

FOSS4G, Cape Town, South Africa, 2008

Web processing and
spatial analysis with the
ILWIS open source GIS software
and GEOSS data



Rob Lemmens
Martin Schouwenburg
Somefun Olalekan Sunday



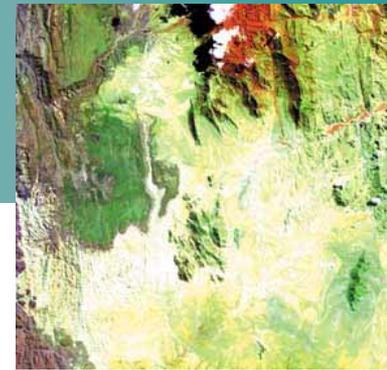
Presentation outline

- ITC
- ILWIS
- 52°North
- ILWIS web services & chaining
- Conclusions



What is ITC about?

- ITC = International institute for geo-information science and earth observation
- 250 staff, 600 students/year
- Mission:
Capacity building and institutional development for and in economically and technologically less developed countries



ITC's spearheads in education, research & projects



Geo-information science and earth observation for

- improving planning and management of multifunctional use of space
- strengthening civil society
- a better understanding of global change
- food security, water management and the environment
- disaster management

ITC's GIS: ILWIS

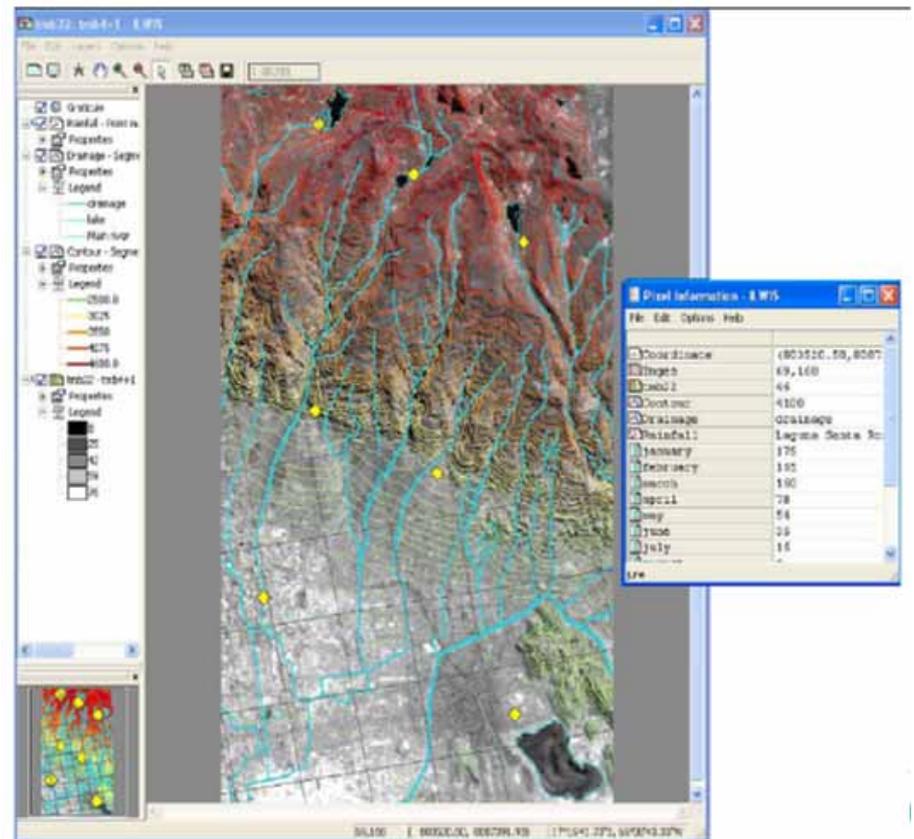


ILWIS: the **I**ntegrated **L**and and **W**ater **I**nformation **S**ystem

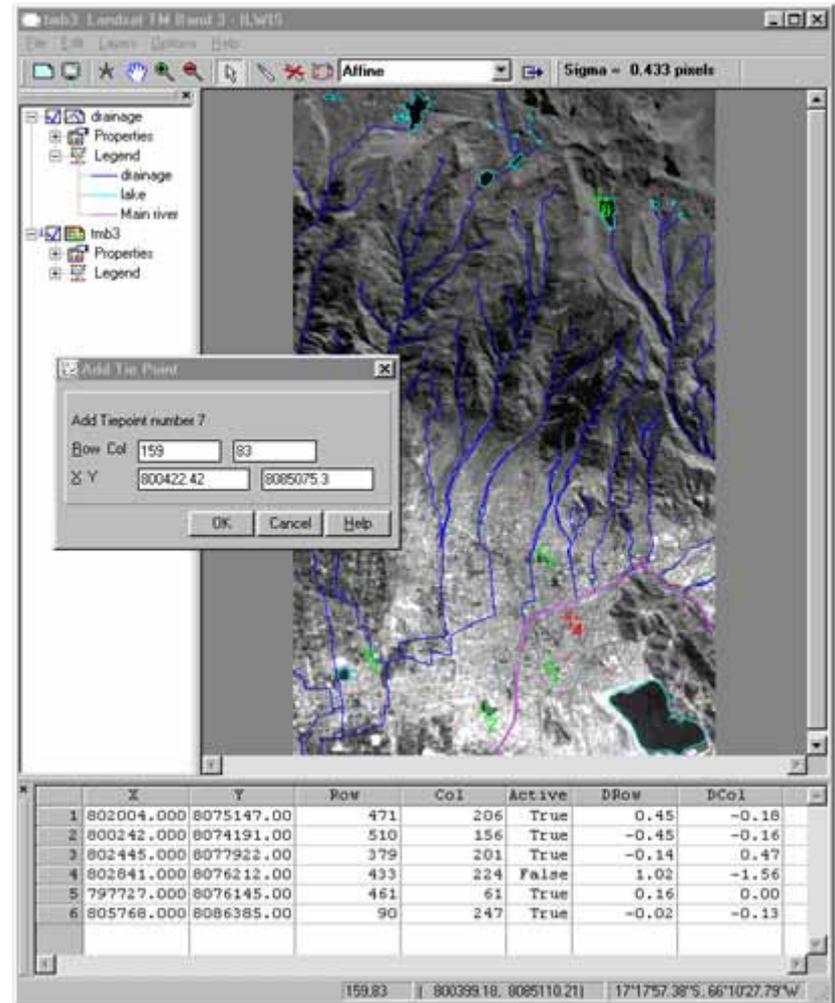
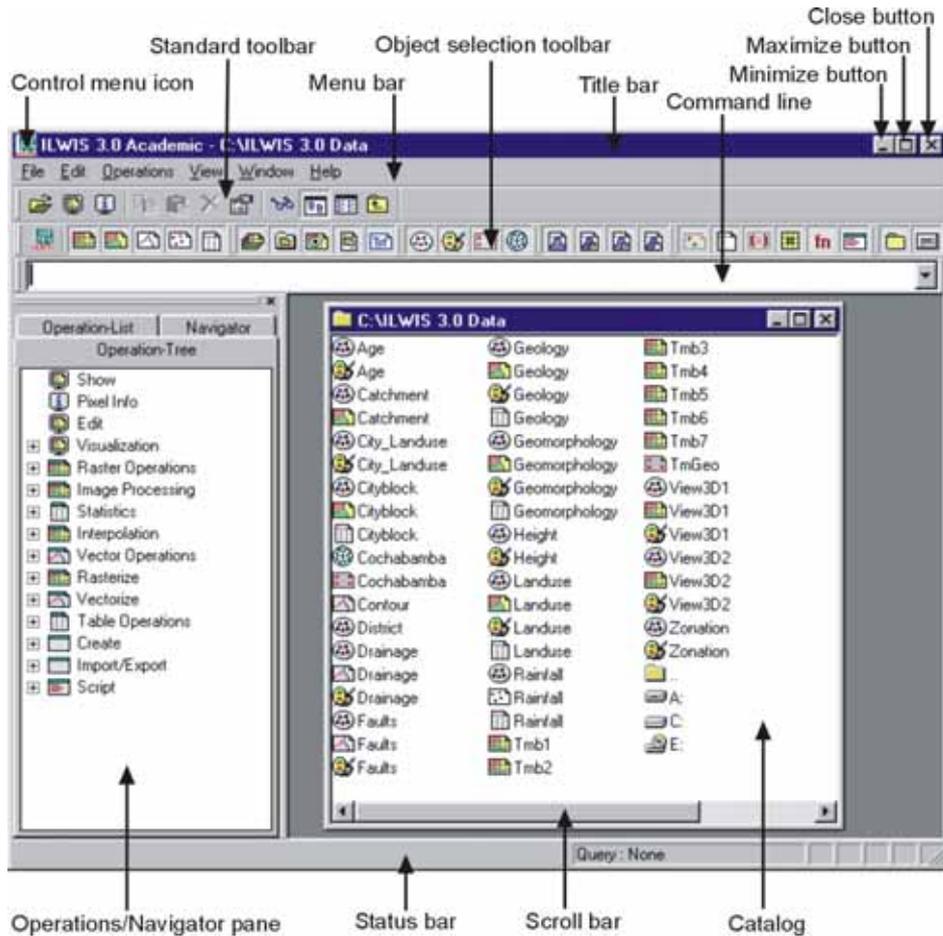
- PC-based integrated Geographical Information System (GIS) & Remote Sensing software
- Developed by ITC
- Originally designed in 1985 for a land use zoning and watershed management project in Sumatra
- Used extensively in courses in and outside ITC, in research and projects

ILWIS key features

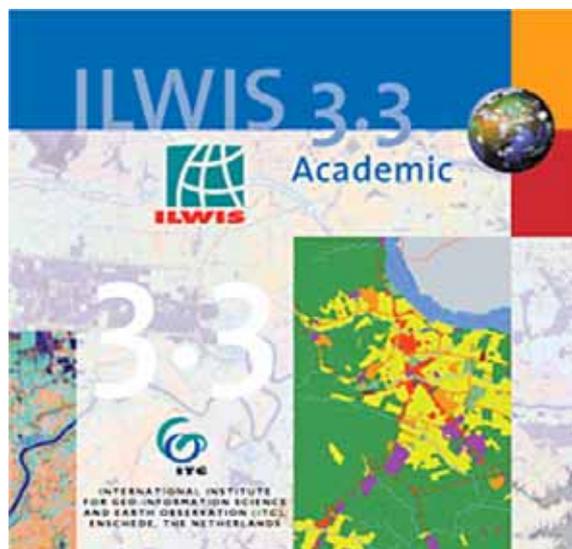
- Raster operations and Image processing
- Vector operations
- Map Statistics
- Scripting
- Data management
- Cartographic output
- Graphs
- And much more...



ILWIS GUI

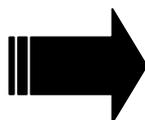


ILWIS goes open source



2005

- Shareware
- Development by ITC



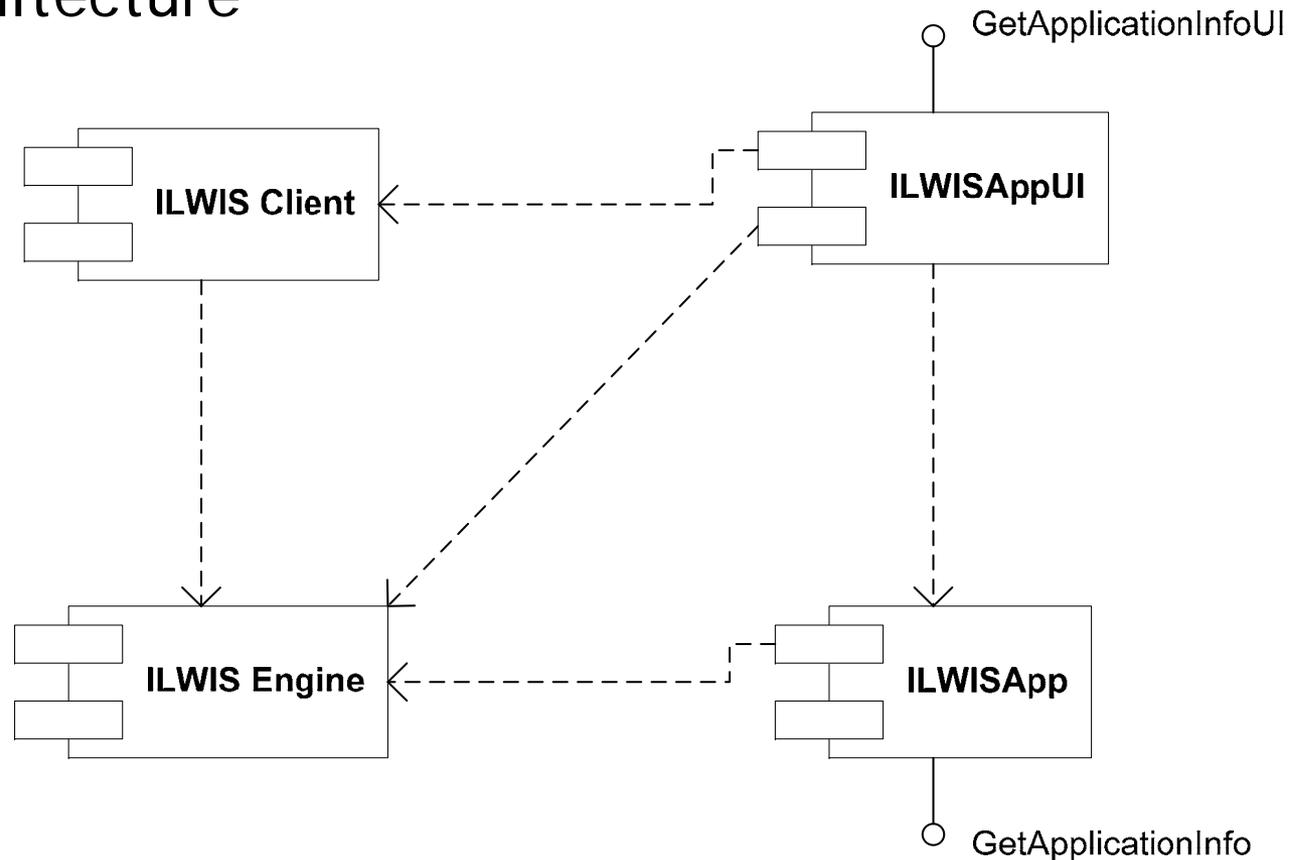
2007

- Open source: GPL license
- Community based development

2008: ILWIS 3.5 with WMS

ILWIS' new structure

- Modularised
- Plug-in architecture



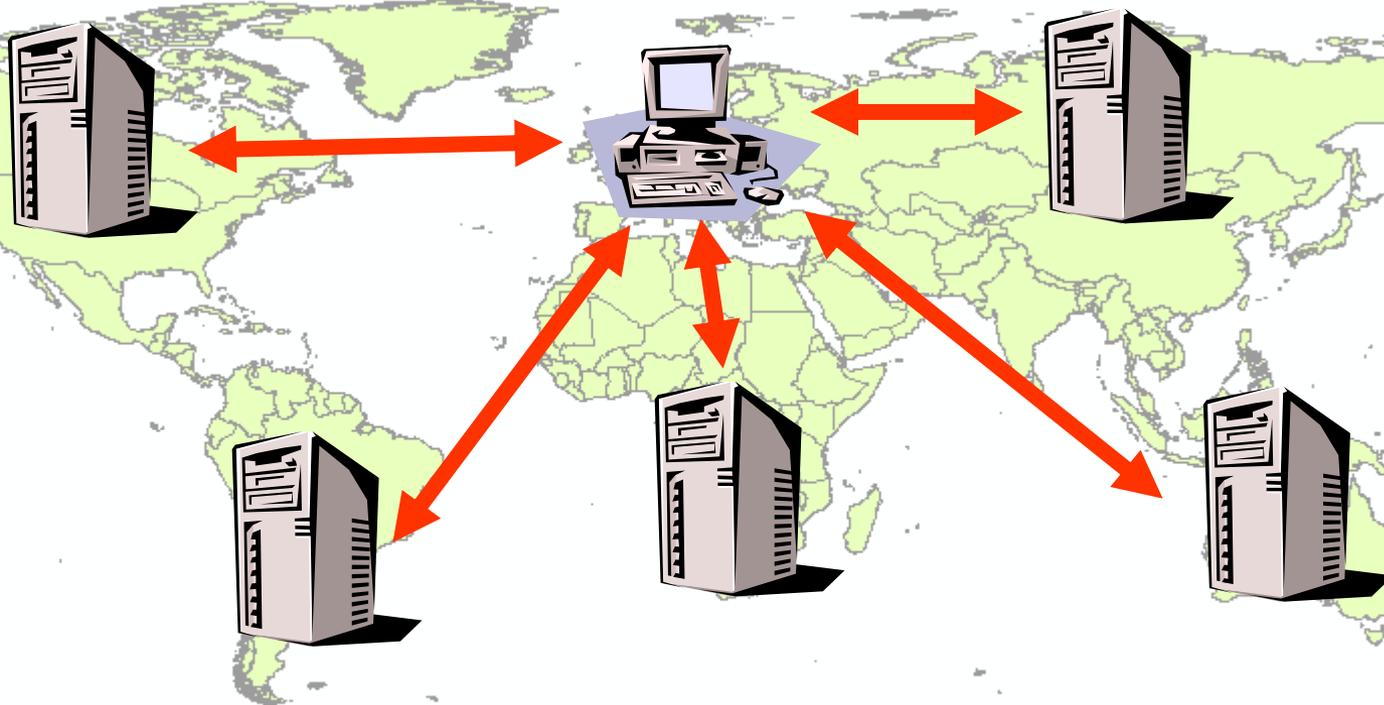
ILWIS Open, the way forward



Objectives of the 52N-ILWIS community:

- Provide a low cost and user friendly solution for satellite image access, processing and result dissemination.
- The advancement of ILWIS into re-usable, interoperable web services. Strong coherence with activities within 52°North's Geoprocessing Community.
- Advance ILWIS as client software in an OpenGIS-based distributed service environment (SDI).
- Support to research groups that want to develop extensions to the existing ILWIS components.

OpenGIS & Distributed servers



OpenGIS interface (WMS, WFS, WCS, WPS, etc.)

Filter services powered by ILWIS

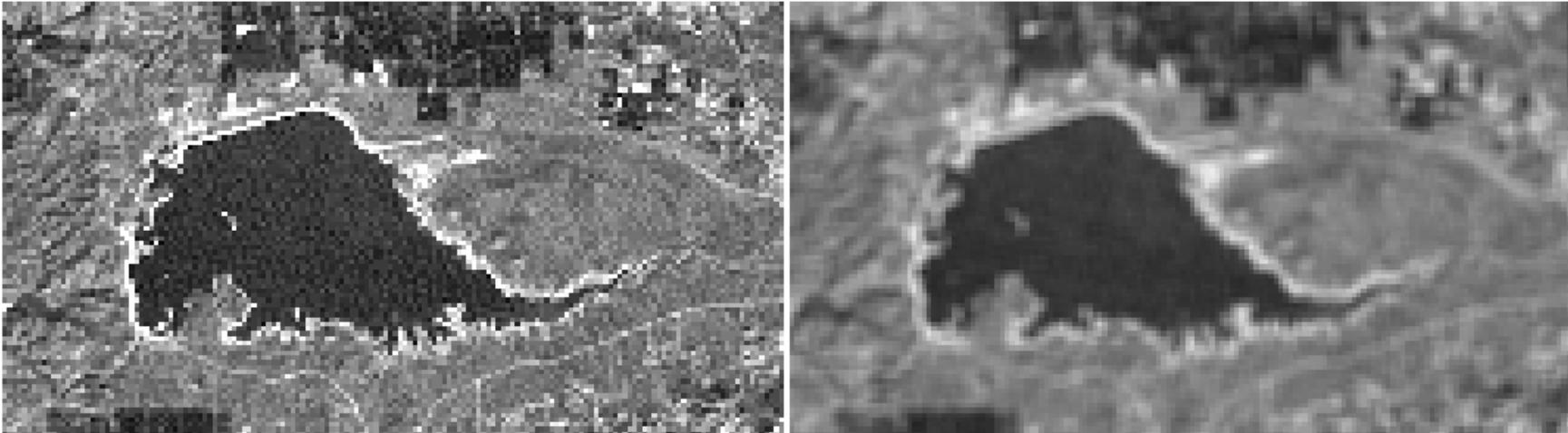


http://ilwiswps.itc.nl:8097/ServiceClientWeb/register.faces - Windows Internet Explorer

http://ilwiswps.itc.nl:8097/ServiceClientWeb/register.faces

http://ilwiswps.itc.nl:8097/ServiceClientWeb/register....

Web processing Client



North South
East West

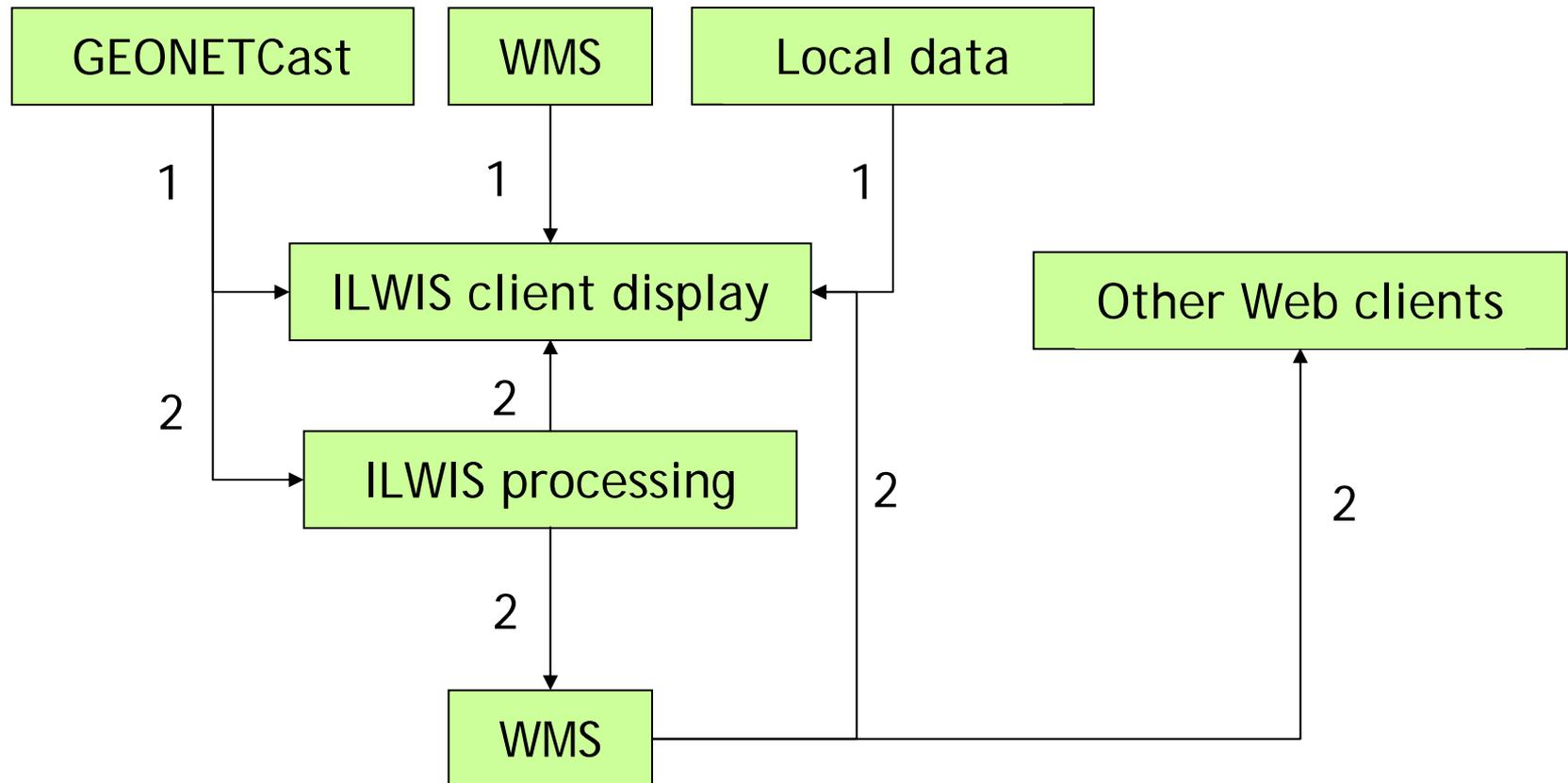
Average 3x3 matrix

Original map (WMS)
Processed map (WMS)

Satellite image analysis for water security



- Use cases:
1. visual analysis
 2. Pixel calculations



GEONETCast

- Part of GEOSS
- Easy and low cost access to environmental data
- Script-based import into ILWIS

Meteosat Second Generation Data Retriever

File Help

Date / Time range [UTC]
From: 9/ 8/2005 05:15
To: 9/ 8/2005 05:15
Repeat Interval (min): 15

Channels
 VIS006
 VIS008
 IR_016
 IR_039
 WV_062
 WV_073
 IR_087
 IR_097
 IR_108
 IR_120
 IR_134
 HRV

Sort

Use bounding box

Lat: 12.566 S 29.213 N (WGS)
Lon: 8.491 E 61.552 E 1984

Files: 1
MB: 7

Conversion
 Original DN Values
 8 bits Values
 Radiometric (mW/m2/st/(cm-1)-1)
 Radiometric (W/m2/st/um)
 Reflectance / Temperature (K)

Output
Format: ILWIS Raster Map
File prefix: t Simple Filename
Folder: F:\rw_sept08 Browse...

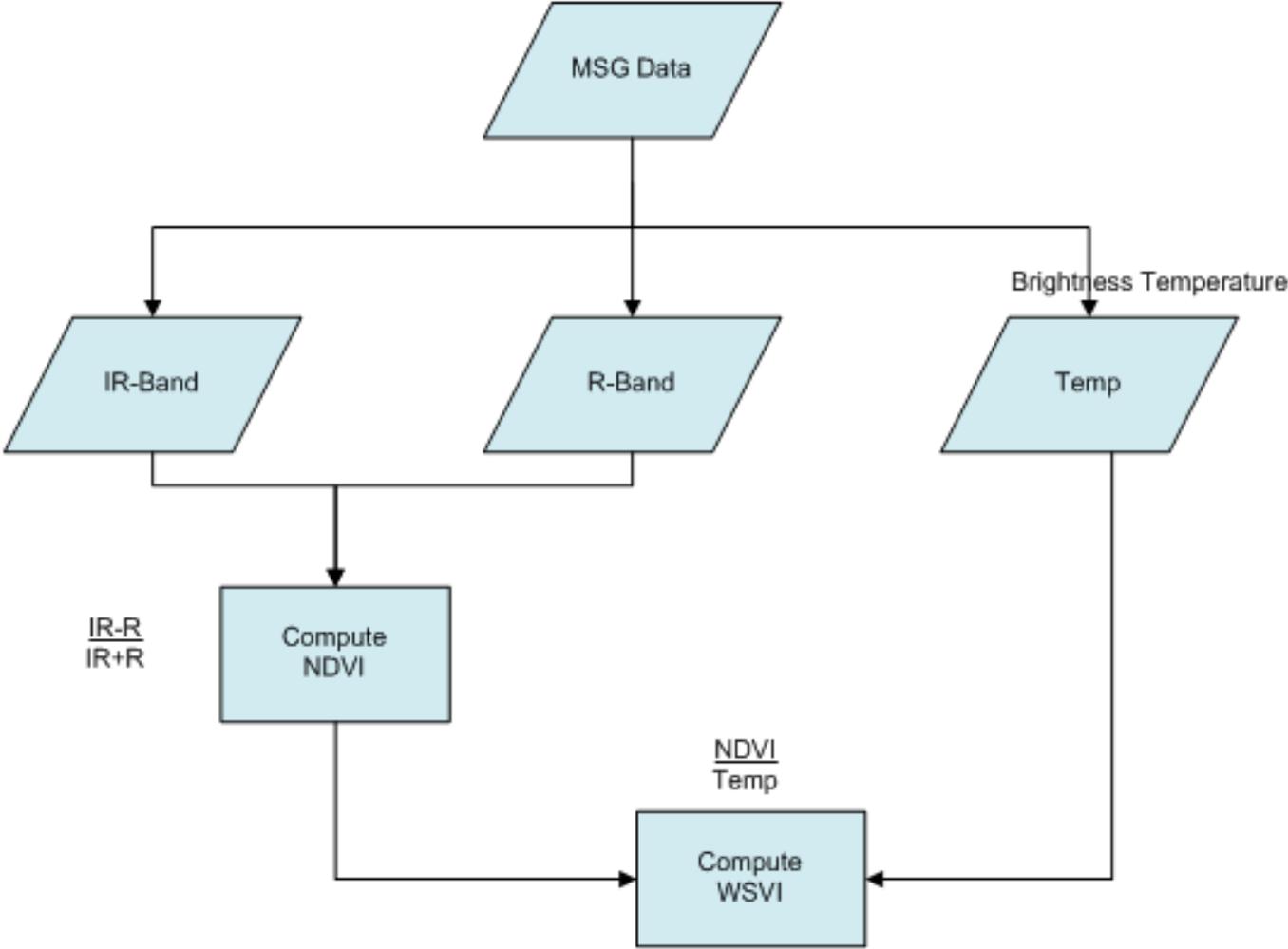
Projection: MSG
Pixel size:

Ignore Errors
 Show Console
Execute
Exit

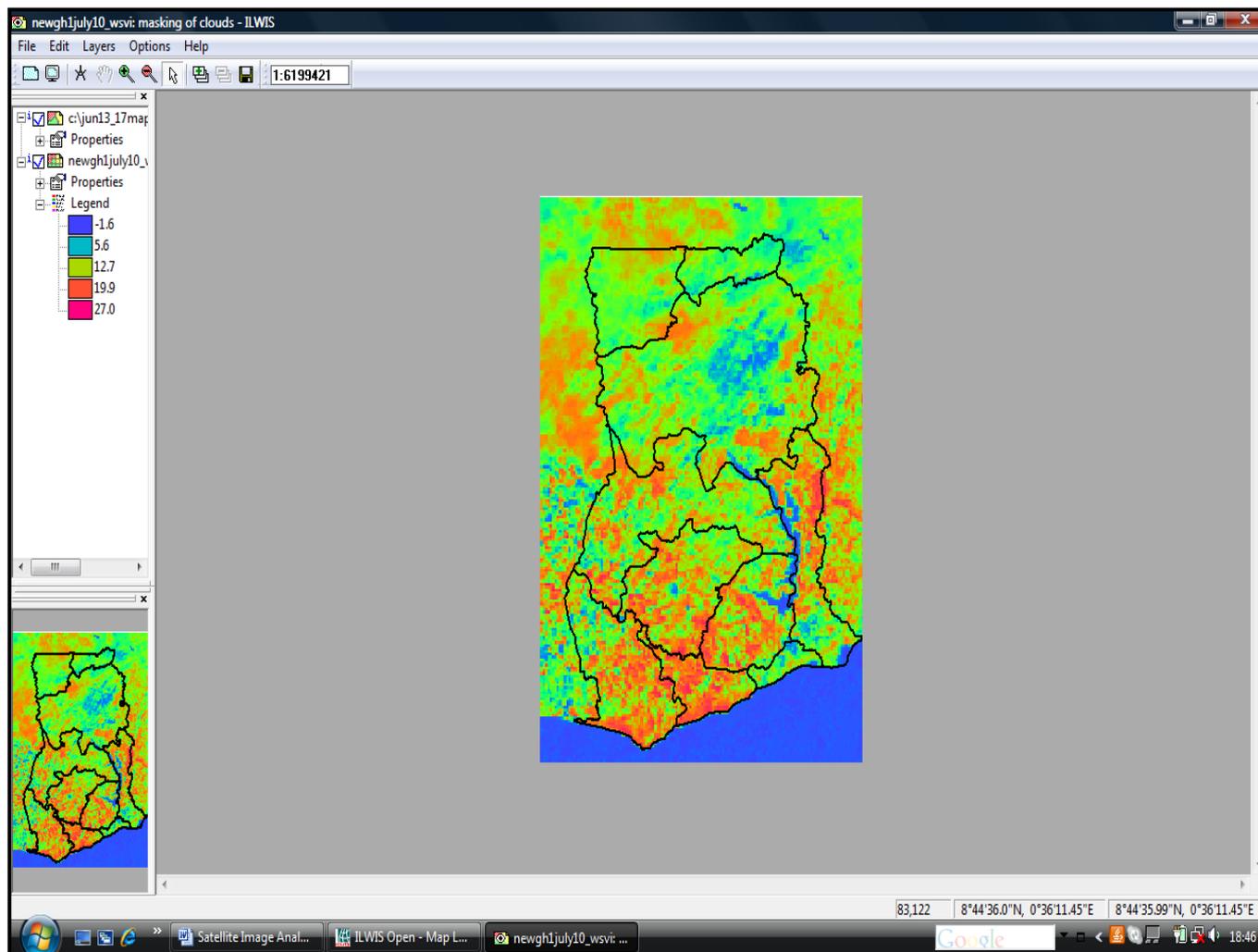
Show command line

line	width	high	center_line	center_width	center_high	scale	speed
10	294.0	7	0, 0, 255	0, 255, 0	255, 0, 0	1.7000	
20	241.0	7	0, 0, 255	0, 255, 0	255, 0, 0	3.2200	
30	211.0	7	0, 0, 255	0, 255, 0	255, 0, 0	1.8200	
40	291.0	7	0, 0, 255	0, 255, 0	255, 0, 0	2.2600	
50	342.0	7	0, 0, 255	0, 255, 0	255, 0, 0	11.6500	
60	226.0	7	0, 0, 255	0, 255, 0	255, 0, 0	5.9700	
70	258.0	7	0, 0, 255	0, 255, 0	255, 0, 0	4.3750	
80	247.0	7	0, 0, 255	0, 255, 0	255, 0, 0	4.7250	
90	229.0	7	0, 0, 255	0, 255, 0	255, 0, 0	3.7750	
100	243.0	7	0, 0, 255	0, 255, 0	255, 0, 0	3.5200	
110	236.0	7	0, 0, 255	0, 255, 0	255, 0, 0	6.1700	
120	233.0	7	0, 0, 255	0, 255, 0	255, 0, 0	3.0200	
130	233.0	7	0, 0, 255	0, 255, 0	255, 0, 0	6.1700	
140	218.0	7	0, 0, 255	0, 255, 0	255, 0, 0	5.7750	
150	290.0	7	0, 0, 255	0, 255, 0	255, 0, 0	4.4700	
160	207.0	7	0, 0, 255	0, 255, 0	255, 0, 0	3.0000	
170	318.0	7	0, 0, 255	0, 255, 0	255, 0, 0	13.1800	
180	348.0	7	0, 0, 255	0, 255, 0	255, 0, 0	8.0500	

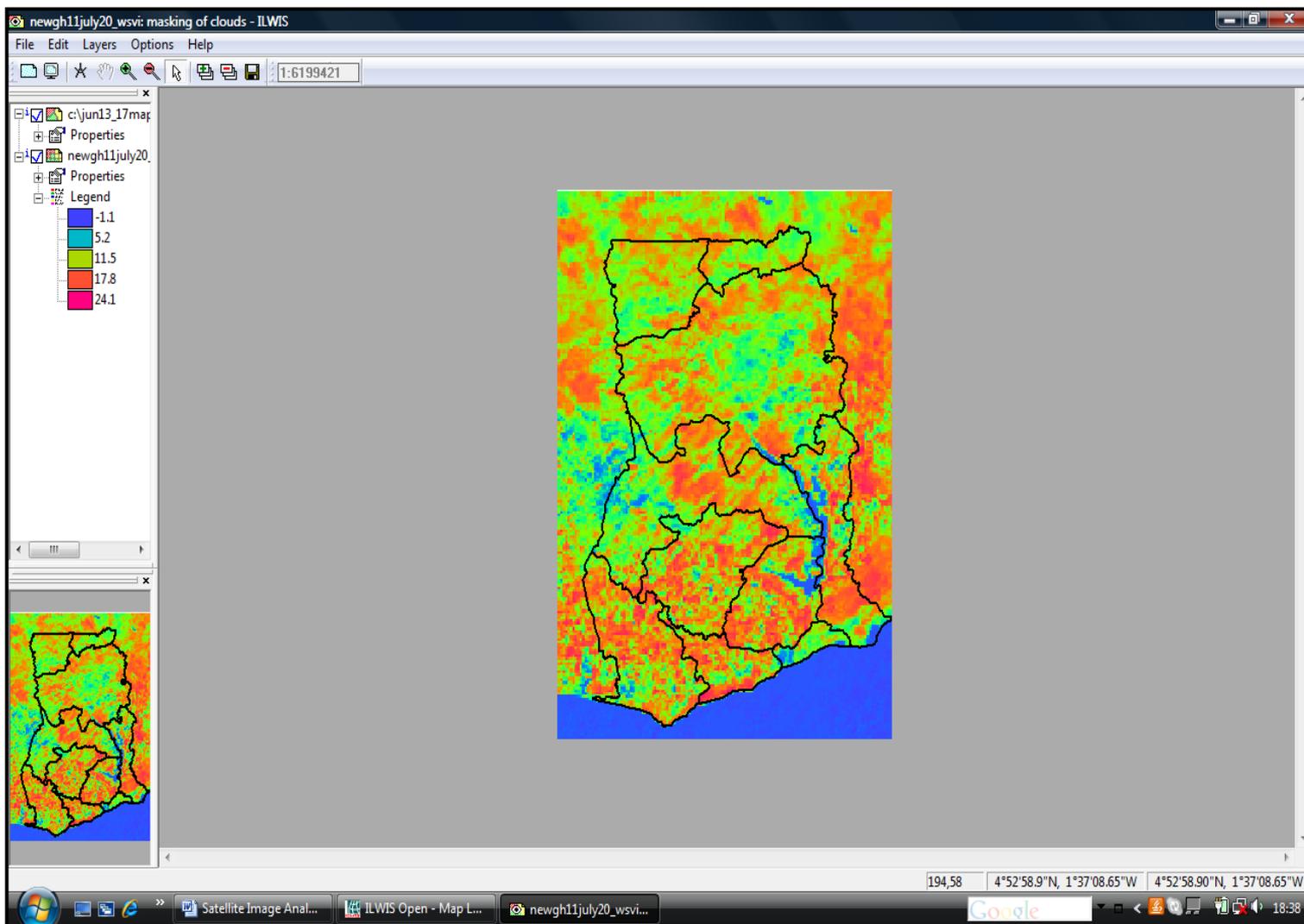
Calculating Water Supply Vegetation Index (WSVI)



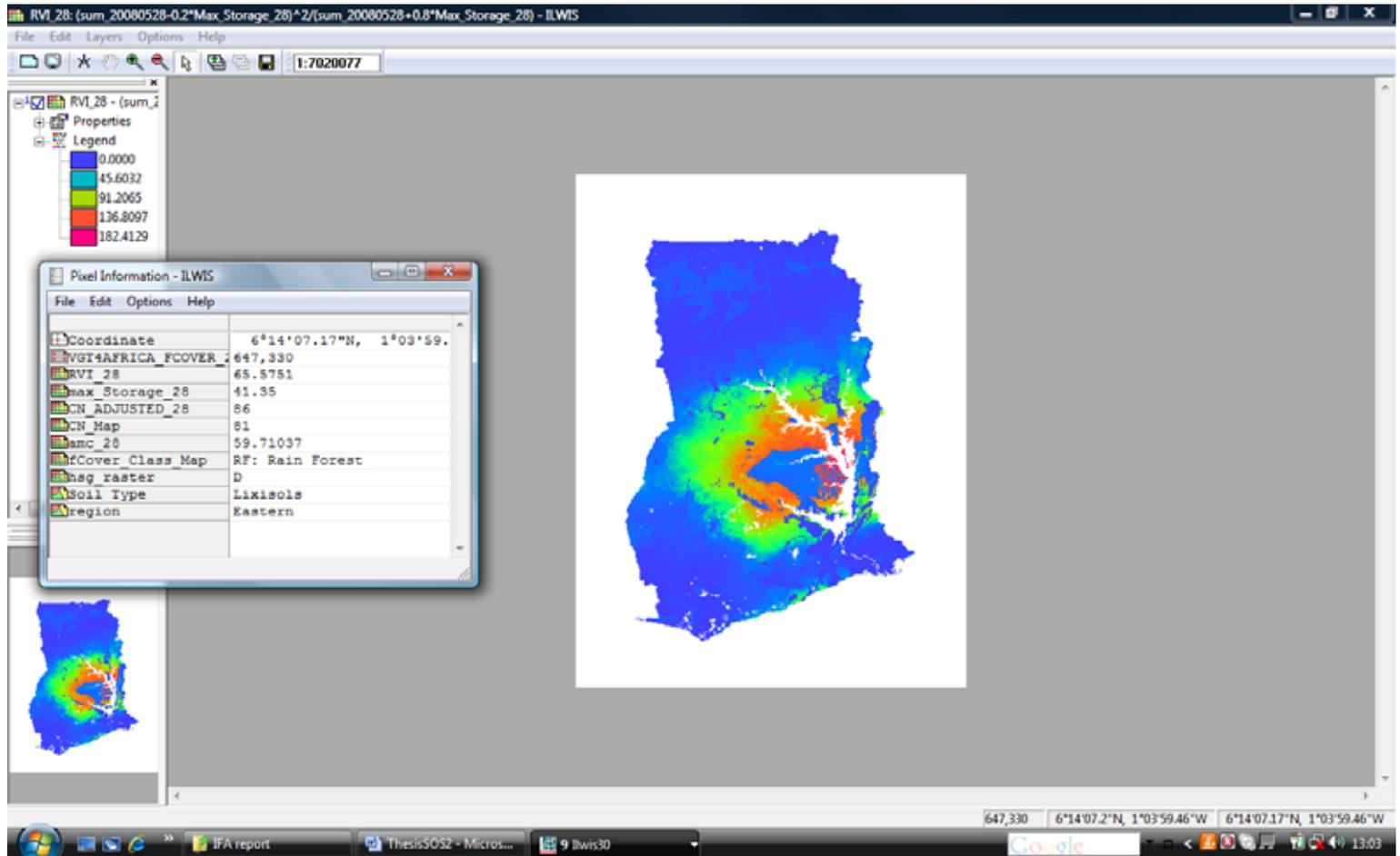
WSVI Maps for July 1 - 10, 2007



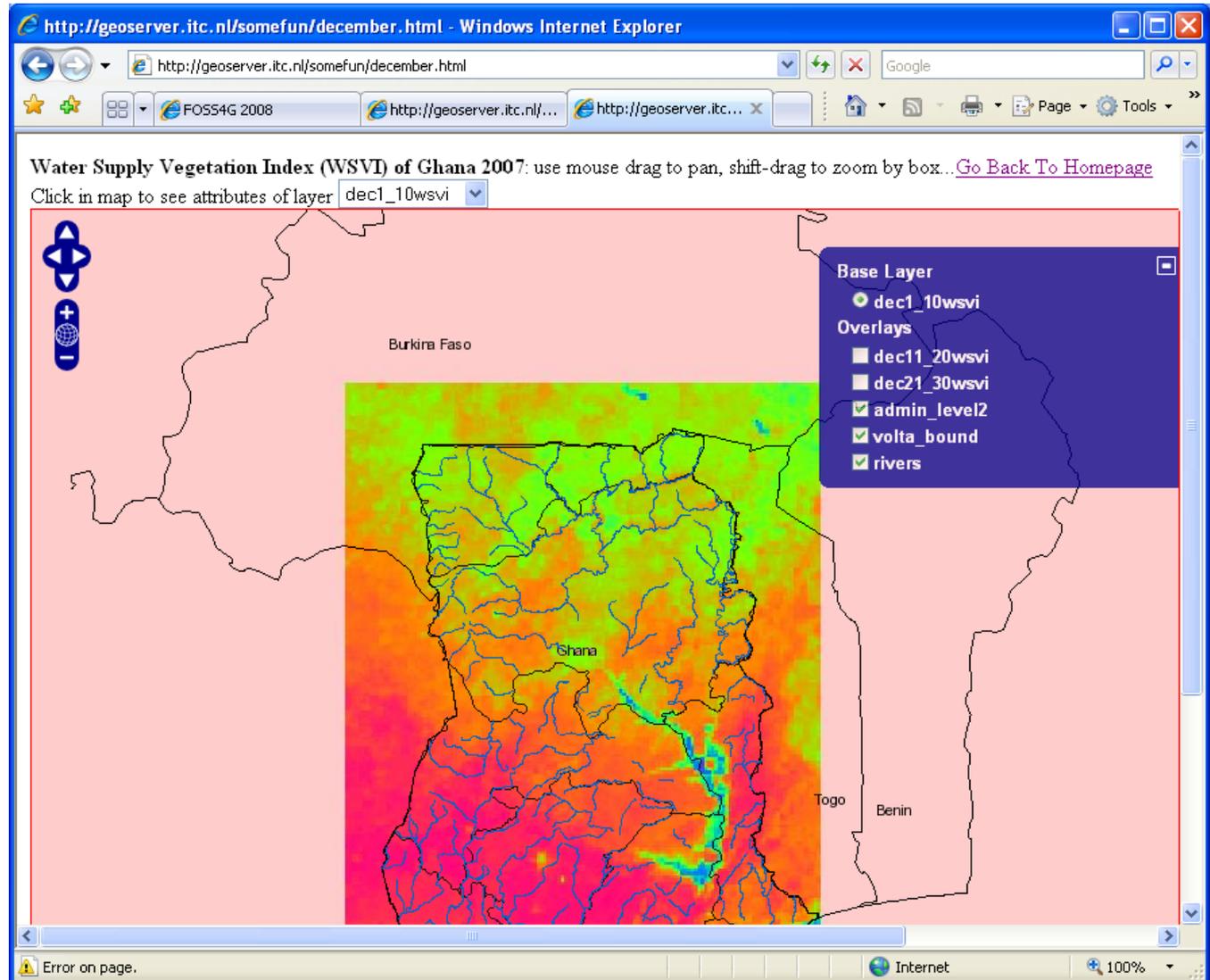
WSVI Maps for July 11 - 20, 2007



Water Runoff Volume Index for May 28, 2008

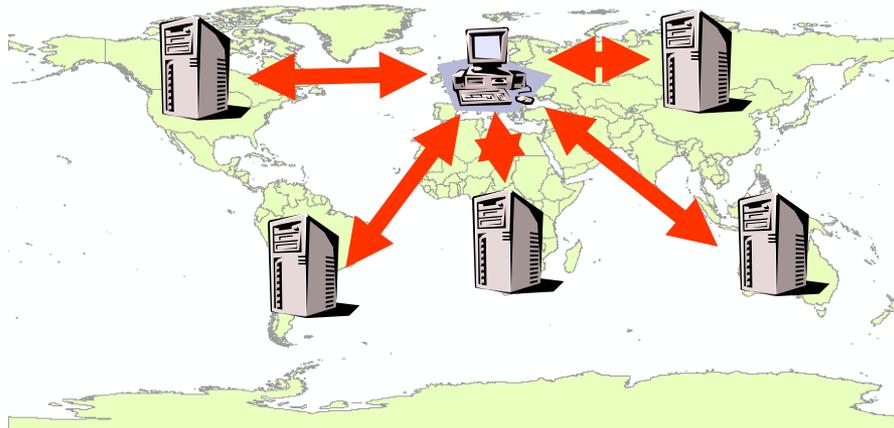


Display in other clients: OpenLayers



Outlook

- Integrated solution for instant data access and processing facility is a quick win for developing nations
- Issues in distributed processing
 - Interoperability
 - Service granularity
 - Smart storage in service chaining



See the demonstration in the Lab
“Using and extending ILWIS open source GIS
software together with GEONETCast services
for web-based satellite image analysis”

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<http://www.itc.nl>

<http://52north.org/ilwis>

