

Working on Data Resources for Disaster Response using Quantum GIS (QGIS)

Training on Geo-referenced Information System for Disaster Risk Management (Geo-DRM),
10-14 February 2014, Kathmandu, Nepal
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What is a GIS?

Information System



Geographic Position



GIS is a set of tools that allow for the processing of ***spatial data*** into ***information***.

An information system that is used to input, store, retrieve, manipulate, analyze and output geographically referenced data or geo-spatial data to support decision making for planning and management of land use, natural resources, environment, transportation, urban facilities, and other administrative records.

GIS links graphical features (entities) to tabular data (attributes)



Representing Geographic Features:

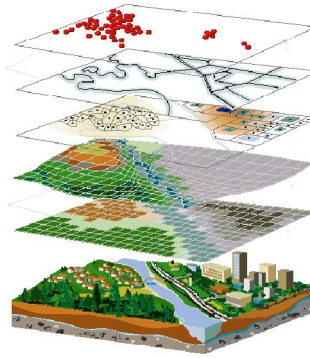
Describe geographical features:

- v By recognizing two types of data:

- Ø **Spatial data** which describes location (where)
- Ø **Attribute data** which specifies characteristics at that location (what, how much, and when)

Represent data in a GIS:

- v By grouping into **layers** based on similar characteristics (e.g hydrography, elevation, water lines, sewer lines, grocery sales) and using either:
 - Ø **vector** data model (coverage in ARC/INFO, *shapefile* in ArcView)
 - Ø **raster** data model (*GRID* or *Image* in ARC/INFO & ArcView)



Spatial Data Types

- Ø **Continuous:** elevation, rainfall, ocean salinity
- Ø **Areas:**
 - Ø **Unbounded:** landuse, market areas, soils, rock type
 - Ø **Bounded:** city/county/state boundaries, ownership parcels, zoning
 - Ø **Moving:** air masses, animal herds
- Ø **Networks:** roads, transmission lines, streams
- Ø **Points:**
 - Ø **Fixed:** wells, street lamps, addresses
 - Ø **Moving:** cars, fish, deer

Database Contents

Natural/Environment

- Ø Hydrography
- Ø Precipitation
- Ø Soil
- Ø Geology

Economic Activity

- Ø Telecommunication
- Ø Electrical Networks
- Ø Industry
- Ø Road Network

Political Jurisdictions

- Ø Political Boundaries
 - Capital City
 - States/Province
 - Countries

Human Geography

- Ø Population
- Ø Birth/Death
- Ø Diseases Density
- Ø Distribution

What questions GIS help

Network Routing

- Ø How to get there?
- Ø Is there a shortest path?
- Ø What happens if the road is closed?

Resources Inventory

- Ø How much do we have?
- Ø Where is it?
- Ø Who owns it?
- Ø Which is the most accessible?

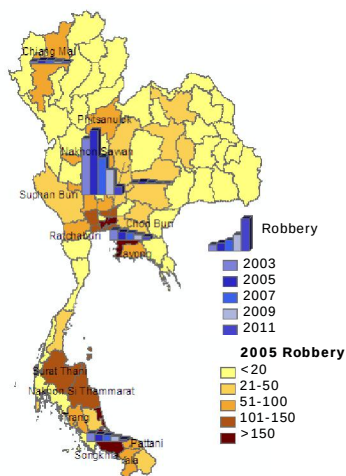
Monitoring

- Ø Which stage it has been changed?
- Ø Which areas will be affected if ...?
- Ø What needs replacing and where?

Planning

- Ø Who is where and at what status?
- Ø Where should the services be improved?
- Ø What are the best solutions?
- Ø Where should the facility be developed?

Crimes



Variables might be considered

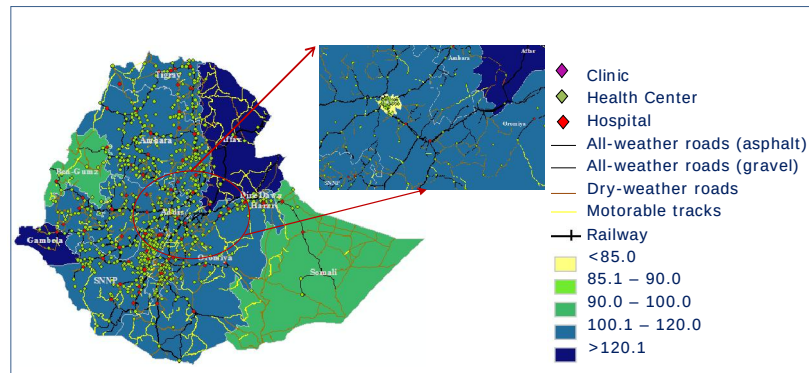
- v Income
- v Age-group
- v Poverty
- v Unemployment/Underemployment

Assist in the allocation of
resources and heighten police
presence in selected areas.

Communities Prone to Violent Crime

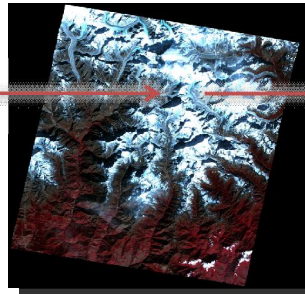
Measure of Poverty

Measure of Poverty



Infant Mortality Rate (per 1000 live births)

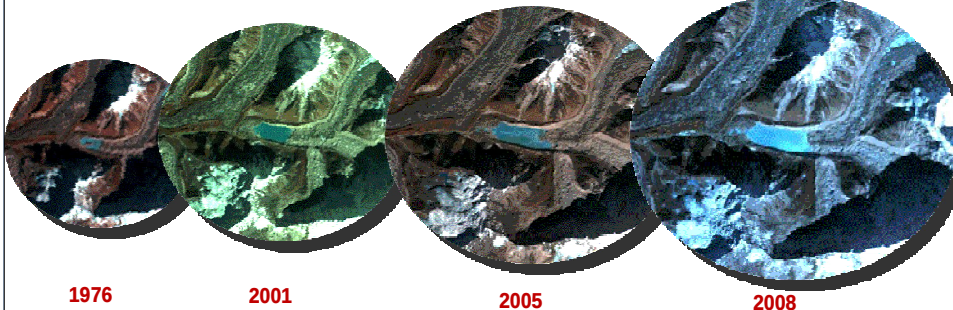
Detect Changes



ASTER Image

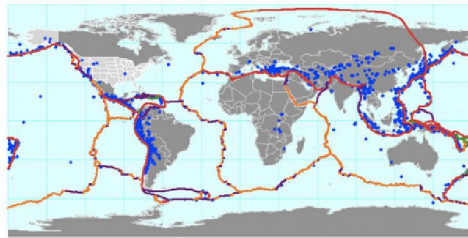
Date: January, 2008

Resolution: 15 meters



Earthquake

- Ø Earthquake ground shaking varies from place to place
- Ø The hazard depends on the magnitudes and locations of likely earthquakes, how often they occur, and the properties of the rocks and sediments that earthquake waves travel through.
- Ø The mapped hazard refers to an estimate of the probability of exceeding a certain amount of ground shaking, or ground motion, in 50 years.



Source: ESRI (Arc Explorer)

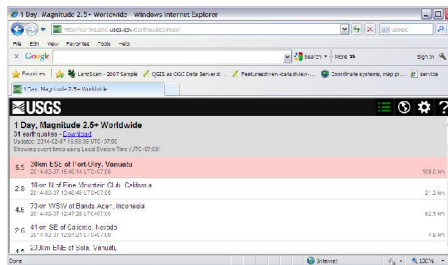
Plate Boundaries and 2006 earthquakes of magnitude greater than or equal 7

Data Preparation

- v US Geological Survey (USGS)
 - Ø M4.5+ Earthquake Locations
 - Ø HAZUS Zip File
- v Cloud Made (OSM)
 - Ø Shapefiles (i.e., highway, POI (school, hospital))
- v Earth Observation Imagery
 - Ø Landsat Images
 - Ø High Resolution Image (i.e., Quickbird)

Data Resources - USGS

- v US Geological Survey (USGS) provides earthquake worldwide events.
- v Information will be updated every 30 mins. through the website <http://earthquake.usgs.gov/>



Magnitude	Location	Time
5.5	Offshore ESE of Vanuatu, Vanuatu	2010-02-27 04:42:14 UTC-11:00
2.6	Offshore ESE of Vanuatu, Vanuatu	2010-02-27 04:42:14 UTC-11:00
2.6	Offshore ESE of Vanuatu, Vanuatu	2010-02-27 04:42:14 UTC-11:00
4.6	Offshore ESE of Vanuatu, Vanuatu	2010-02-27 04:42:14 UTC-11:00
2.6	Offshore ESE of Vanuatu, Vanuatu	2010-02-27 04:42:14 UTC-11:00

Available format:

KML (Keyhole Markup Language) – Allow to select which magnitude to display, Able to view in Google

GeoJSON – A format for encoding a variety of geographic data structure

CSV (Comma Separated Values) – Able to create location using lat/lon using QGIS



Data Resources – USGS (Continued)

v Getting Earthquake Locations

- Ø Go to <http://earthquake.usgs.gov/earthquakes/map/>
- Ø Data & Products > Real-time Data Feeds > Format > Spreadsheets > M4.5+ Earthquake > Save
- Ø Open to look at the data in excel sheet

We will use in QGIS Hands-on Session



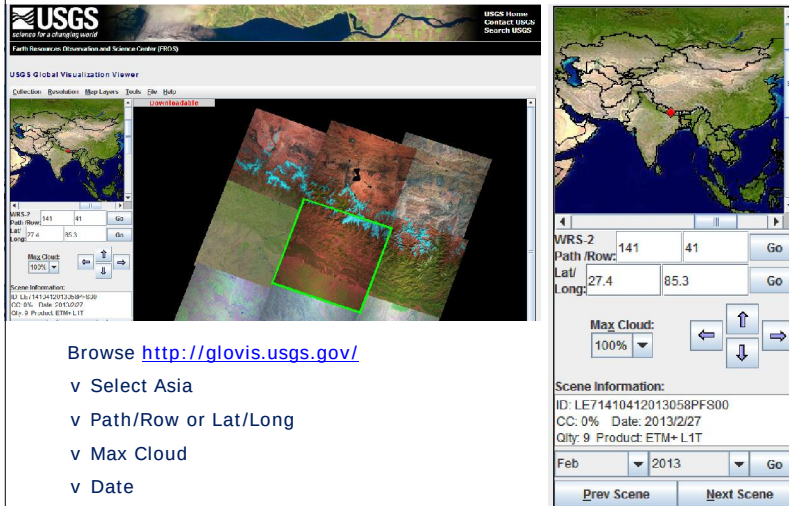
v In September 2011, Earthquake at Magnitude 6.9, Depth 20 km occurred in India-Nepal Border Region, USGS provide hazard map.



Cloudmades è The files provided on these pages are created from OpenStreetMap map data. OpenStreetMap is a work in progress many of the countries are only partially mapped or are incomplete. The data contained on these pages has not been checked or verified.



Data Resources – Landsat

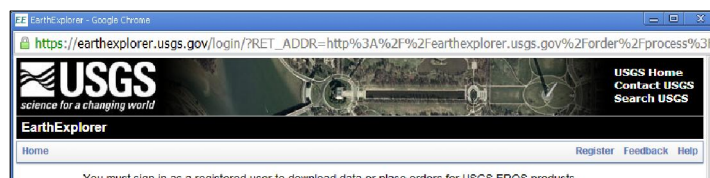


Browse <http://glovis.usgs.gov/>

- v Select Asia
- v Path/Row or Lat/Long
- v Max Cloud
- v Date

Once selected the scene > Click Add > Send to Cart

Data Resources – Landsat



预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_5635

