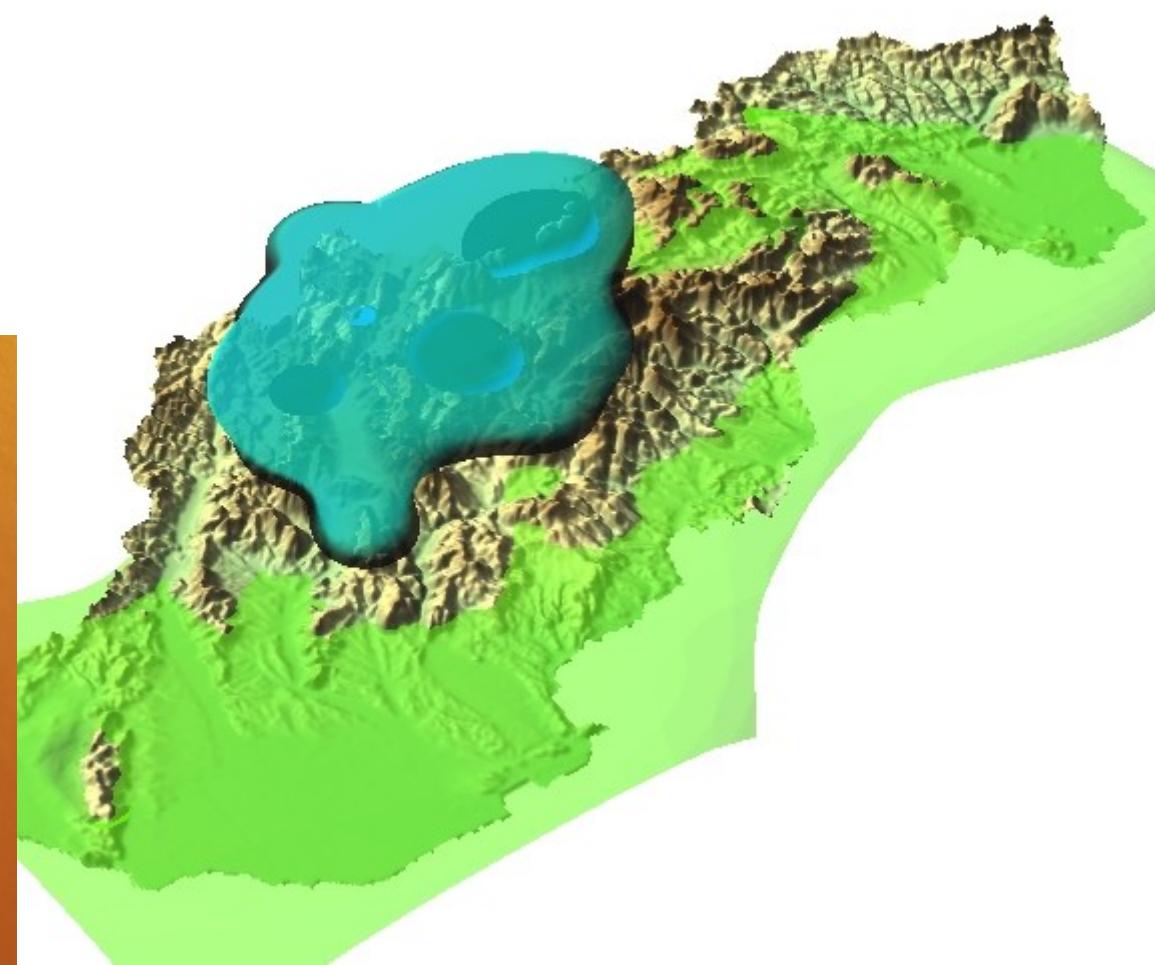
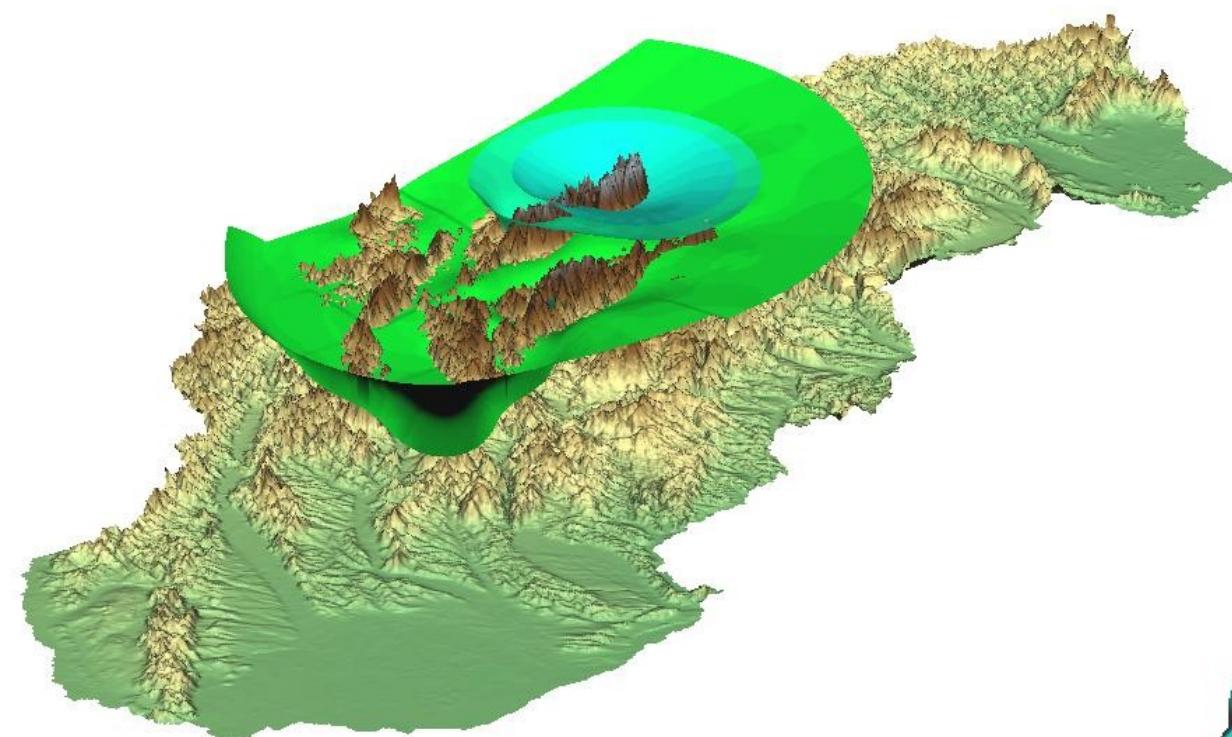
New GRASS User map ([without pop-up](#))

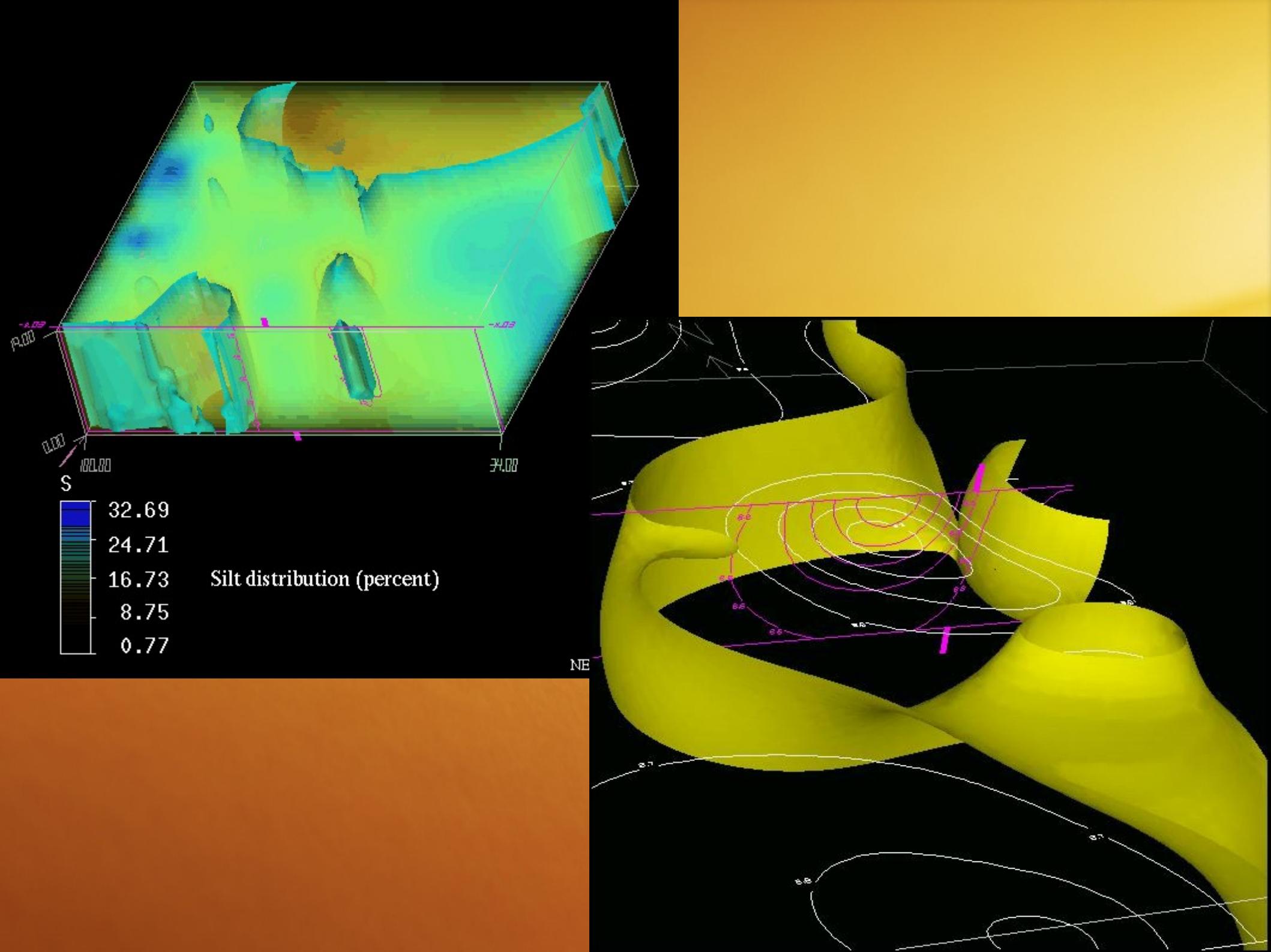
## Geographic Resources Analysis Support System

Commonly referred to as GRASS, this is a Geographic Information System (GIS) used for geospatial data management and analysis, image processing, graphics/maps production, spatial modeling, and visualization. GRASS is currently used in academic and commercial settings around the world, as well as by many governmental agencies and environmental consulting companies.

### Latest News! [XML](#) [RSS FEED](#)

- 12 Feb 2007: [New GRASS bug and wish tracker](#) - Gforge based
- 10 Feb 2007: [GRASS GIS 6.2.1 winGRASS/Cygwin binaries available](#) - download package
- 20 Dec 2006: [GRASS GIS / OSGeo Newsletter Published](#) - The first combined GRASS-News / OSGeo-News volume is available
- 12 Dec 2006: [GRASS 6.2.1 released](#) - This release fixes several bugs discovered in the 6.2.0 source code





What is the length of roads fully contained within each municipality?

```
postgis=# SELECT m.name,  
    sum(length(r.the_geom))/1000 as roads_km FROM bc_roads AS  
    r,bc_municipality AS m WHERE r.the_geom && m.the_geom  
    AND contains(m.the_geom,r.the_geom) GROUP BY m.name ORDER BY  
    roads_km;
```

RESULT:

| name | roads_km |
|------|----------|
|------|----------|

---

SURREY | 1539.47553551242

VANCOUVER | 1450.33093486576

LANGLEY DISTRICT | 833.793392535662

BURNABY | 773.769091404338

PRINCE GEORGE | 694.37554369147 ...

The PostGIS logo is displayed in a large, stylized, green font. The letters 'Post' are in a black serif font, and 'GIS' is in a bold, green sans-serif font.

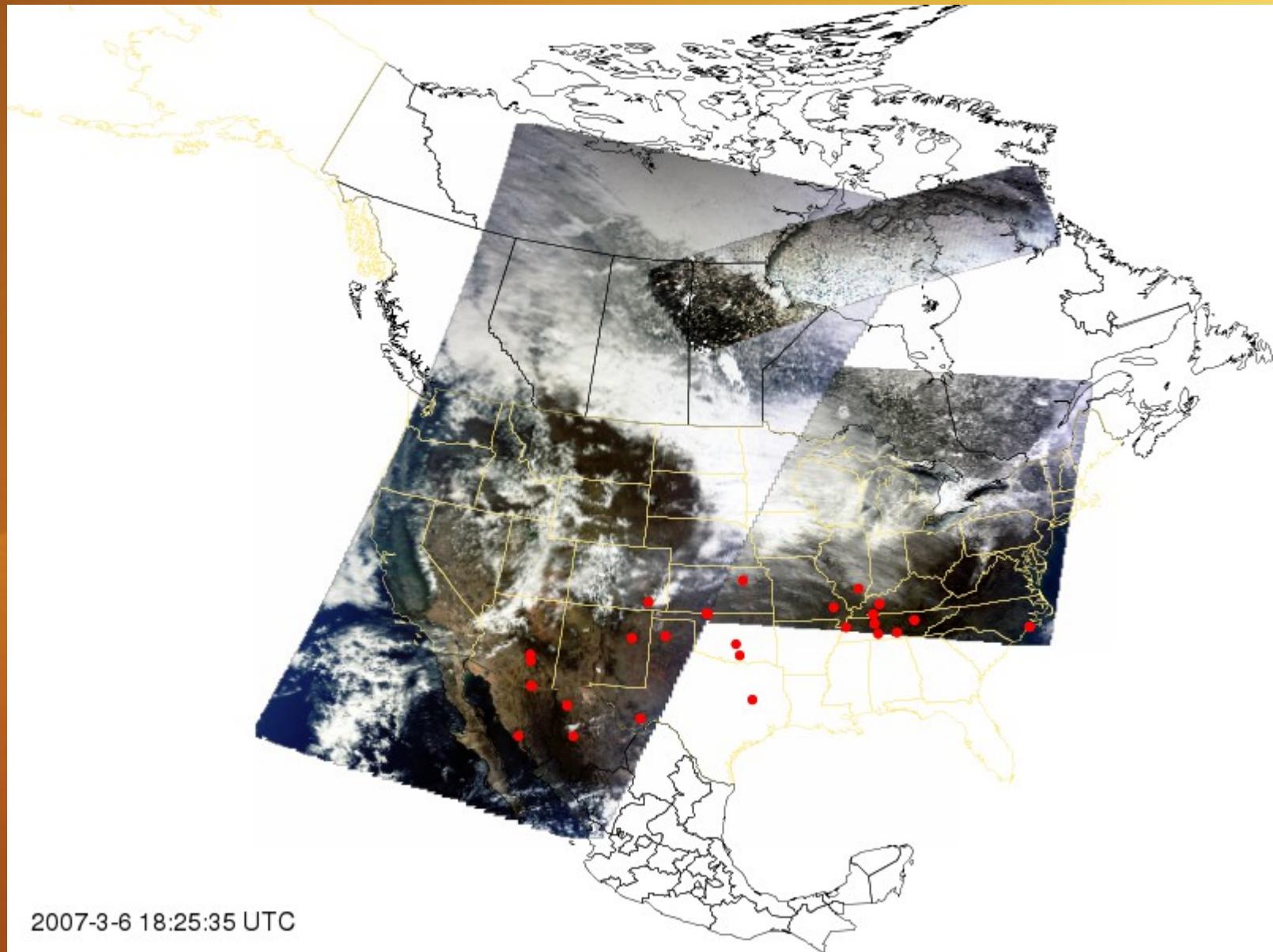
- Web mapping servers
  - Geoserver
  - MapServer
  - Deegree
  - Mapnik

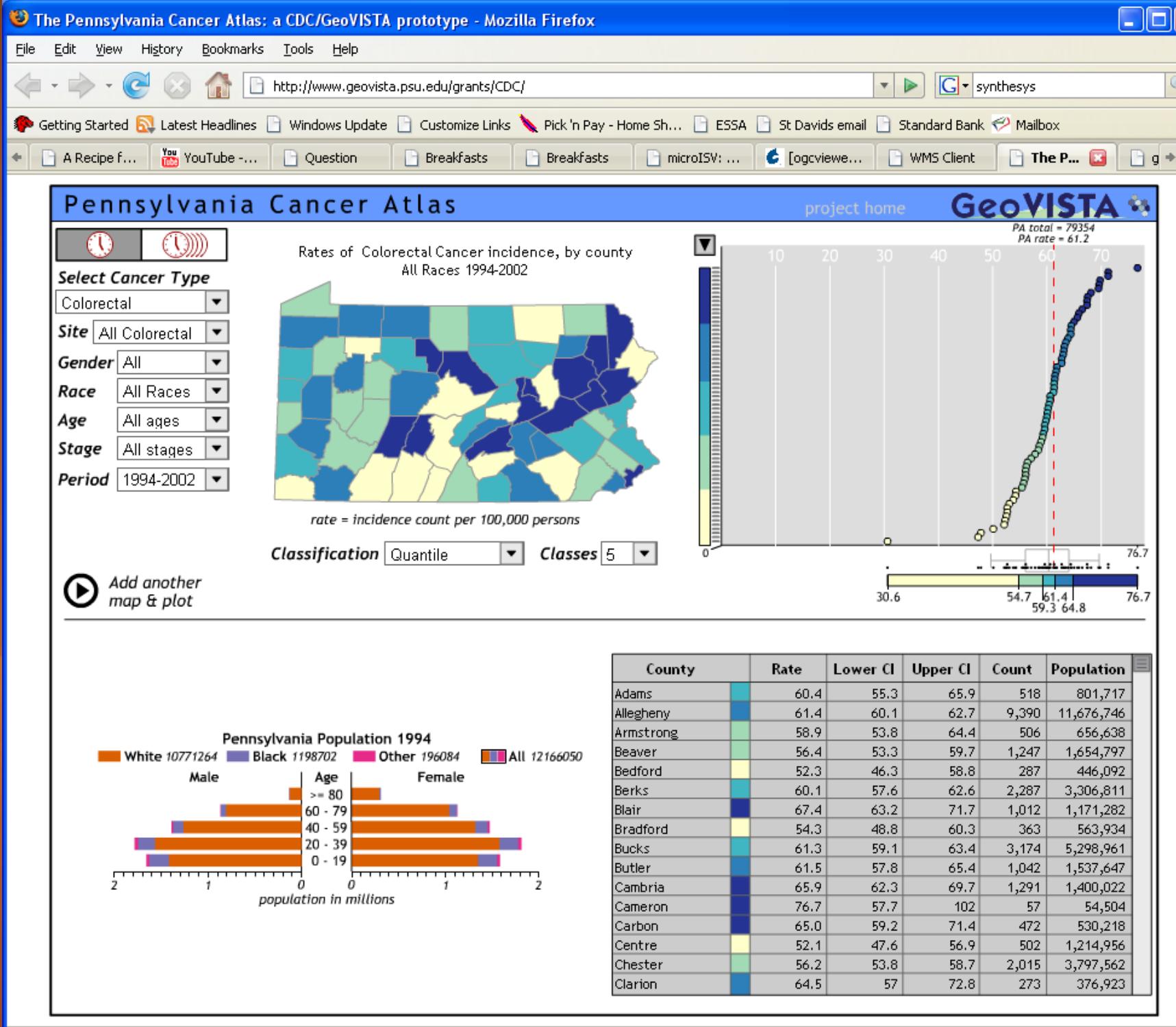
GIS on the  
Web

# GIS on the Web

- Web mapping clients
  - OpenLayers
  - MapBender
- Tools and frameworks
  - GeoDjango
  - GeoExt
  - Geojquery
  - web2py

# GeoServer





[ogviewer.EAUFRANCE.FR:GeoViewer] - Mozilla Firefox

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http://sandre.eaufrance.fr/geoviewer/?lang=en

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The What... Beginning ... A Recipe f... YouTube -... Question Breakfasts Breakfasts microISV: ... [ogcv... WMS

> Site map > Contact

 Sandre

GOTO SELECT DATASETS WMSBROWSER HELP

aoiInfo

geonameInfo geonameA( ), geonameP( ), geonameAIRP( ), geonameRSTN( ), geonameV( ), geonameT( ), geonameH( ), geonameL( ), geonameU( )

Geographical names:  GEO NAMES

France 2005 Tous droits réservés

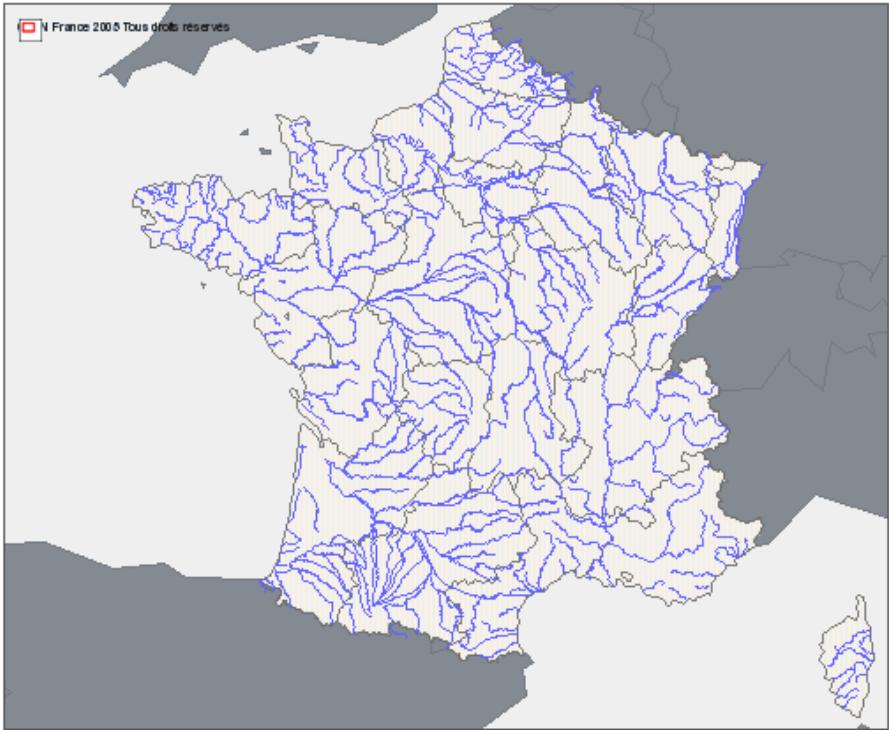
MapInfo Advanced Options

Scale X,Y: / / Lambert II étendu 0 63 126 189 252 km

RSS 2.0 | Home | Qui est le Sandre ? | Site map | Contact

Find: grass Next Previous Highlight all Match case

Done



# The WRF-Chem Smoke Dispersion Modeling System

[Home](#) – [About](#) – [Resources](#) –**Map Layers:**

- Background
- State/Provincial boundaries
- Active fires

**Meteorology layers:**

Time step (UTC):

2006-08-14 00:00:00

Pressure level:

surface

 Constituent:

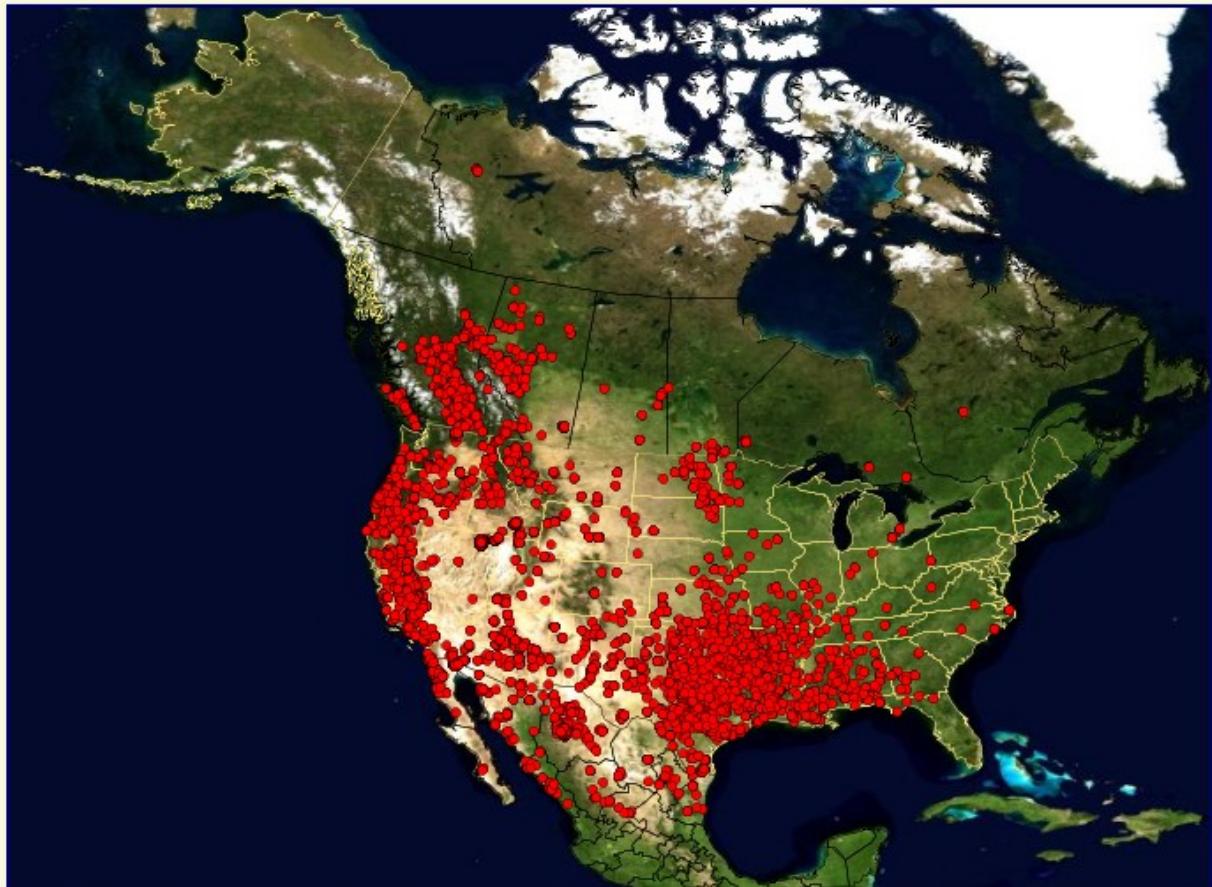
CO\_surf

 Contours:

CO\_surf

 Emissions:

ECO

 Wind bars

BBox: -4578324,2500333,3189008,4611929

# MapServer

UNEP DEWA UNEP.Net GEO

 United Nations Environment Programme  
Global Environment Outlook  
UNEP 

**GEO Data Portal** English | Français Contact | Help | System sign in

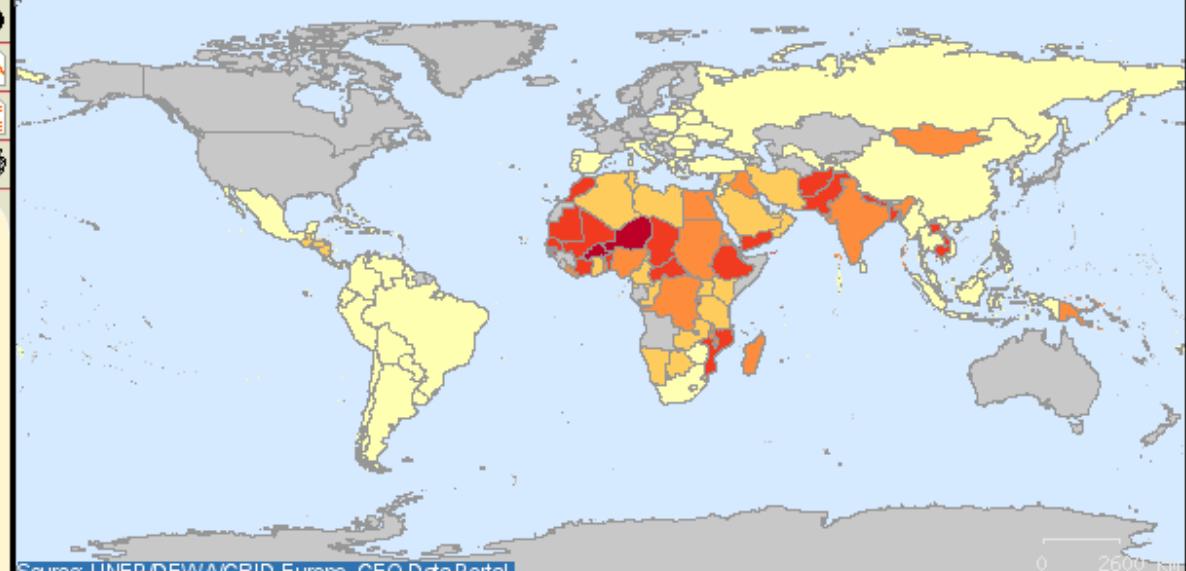
Map Graph Table Metadata Download

Navigation 

**Illiteracy Rate - Ages 15 and Over [1999]**

Source: UNEP/DEWA/GRID-Europe, GEO Data Portal

0 2600 Km





International Boundaries

Units: Percent

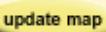
|         |
|---------|
| no data |
| <=17.10 |
| <=34.00 |
| <=50.90 |
| <=67.80 |
| >67.80  |

General Symbology Classification Trend Analysis

Choose additional **display options** for your selected dataset - display the **values**, change the **year**, select a different **color-ramp**, etc. Just click on the tags above to make your selection.

General Background Query Boundaries Layers

This menu gives you access to the "View". Change the **mapsize**, select the **background** layer, define the **query** layer etc. Just click on the tags above to make your selection.

Theme  View

For some map examples see [gallery](#).

The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

[Help](#)

SIG Fedegan - Federación Colombiana de Ganaderos - Microsoft Internet Explorer provided by ...

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Address  Go Links GIS server ILO

**FEDEGAN**  
FEDERACION COLOMBIANA DE GANADEROS

www.fedegan.org.co

+ INICIO  MAPAS  HERRAMIENTAS  GOOGLE EARTH  ACERCA DE  NAV1  NAV2

©2007 Federación Colombiana de Ganaderos

ATLÁNTICO MAGDALENA CESAR SUCRE CÓRDOBA BOLÍVAR NORTE DE SANTANDER QUIA LAGUAJIRA

0 150 300 km

Proyección: Bogotá / Colombia Bogotá  
MinX: 769897 Unidades: Meters  
MaxX: 1347091 Dist:   
MinY: 1410000 X:   
MaxY: 1842895 Y:

Cliente Intermedio

Usuario:   
Clave:

Defina la Escala:  1  2  3  4  5  6

Defina la Escala:

FEDEGAN - Federación Colombiana de Ganaderos - 2007

Opening page http://216.72.142.149/fedegan/fedegan2/fedegan2.phtml?languag Internet

## OpenStreetMap



The Free Wiki World Map

OpenStreetMap is a free editable map of the whole world. It is made by people like you.

OpenStreetMap allows you to view, edit and use geographical data in a collaborative way from anywhere on Earth.

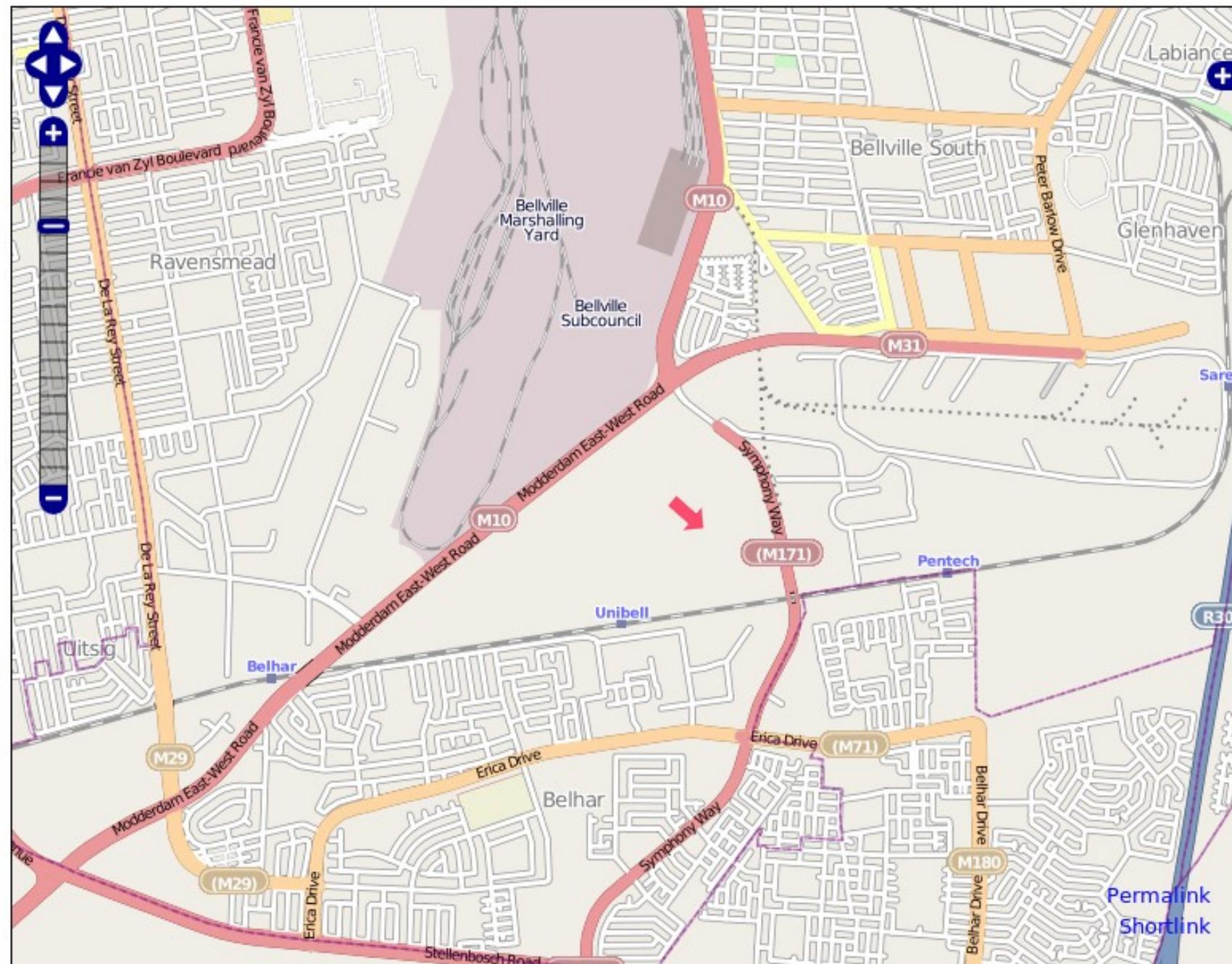
OpenStreetMap's hosting is kindly supported by the UCL VR Centre and [bytemark](#). Other supporters of the project are listed in the [wiki](#).

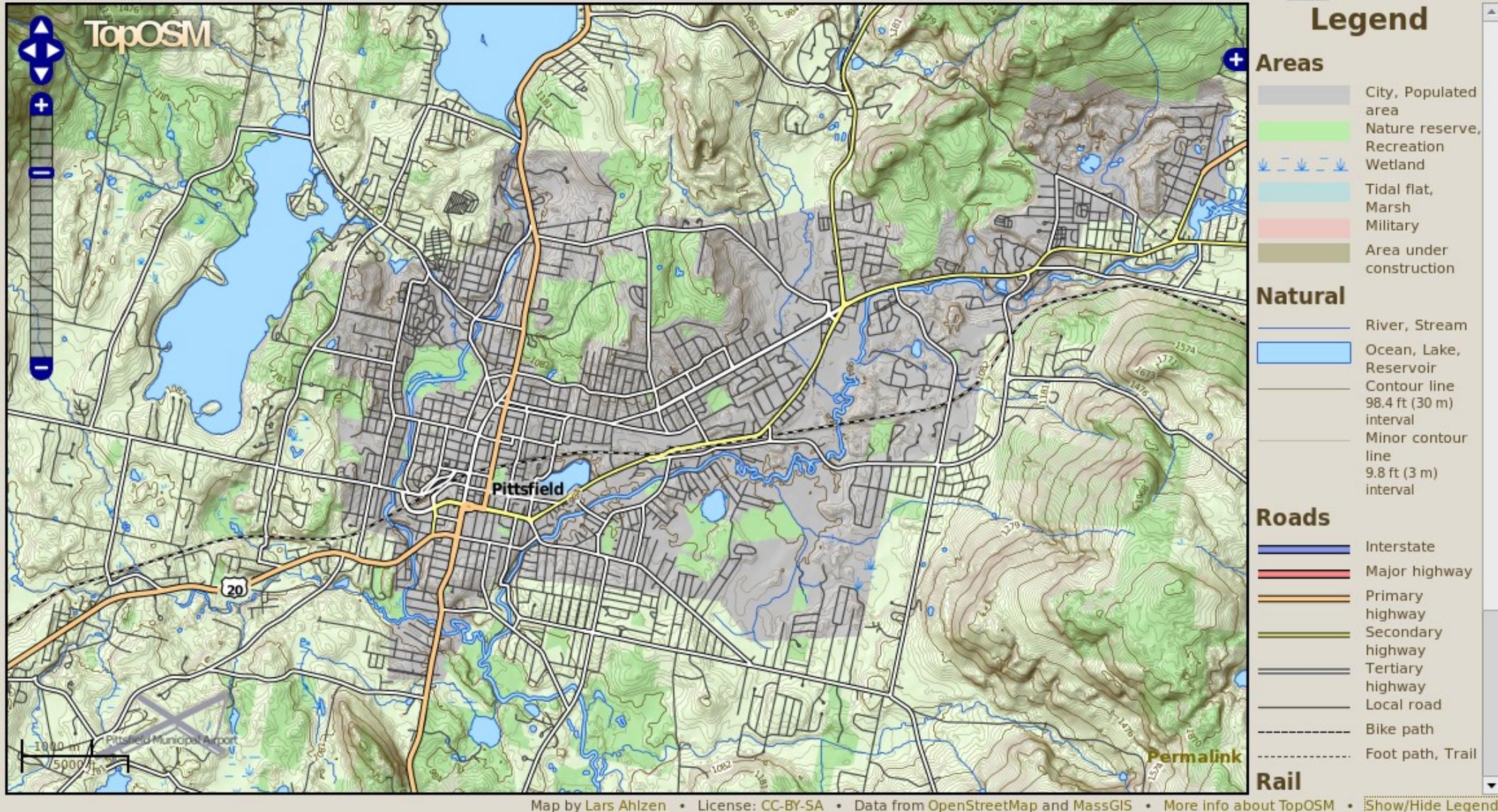
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[News blog](#)  
[Shop](#)  
[Map key](#)

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[the western cape](#) [Go](#)

examples: 'Alkmaar', 'Regent Street, Cambridge', 'CB2 5AQ', or 'post offices near

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**Layer Manager**

- Botswana X
- Starfield
  - Images
    - The Blue Marble
    - NASA Landsat Imagery
      - NLT Landsat7 (Visible Color)
      - I-Cubed ESAT World Landsat7 Mosaic
      - OnEarth 15m Global Mosaic, pseudocolor
      - OnEarth 15m Global Mosaic, visual
      - NLT Landsat7 (Pseudo Color)
      - Geocover 2000
      - Geocover 1990
    - USGS Imagery
  - OnEarth WMS
    - Global Mosaic, pseudocolor
    - Global Mosaic, visual
    - Global Mosaic base, pseudocolor
    - Global Mosaic base, visual
    - TERRA MODIS
    - AQUA MODIS
    - TERRA 721 MODIS
    - AQUA 721 MODIS
    - TERRA NDVI MODIS
    - AQUA NDVI MODIS
  - ZoomIt! Data
    - Astrobiology Field Guide
    - Flags of the World
    - Landmark Catalog
    - Atmosphere
    - EarthQuake Icons
    - Historical EarthQuake Icons
    - KML Icons
    - GlobalClouds
  - Boundaries
    - Countries
    - US States
  - Lewis and Clark Trail
  - Grid lines
  - Placenames
  - Measure Tool
  - Zoom Extender



# Spatial data management and access

- Spatial Databases
  - PostGreSQL -> PostGIS
  - MySQL
- Files
  - Almost all types
- Web services

# Development

- Libraries (mainly C-based and Java-based)
  - Geotools
  - Terralib
  - JTS / GEOS
  - GDAL
  - OGR
- Interfaces
  - GeoAPI

# Open standards

- Metadata -
  - ISO3950, CSW
  - ISO19115, 19139
- Data
  - OGC simple feature specification
    - PostGIS, Oracle Spatial, ESRI ArcSDE
- Web services
  - OGC OWS specifications
    - Web Map Service (WMS)
    - Web Feature Service (WFS)
    - Web Coverage Service (WCS)
    - SWE services (SOS, SPS, SAS, SensorML)

Most FOSS GIS support these by default

# SDI - GeoNetwork



Home | Contact us | Links | About | Help |

GeoNetwork™  
OpenSource  
Geographic data sharing for everyone

中文 | English | Español | Français | Русский | Deutsch | Nederlands

Username  Password  Login

FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS

## WHAT?

What?

Title

Abstract

Keywords

### Map type

- Digital  Interactive  
 Hard copy  Downloadable

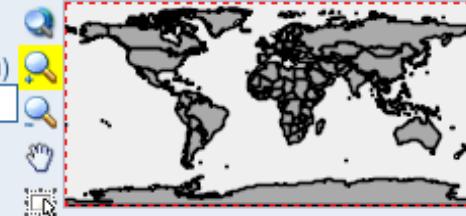
### Search accuracy

- Precise      Imprecise

## WHERE?

long (min)

-180



long (max)

178.2

Type

overlaps

Region

- Any -

## WHEN?

Anytime

From  To

Restrict to

Catalog  - Any -

Category  - Any -

Options

Sort by  Relevance

Hits per page  10

Output  Full

Search

Reset Hide advanced options

## CATEGORIES

- Applications
- Audio/Video
- Case studies, best practices
- Conference proceedings
- Datasets
- Directories
- Interactive resources
- Maps & graphics
- Other information resources

## GEONETWORK'S PURPOSE IS:

- ▶ To improve access to and integrated use of spatial data and information
- ▶ To support decision making
- ▶ To promote multidisciplinary approaches to sustainable development
- ▶ To enhance understanding of the benefits of geographic information

GeoNetwork opensource allows to easily share geographically referenced thematic information between different organizations. For more information please contact

[gavin@saeon.ac.za](mailto:gavin@saeon.ac.za)

Featured map

# Open Data, APIs and services



[register now](#)

[home](#) [pro](#) [web-map builder](#) [developer area](#)

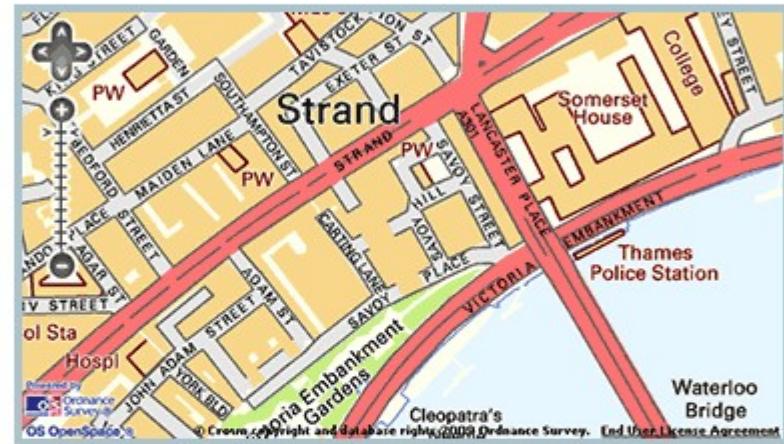
## Welcome to the OS OpenSpace API

The OS OpenSpace API is free to access and lets developers create amazing web applications and online projects with Ordnance Survey maps.

But OS OpenSpace API is not just for developers.

Although the API uses JavaScript to make web pages more interactive, anyone can create an application by following our sample code and tutorials.

Get Ordnance Survey maps on your website to enhance the service and customer experience.



Example of OS OpenSpace API displaying Ordnance Survey data

### step 1

get started and  
**register now**  
for your API key



### step 2

technical help is  
available from our  
**developer** area



### step 3

join our **forum**  
and share your  
thoughts



ka-Map! - Microsoft Internet Explorer provided by Mintek [http://pywps.ominiverdi.org/demo/embrio/ka-map/htdocs/index\\_wps\\_qgis.html](http://pywps.ominiverdi.org/demo/embrio/ka-map/htdocs/index_wps_qgis.html)

File Edit View Favorites Tools Help

Back Favorites DAP Options Files D/L 0 files

Address [http://pywps.ominiverdi.org/demo/embrio/ka-map/htdocs/index\\_wps\\_qgis.html](http://pywps.ominiverdi.org/demo/embrio/ka-map/htdocs/index_wps_qgis.html) Go Links GIS server ILO

KA-MAP + PYWPS + GRASS + QGIS your Dainty Web GIS Salad Everywhere [HELP](#) [CREDITS](#)

Spearfish | 1:120000 |

Map Info

Spearfish

Reference map

Layers

+  Spearfish

x: 597026.68 y: 4926581.34

kilometers

0 2.5 5.0 7.5

Done Internet



File Edit View Favorites Tools Help

Address [http://pywps.omniverdi.org/demo/embrio/ka-map/htdocs/index\\_wp](http://pywps.omniverdi.org/demo/embrio/ka-map/htdocs/index_wp) Go Links GIS server ILO

## KA-MAP + PYWPS + GRASS + QGIS

your Dainty Web GIS Salad Everywhere

[HELP](#) [CREDITS](#)

Spearfish



### Visibility

select a point on the map and click on "calculate" button to see the places you can see from that point.

[more info...](#)

#### Params

X:598899

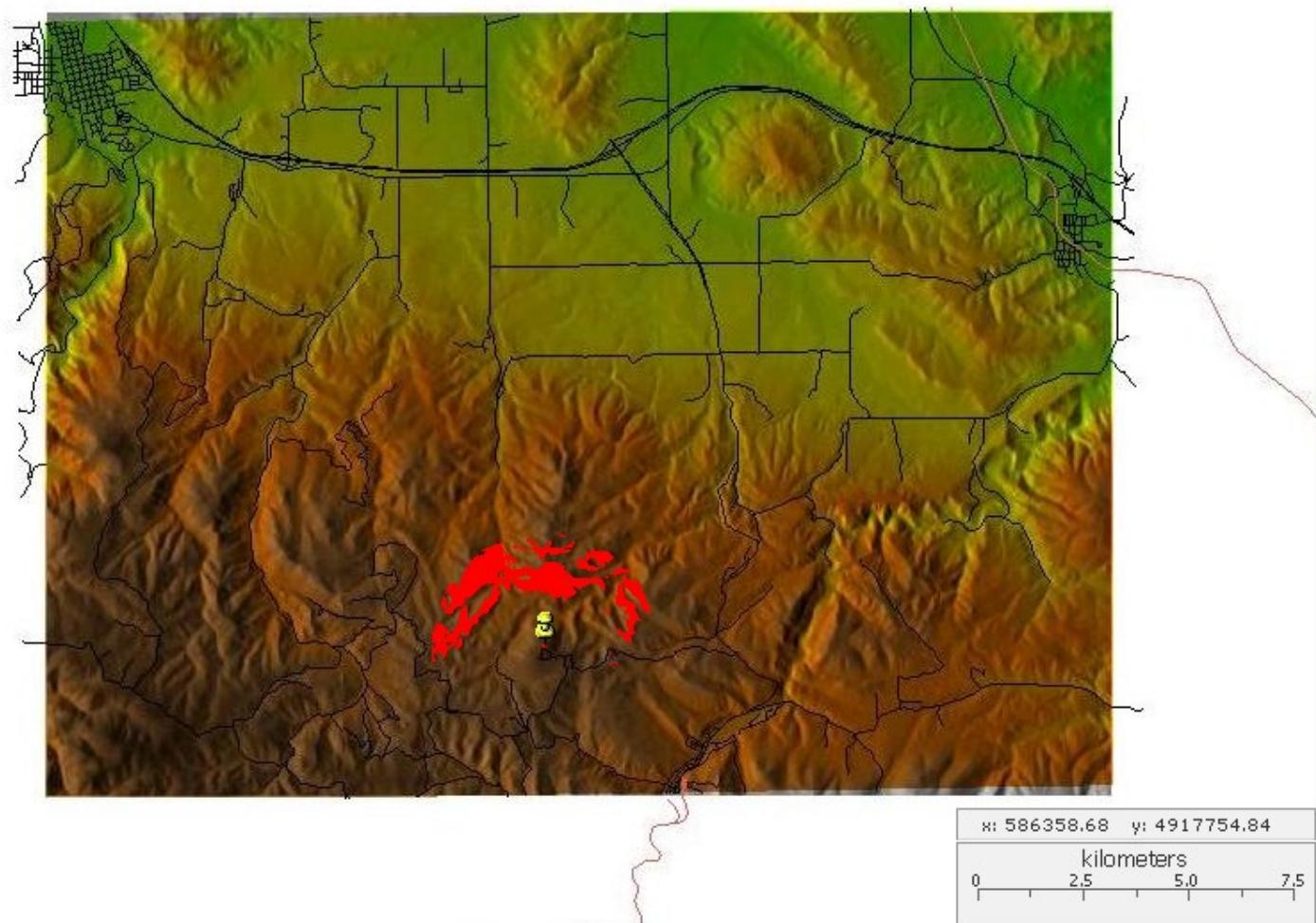
Y:4916707

Max distance where check visibility:  
(range 2000 -> 7500)

2000

Height of the observer:  
(range 1 -> 50)

1



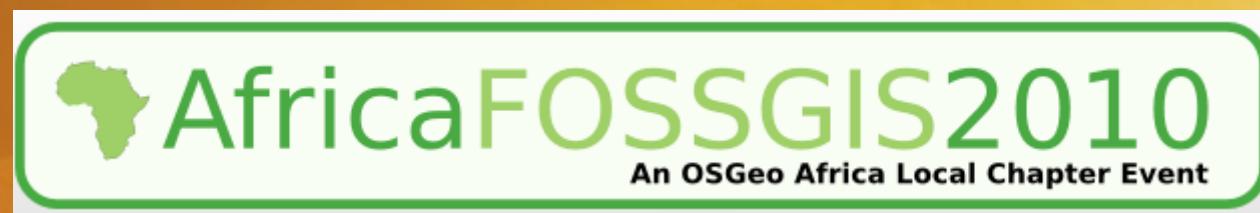
x: 586358.68 y: 4917754.84

kilometers

0 2.5 5.0 7.5



# Events



September 26 -29, Midrand



for Geography teachers  
Bridge House  
May 27?

# Resources



[Google groups](#)



**Southern African Geography Teachers Network**

<http://groups.google.com/group/sageographyteachers>

Local OSGeo mailing list: <http://lists.osgeo.org/mailman/listinfo/africa>



**GISSA**  
**website and**  
**CRM...**