GEOSUR PROGRAM

Workshop on Introduction to the Use of the GeoSUR Geoservices





Buenos Aires, August 27th - 28th, 2009

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Andean Development Corporation (Corporación Andina de Fomento – CAF, in Spanish)

Some logistics data

- The organizers
- Schedule:
  - It starts: 9:30 a.m. It ends: 6:30 p.m.
  - Lunch: 12:30 p.m. to 2:00 p.m.
  - Refreshments: 11:00 a.m. and 3:30 p.m.
- Instructors: Eric van Praag, Jesús Suniaga.
- Dynamics of the course

Objectives of the Workshop

- To learn about the basic functionalities that the geographic information services offer for the territorial planning and zoning.
- To acquire the basic skills that are necessary to have access to and use maps and geographic data in the Internet.
- To acquire the basic skills that are necessary to use the geoservices developed by GeoSUR in the planning of the IIRSA projects.

Agenda

Thursday

- Introduction to the GeoSUR Program
- Introduction to the SIGs
- Regional Map Service

Friday

- GeoSUR Site
- Relief map service
- Consultation of geographic data in the Internet
- Assessment / Feedback

Introduction to the Geographic Information Systems (Sistemas de Información Geográfica or SIGs, in Spanish)

Some interesting data

- The global geospatial market is appraised in US$ 3.6 billions in 2006.
- The development of the USA geosite cost US$ 2.4 billions.
- The value of the SIG market in Brazil is US$ 150 billions. 3000 specialists work on it.
- INSPIRE estimates that the implementation of a WMS costs 200,000 euros and a geospatial catalogue (when there is metadata) costs 150,000 euros.

Ancestors of the online SIGs

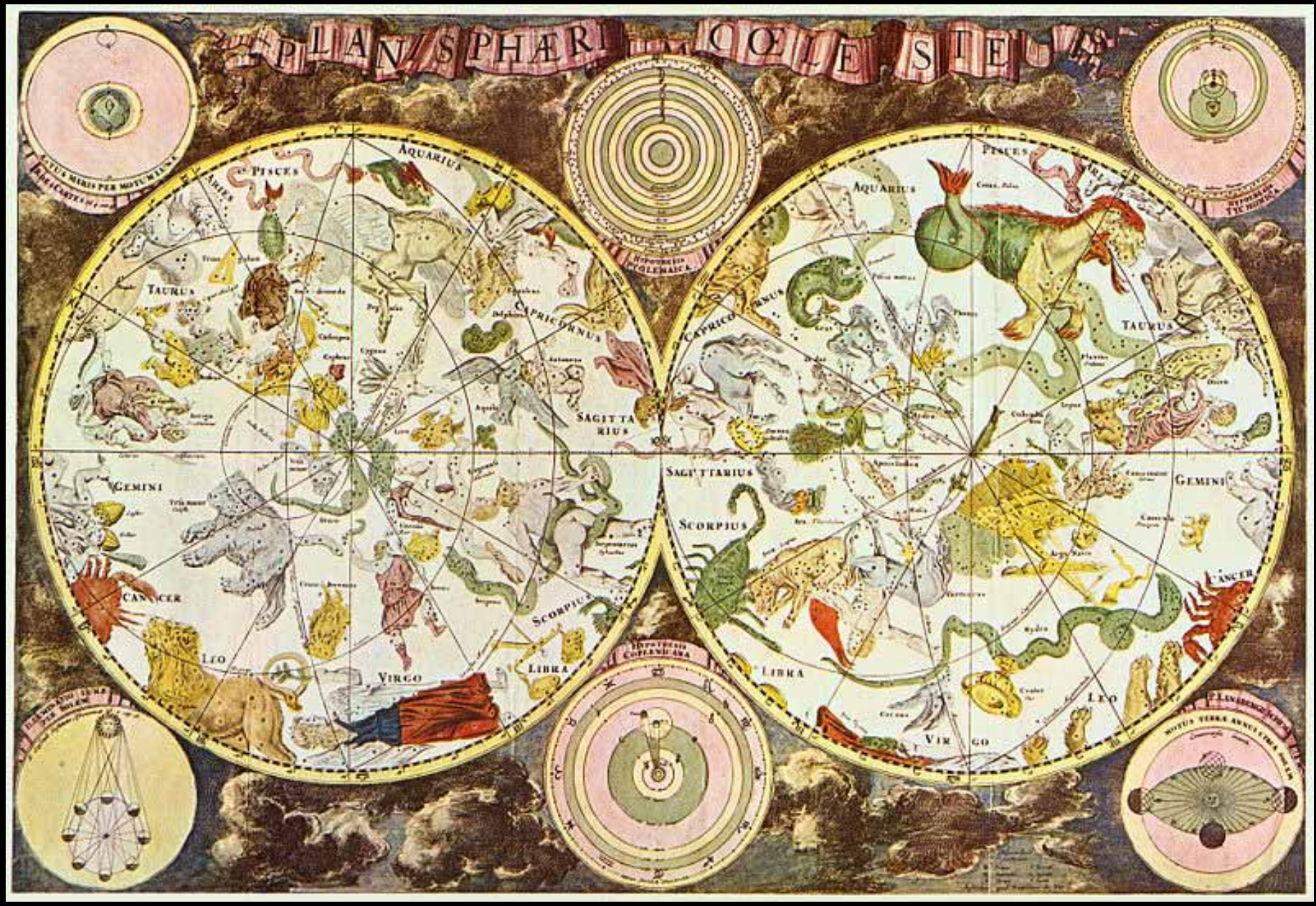
- The first maps are attributed to the Sumerians.
- 100 BC: the Greeks developed geometry.
- 1300 AC: Expansion of the known world with the Renaissance
- 1680 AC: Positivism, concern with positional precision
- 1800 AC: Thematic maps appear
- 1950: Cartographic modeling
- 1962: Geographic information systems
- 1990s: Online maps/IDEs

The oldest map.

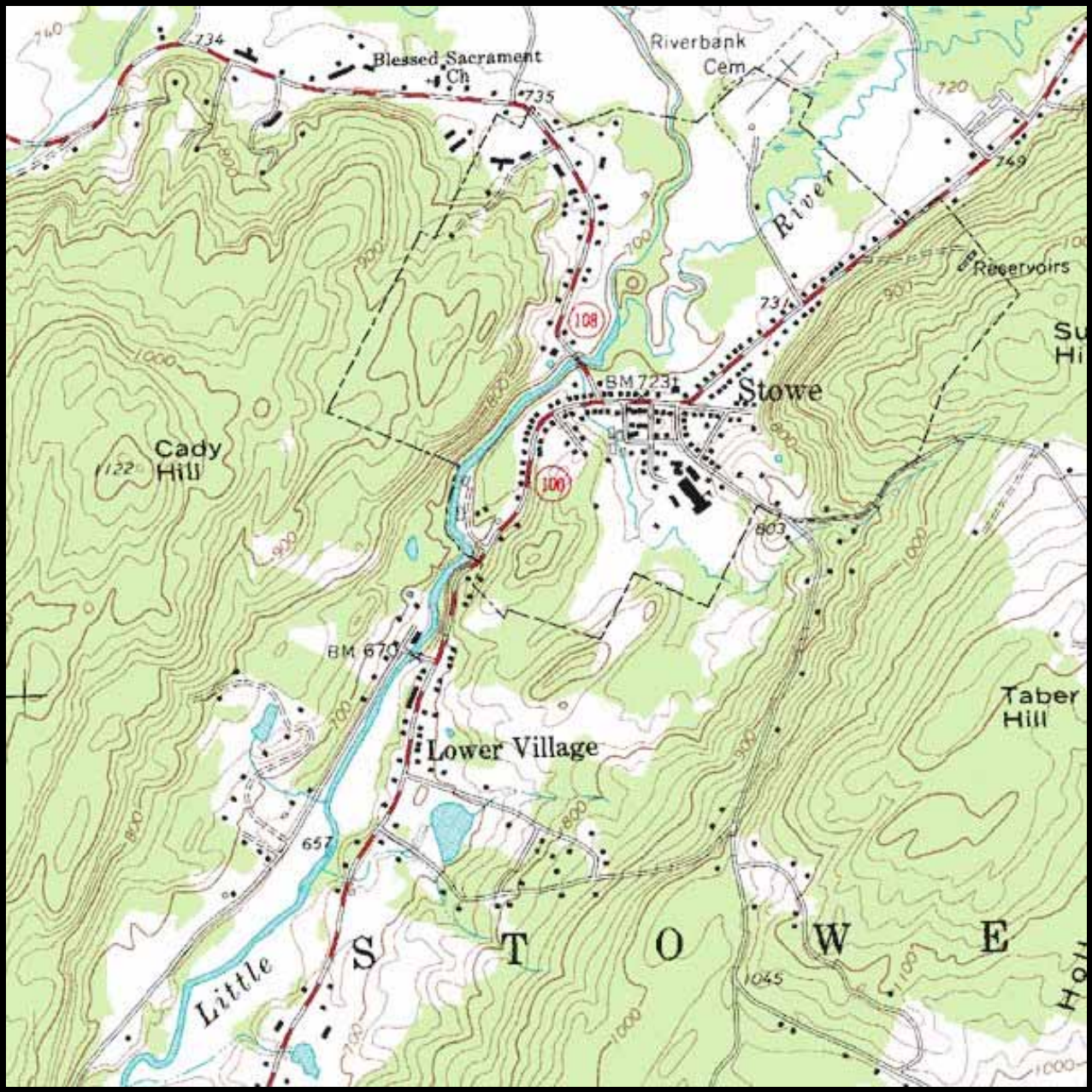
Map of Babylon.

6th century.

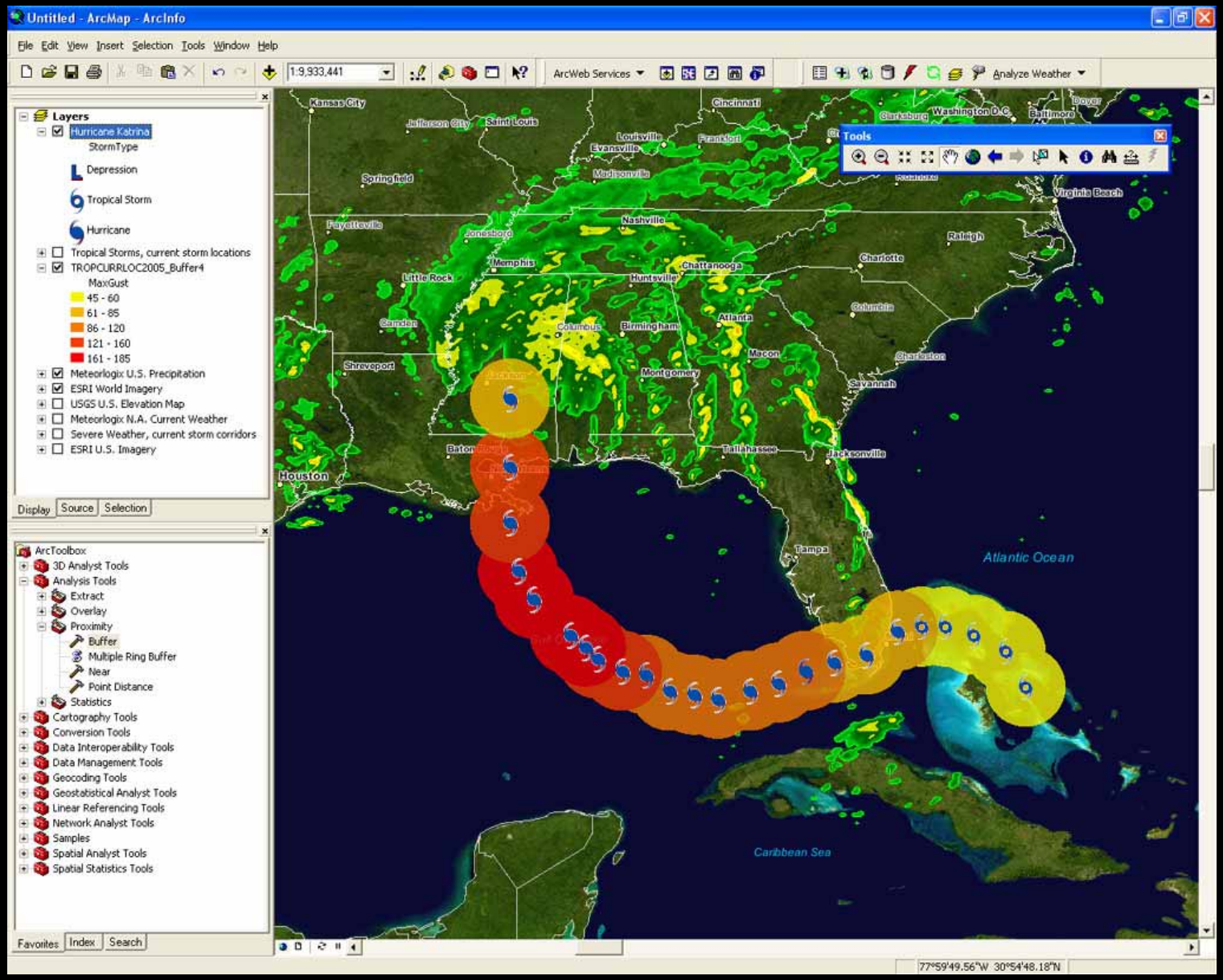
World Map.
13th century.



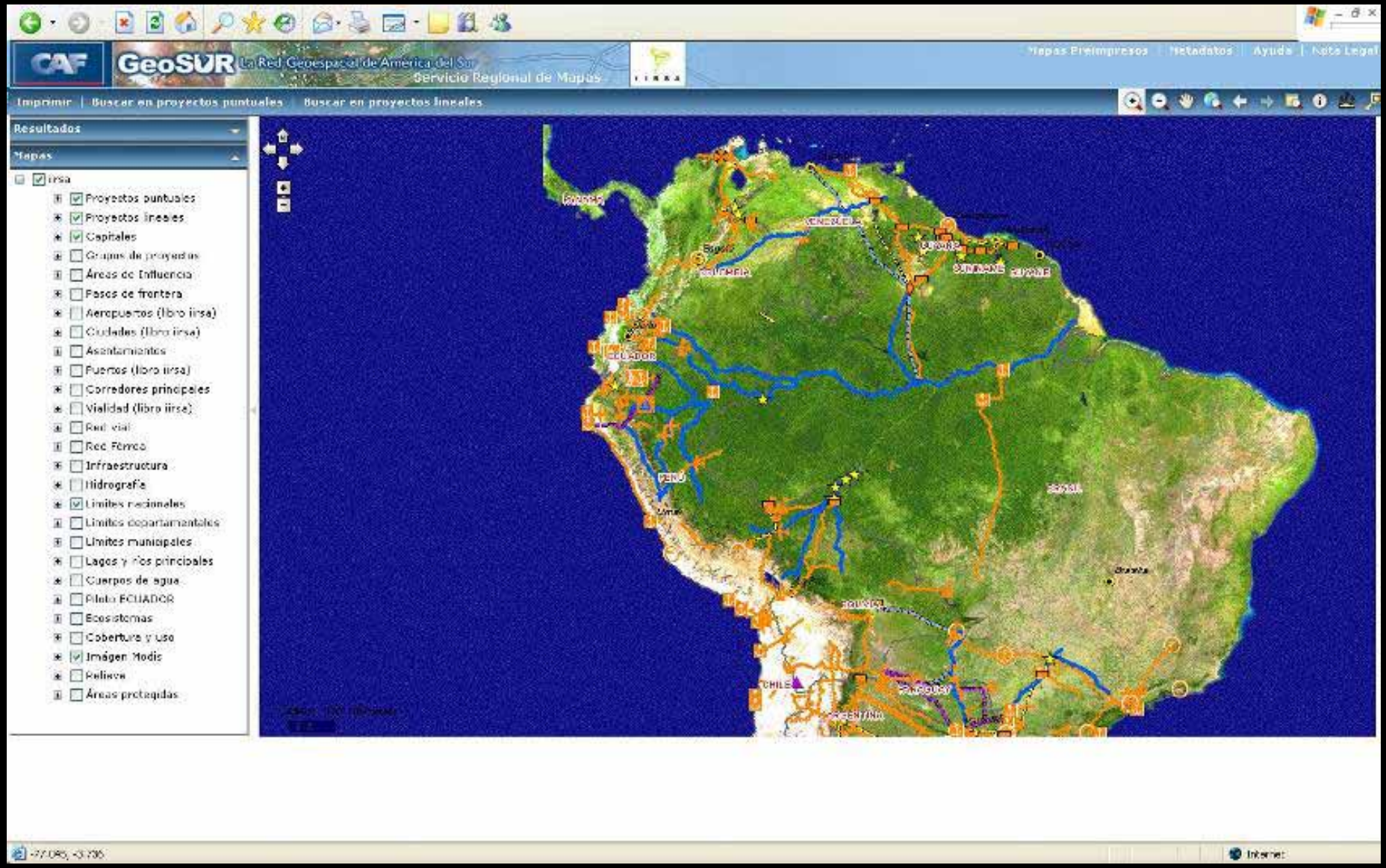
Celestial chart. 17th century



USA map. USGS. 1960



Geographic Information Systems. 1962. Canada



Online maps. Decade of 1990.

What does a map say?

- Where is it?
- What is it?
- When does it happen? (sometimes)
- What is near, far, in which direction? How can I get there?
- What other things are there, too?
- How do they relate among themselves?

Introduction to the Regional Map Service (Servicio Regional de Mapas or SRM, in Spanish) of the GeoSUR Program

What is a Map Service?

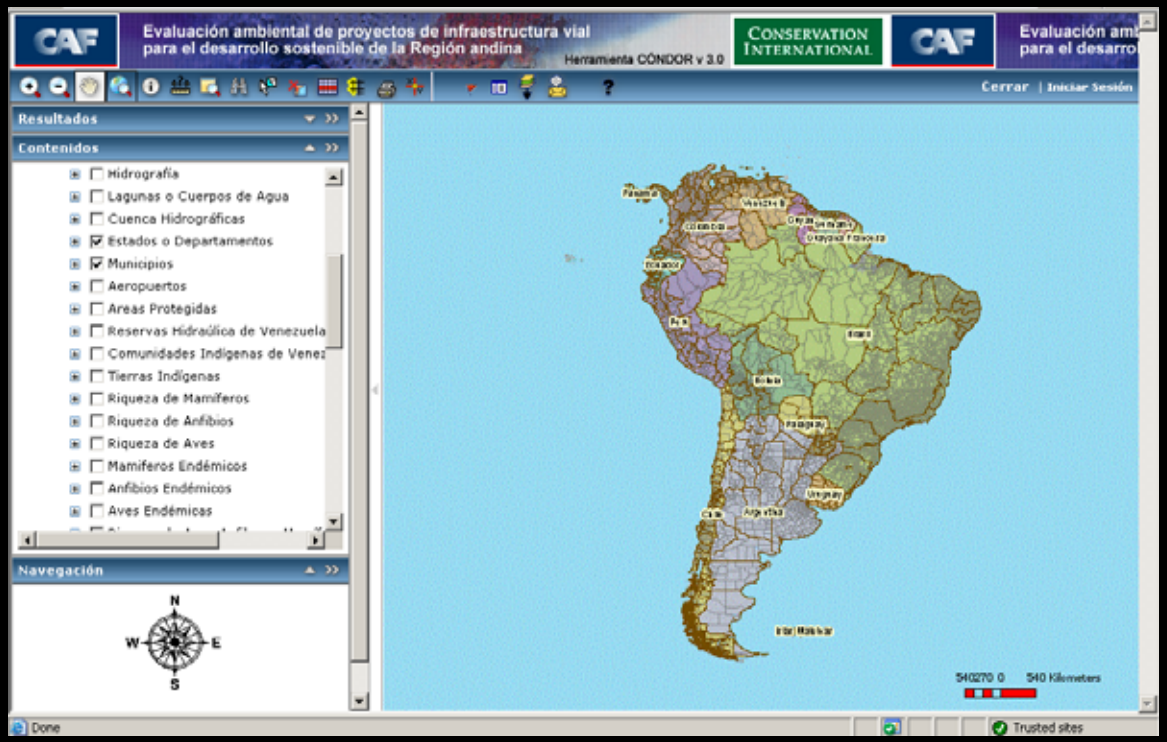
A map service is a SIG that is available in the Internet and that is open for the public. In order to use a map service it is not necessary to have a specialized SW. In general, this type of service offers less functionality than a desktop SIG.

Each institution participating in GeoSUR is committed to implement its own map service.

The map services may be created using a free SW or a commercial one. Sophisticated services allow the running of models or the performance of analysis (relief geoservice).

Cóndor v3.0

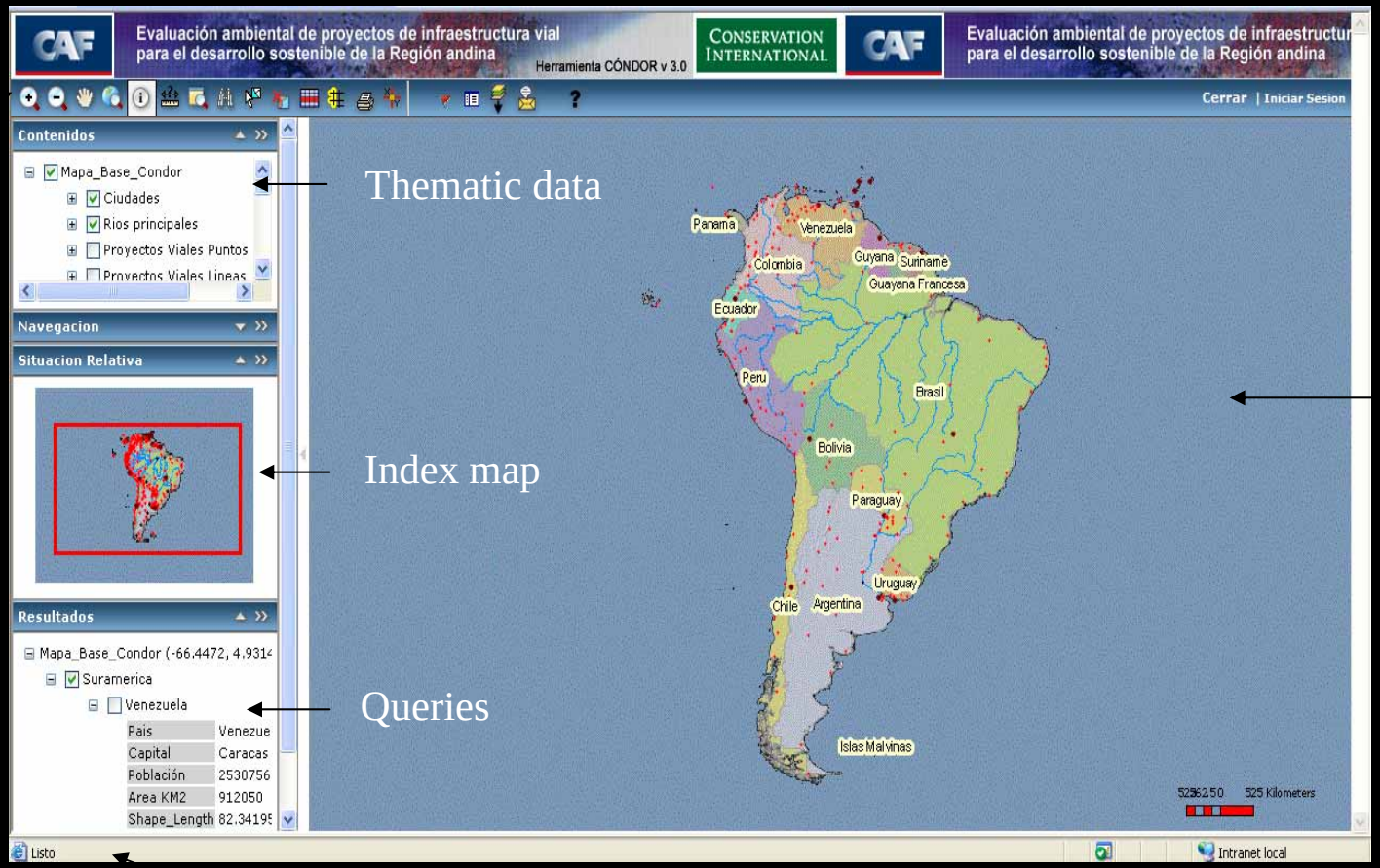
It is a Geographic Information System designed to visualize the road projects approved by the governments in the Andean region.



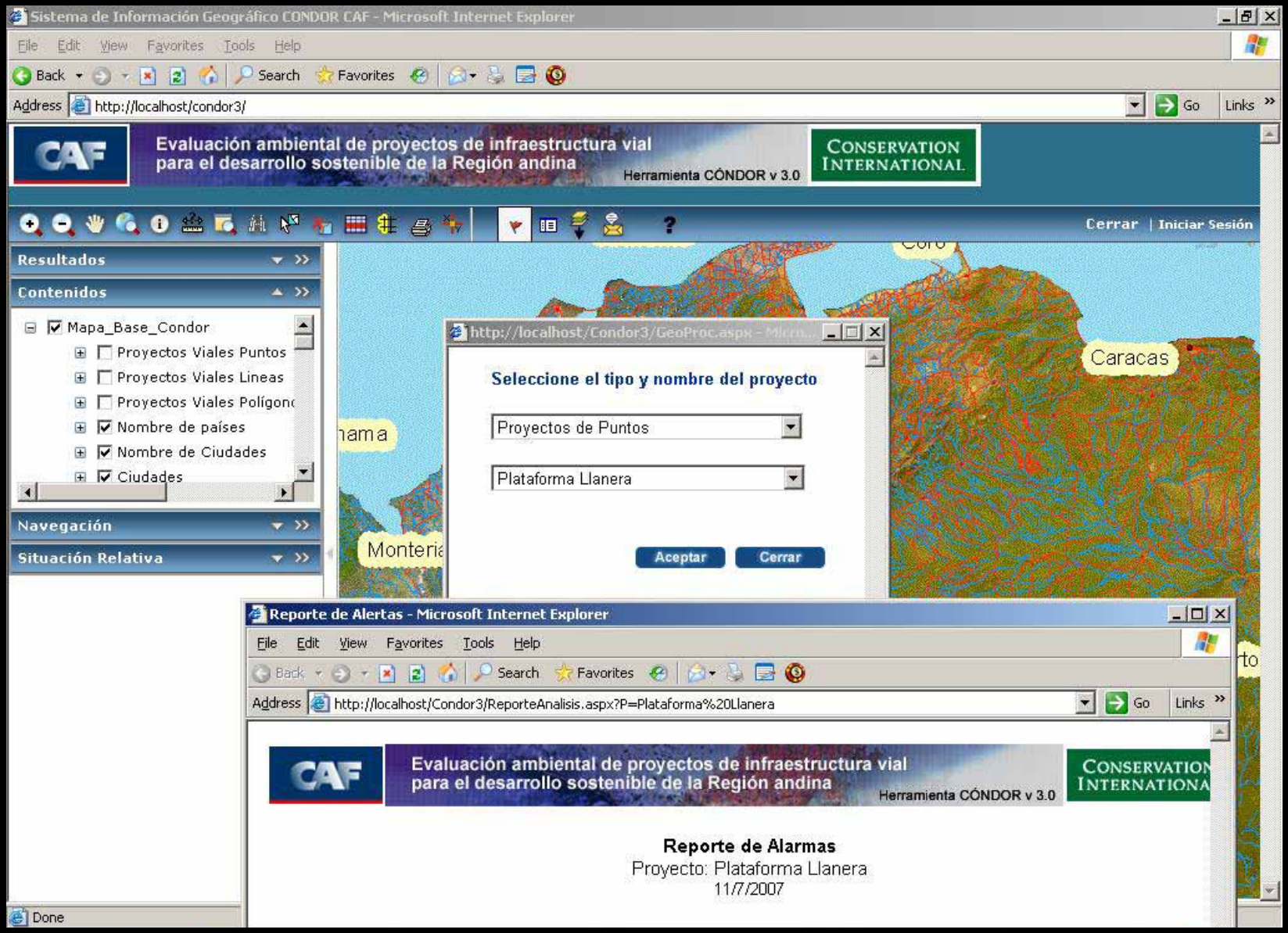
It allows to make decisions, as an early alert process, in relation to the road impact on sensitive areas such as: Natural Protected Areas, Indigenous Territories or areas of interest.

Technological Platform

- Basic view of Cóndor v3.0 in a standard web page.



Report on Alert Analysis



Relation between Cóndor and the SRM of GeoSUR

- Both operate in the same platform: ArcGIS Server 9.3 and both will be located in the same physical server by the end of 2009.
- Cóndor is a specialized node of the map service network related to the GeoSUR Program.
- Spatial data provided by Cóndor and by SRM may be consulted from the display of the GeoSUR Geosite.

GeoSUR Network: Geographic Vision

GeoSUR Geosite

GeoSUR SRM

South America

Cóndor

Andean Region

IGVSB

IGAC

IGM Ecuador

MMA Brazil

IBGE

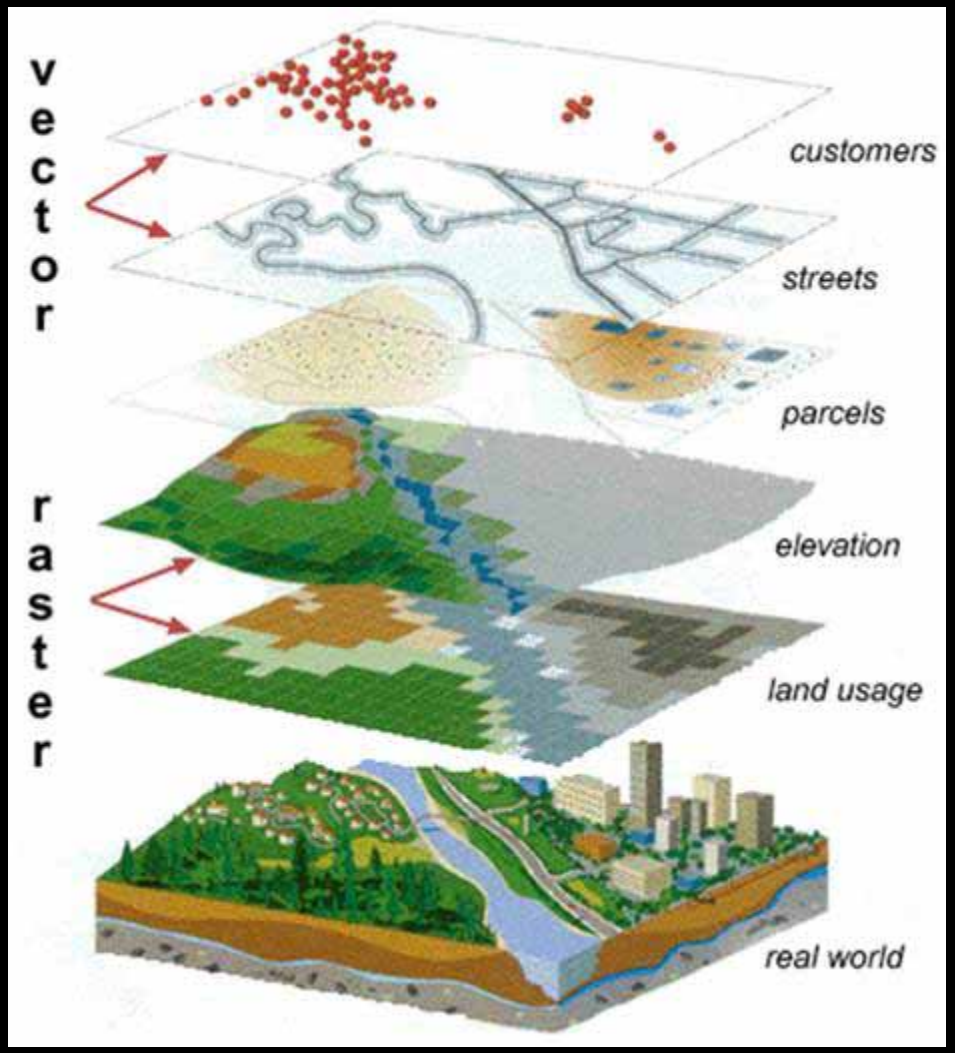
IGM Bolivia

SGM Uruguay

IGM Argentina

IGM Chile

GeoSUR SRM: A SIG in Internet



Information provided by the GeoSUR Map Service

In a map geoserver, any type of georeferenced spatial information can be displayed:

- Topographical sheets
- Digital elevation models
- Use/coverage
- Populated centers
- Feasibility
- Integration Infrastructure Projects (IIRSA)
- Hydrography / bodies of water
- Risk maps
- Ecosystems
- Protected areas
- Climate
- Satellite images
- Orthophotomaps
- Documents related to projects and territories

GeoSUR Regional Map Service

- Online system (SIG, in Spanish) that allows to select, visualize and look for information gathered by the CAF
- It has 40 regional maps and 65 pre-printed maps of IIRSA projects.
- It has IIRSA digital maps of: roads, populated centers, ports, airports and projects.
- Automatic link to the IIRSA Project Database
- It operates with the same Cóndor system.

Introduction to Geosites

What is a Geosite?

A geosite is a specialized type of site in Internet that allows to locate and consult spatial data. In general, it has two elements: a metadata database and a map display.

The metadata are files that contain information on spatial data. The map display allows to consult the digital maps related to each of the metadata or files.

What is a metadata?

A metadata is a simple file that describes a spatial data. In general, it contains information on the following aspects of the data:

- Title
- Creator
- Creation date
- Description of the content
- Source data used for its creation
- Copyright
- Availability and ways of getting it
- Price
- Etc.

Each spatial data available from de Geosite must have its associated metadata. Metadata are generated by the institutions that create spatial data.

Experiences in Latin America

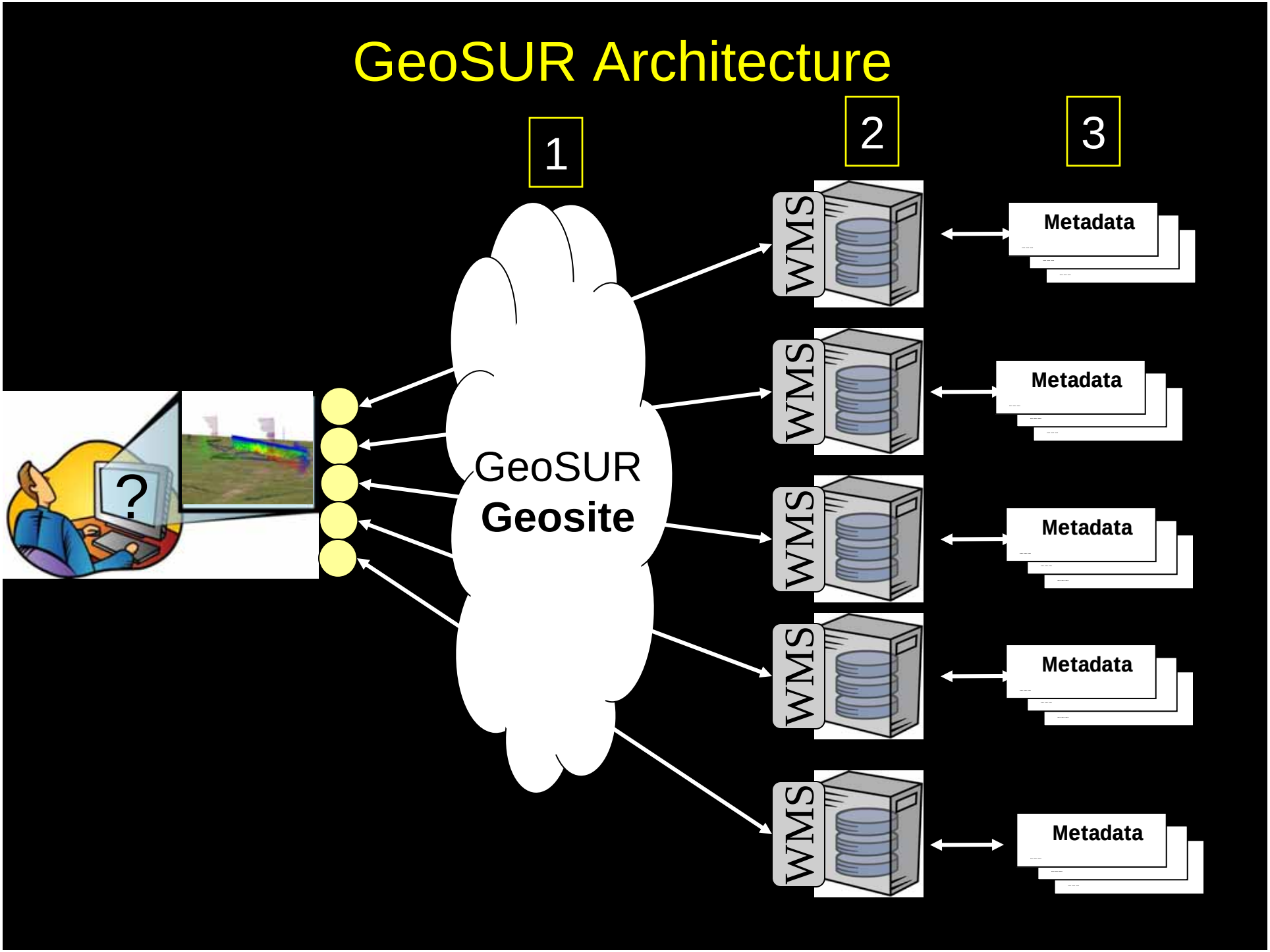
ICDE Colombia

SIAPAD / CAN

SNIT Chile

IABIN

GeoSUR Architecture



The GeoSUR GeoSite

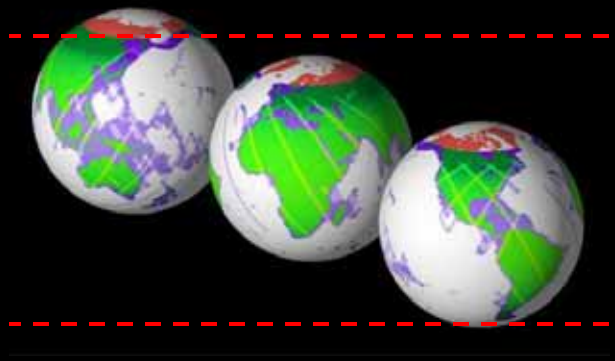
- It is jointly managed by the CAF and the IPGH.
- It will be located in a CAF server.
- It was developed with GIS Portal Toolkit.
- It currently offers access to 12 map services of participating institutions.
- The connections to metadata catalogues of participating institutions are being periodically updated.

Introduction to the Regional Relief Map Service and SRTM Data

SRTM derived data

Shuttle Radar Topography Mission:

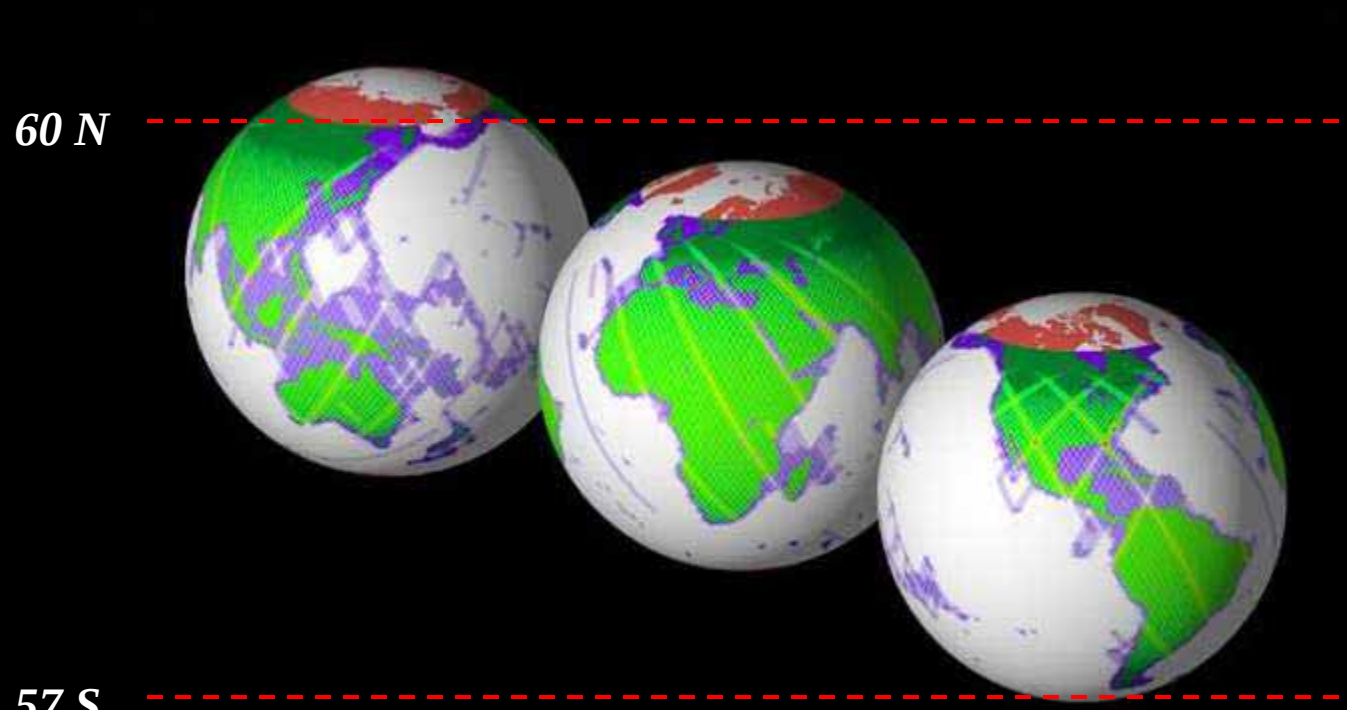
- Elevation data for the 80% of the Earth were performed.
- The USGS has gathered data for South America.
- The GeoSUR Program supports the creation of derived data.



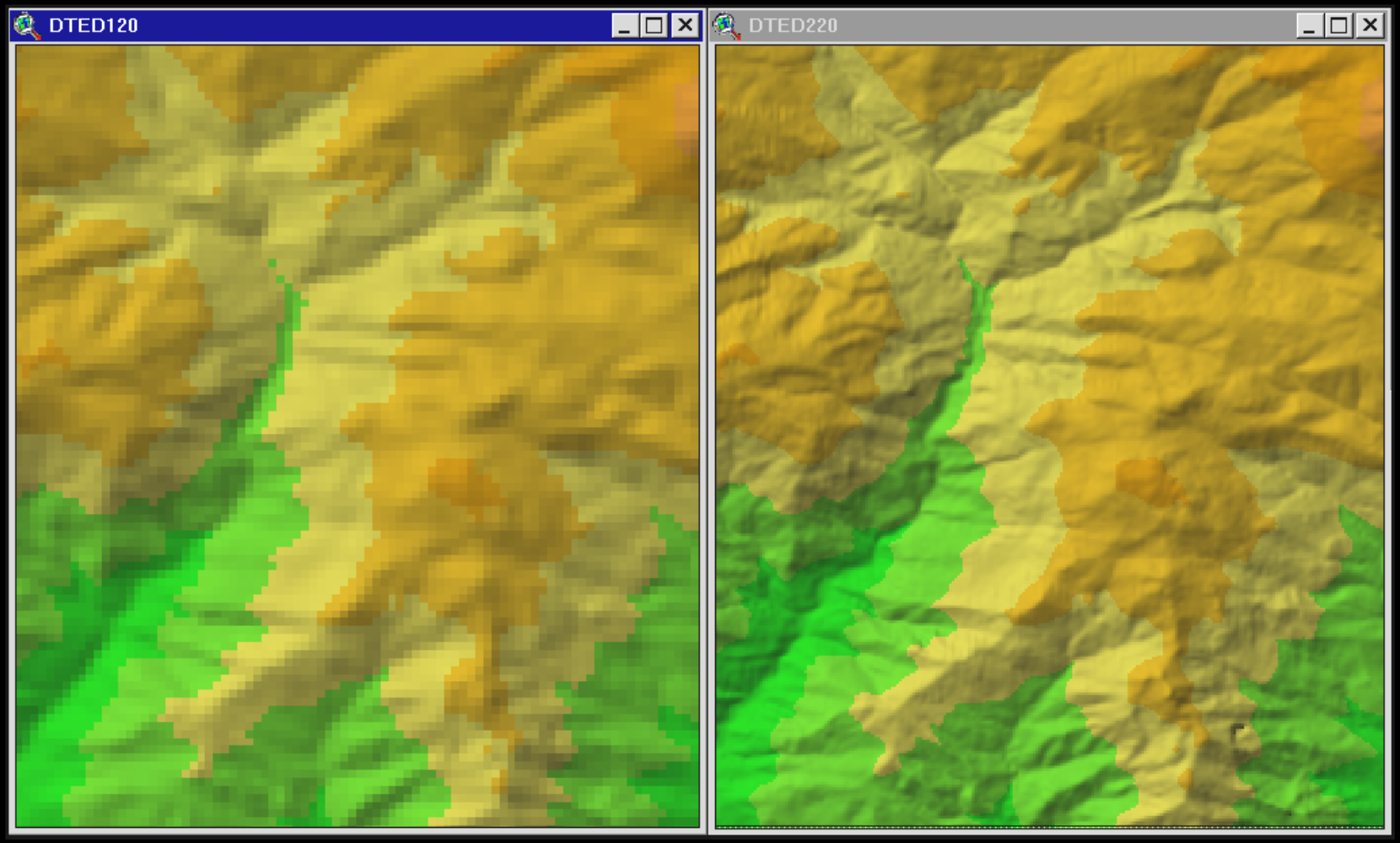
DERIVED DATA

- Relief digital map (hill shade).
- Basin digital map.
- Sub-basin digital map.
- Hydrographic map (stream).
- Aspect map.
- Slope map.
- Hydric accumulation map.
- Flow direction map.
- Pour points map.

Coverage



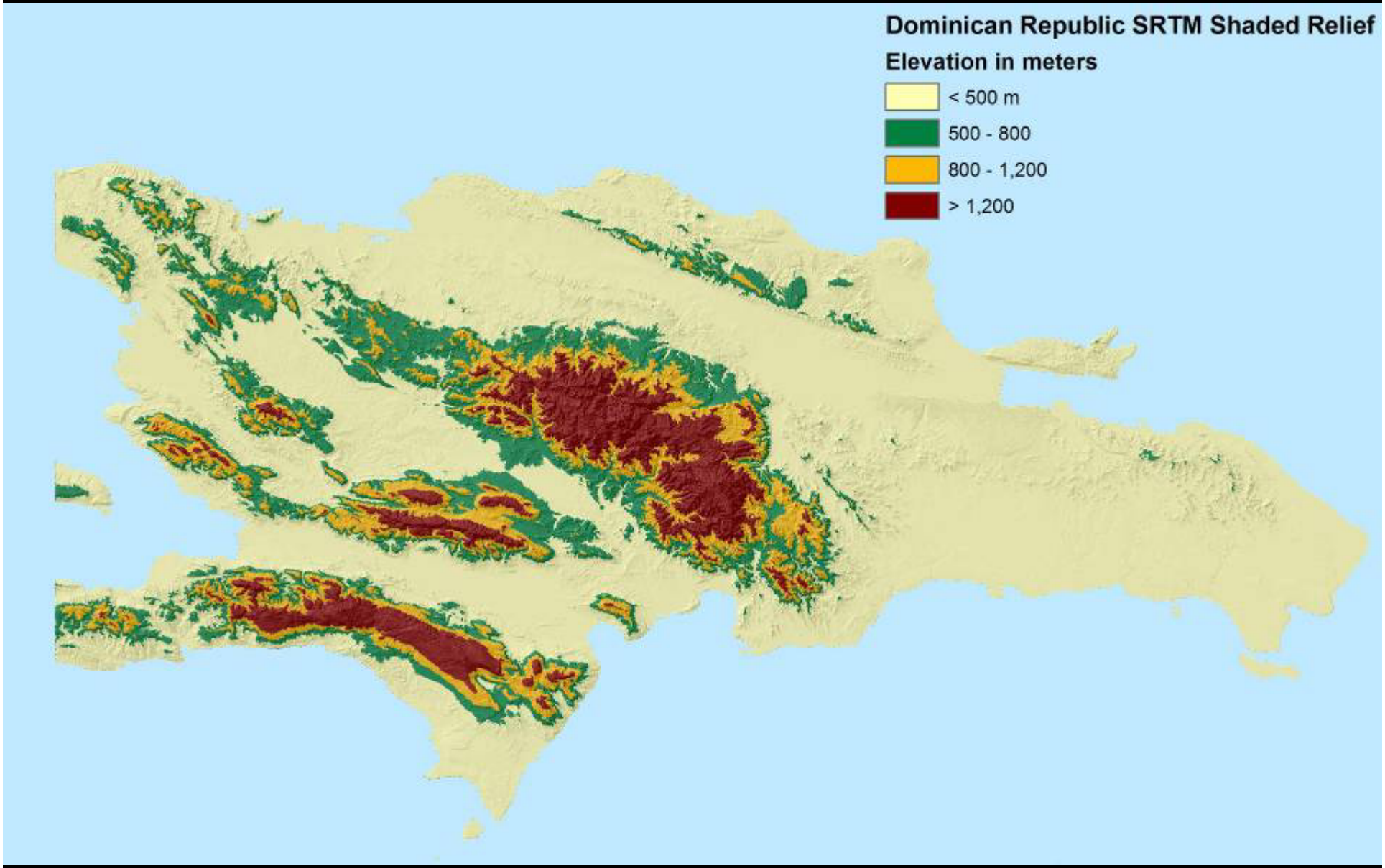
Courtesy of the NGA



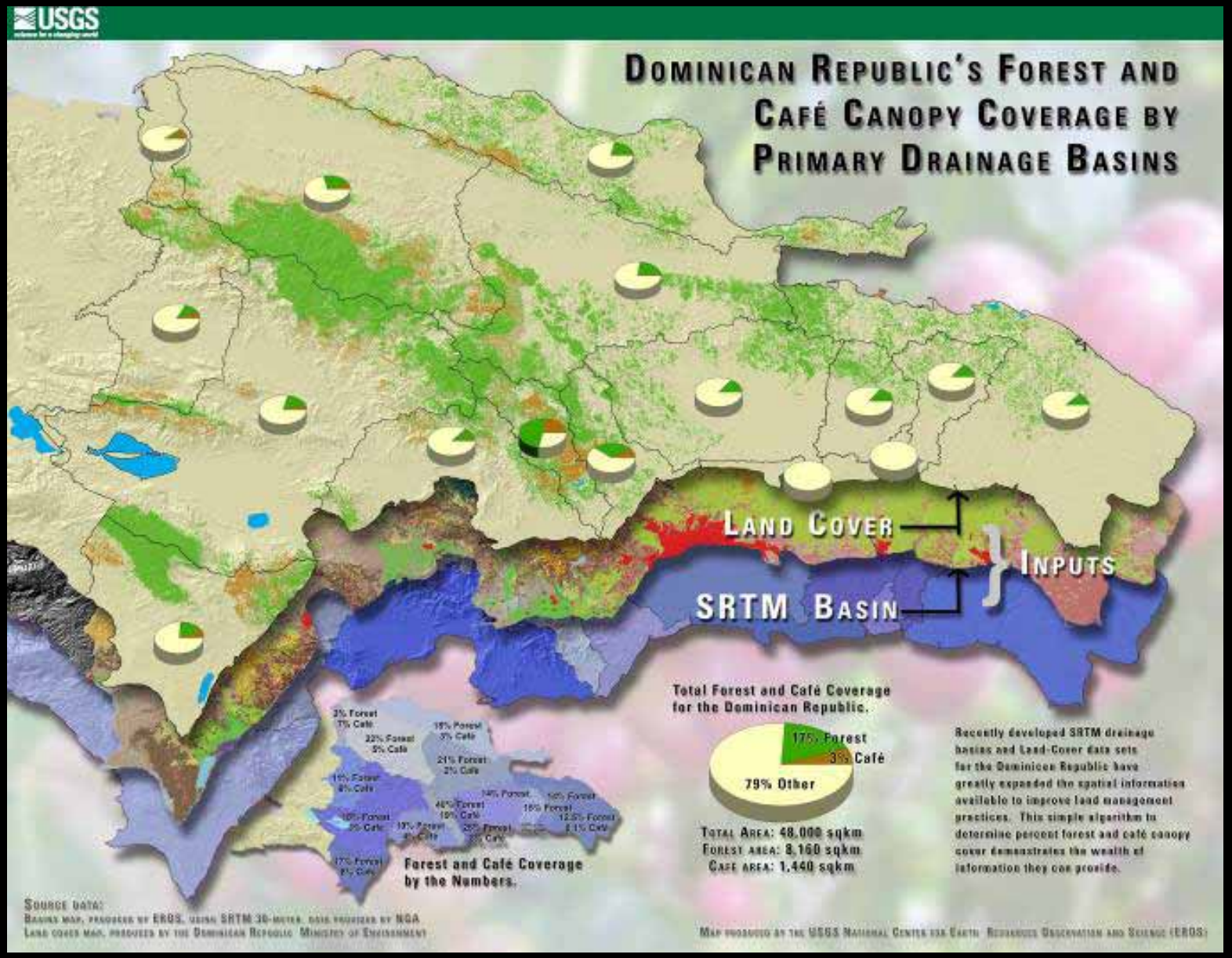
Adapted to the material of the NGA

Comparison between SRTM data: 30 and 90 meters

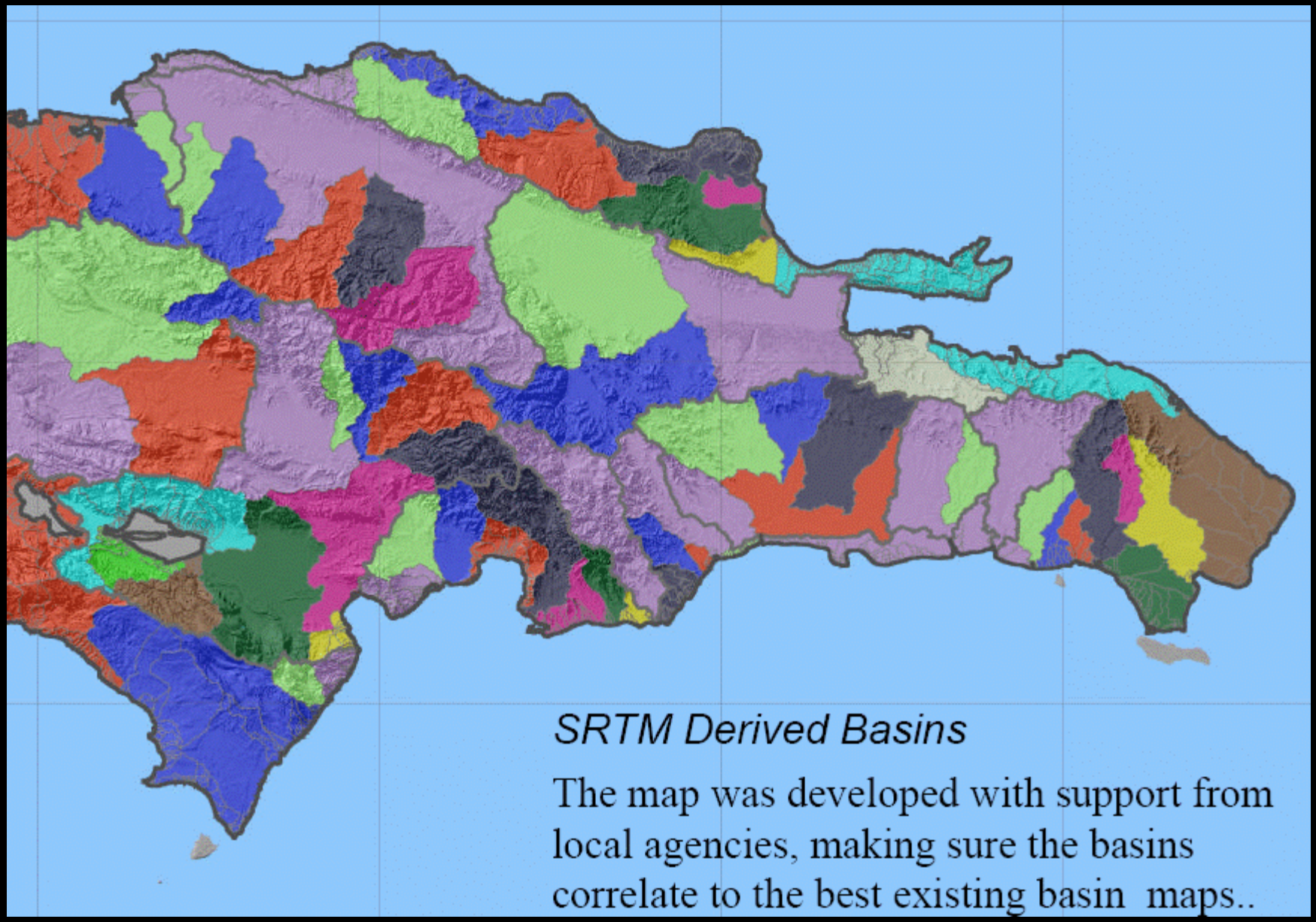
Outline and coffee map: Dominican Republic



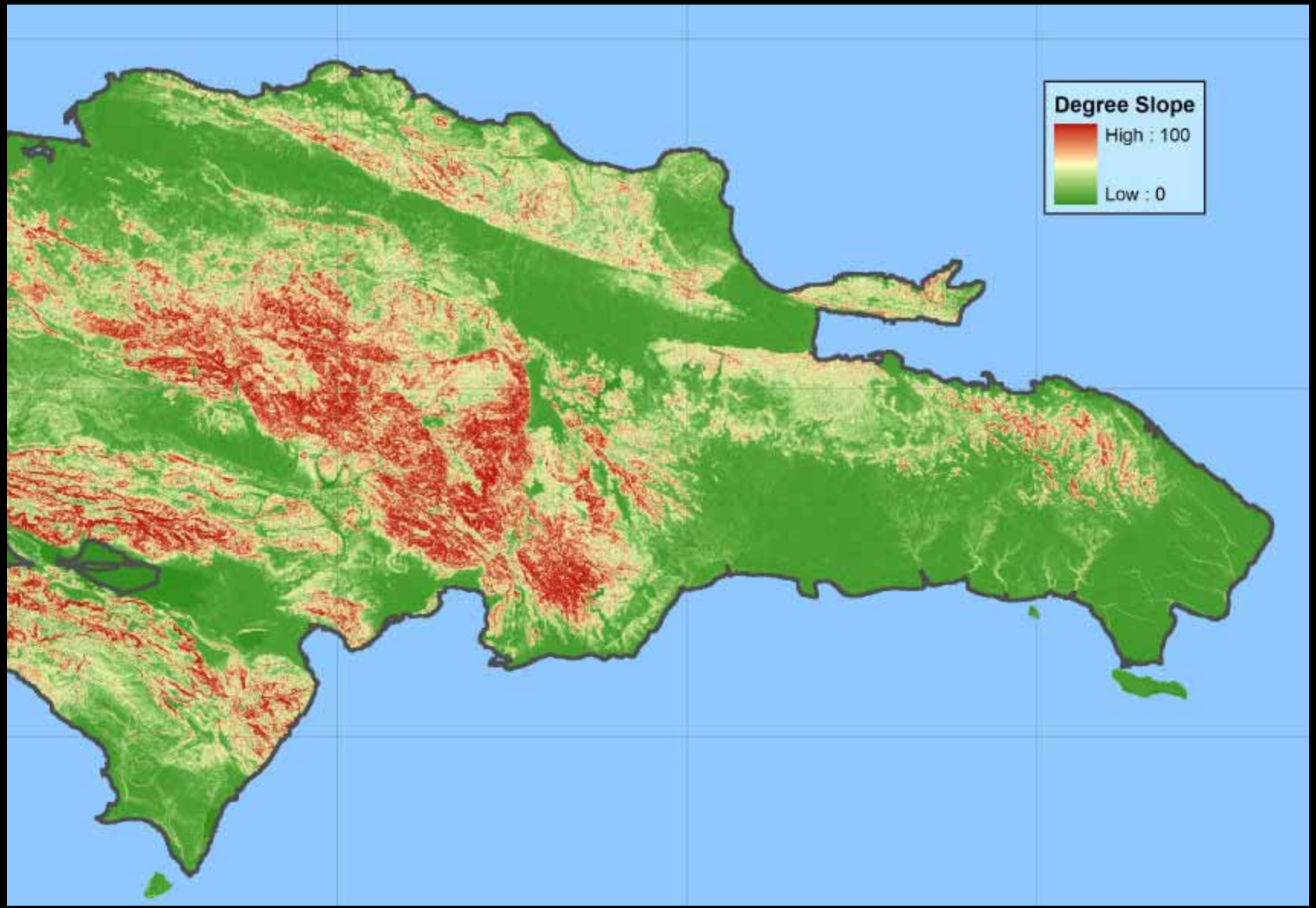
Estimation of Environmental Services



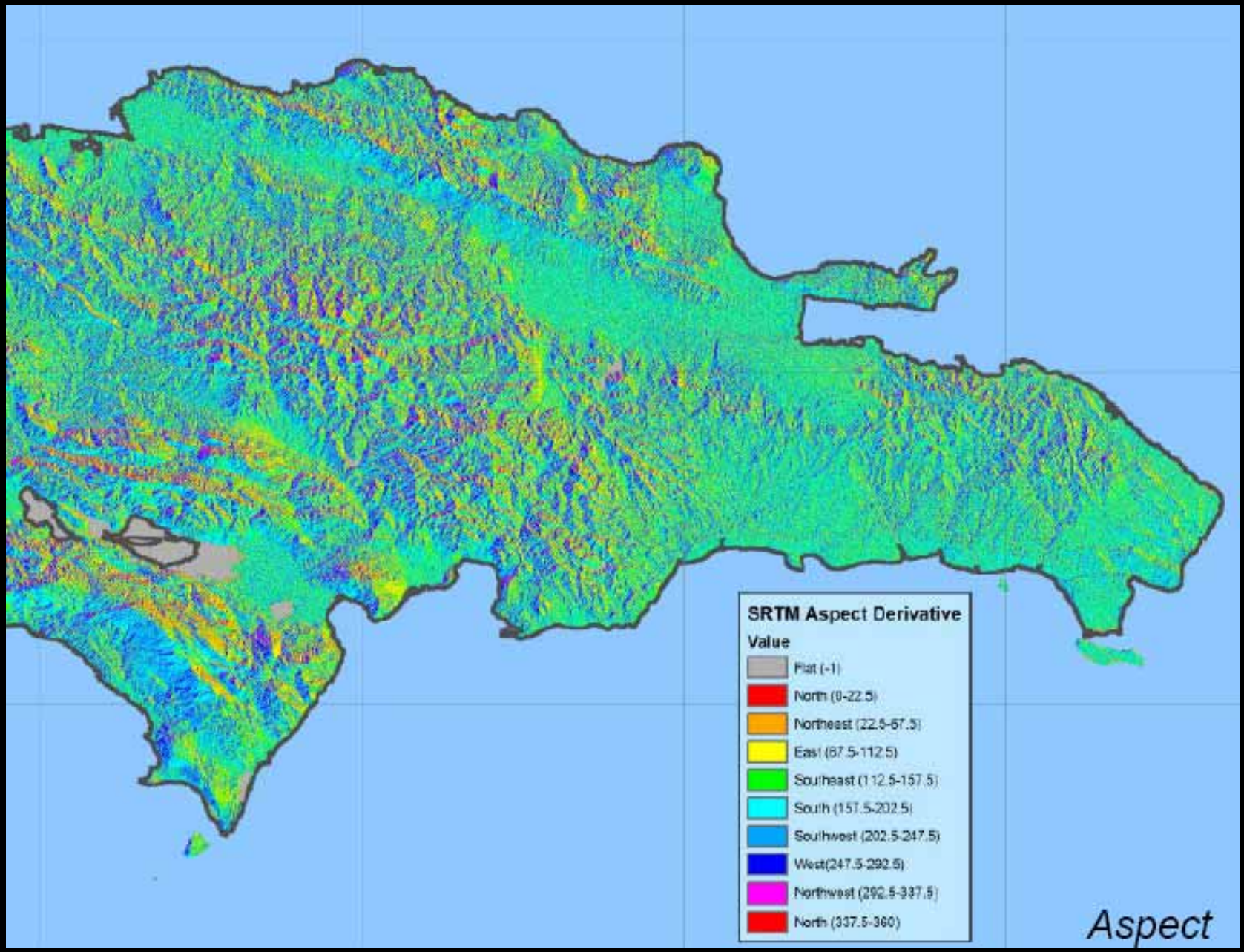
Basin map: Dominican Republic



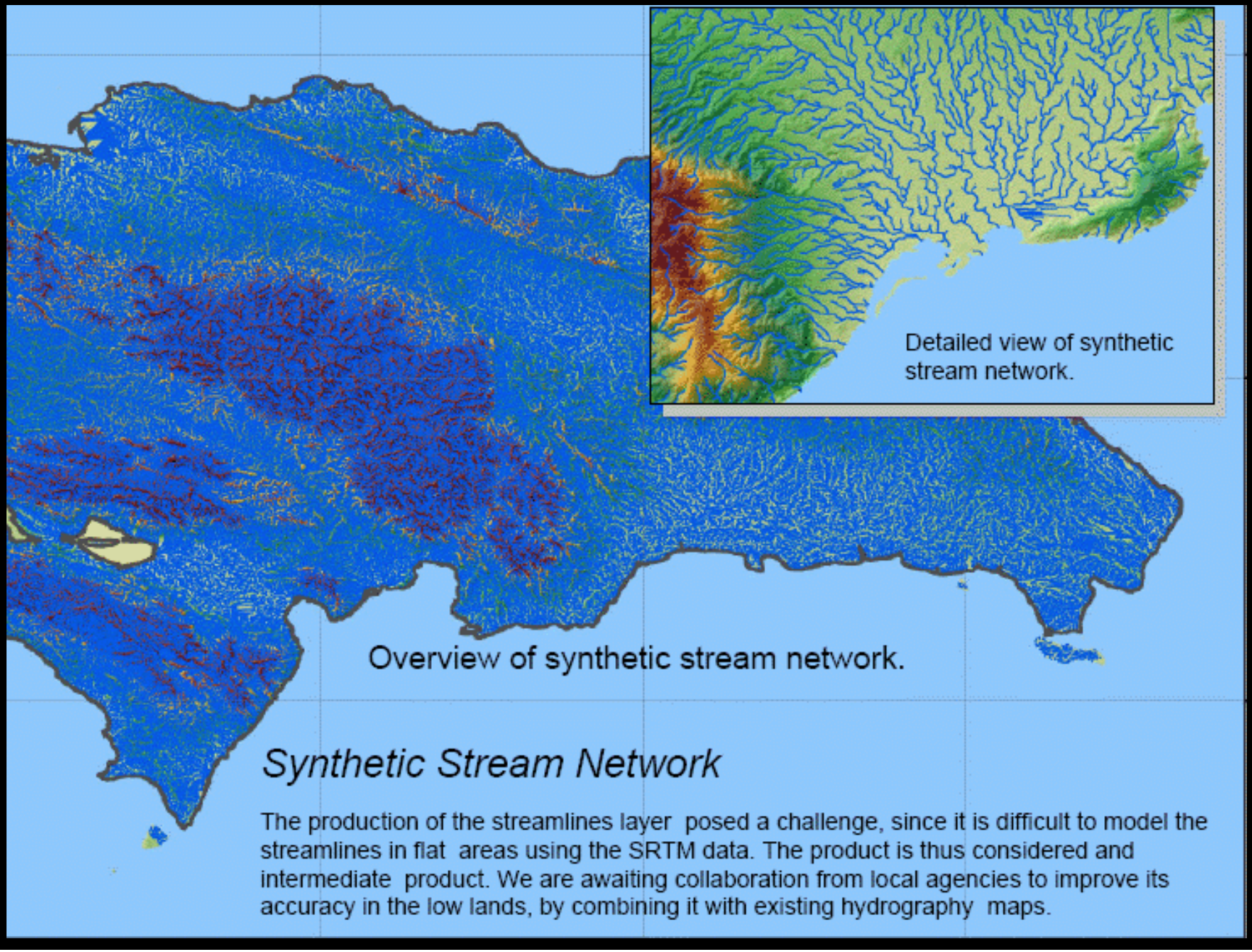
Slope map: Dominican Republic



Aspect map: Dominican Republic



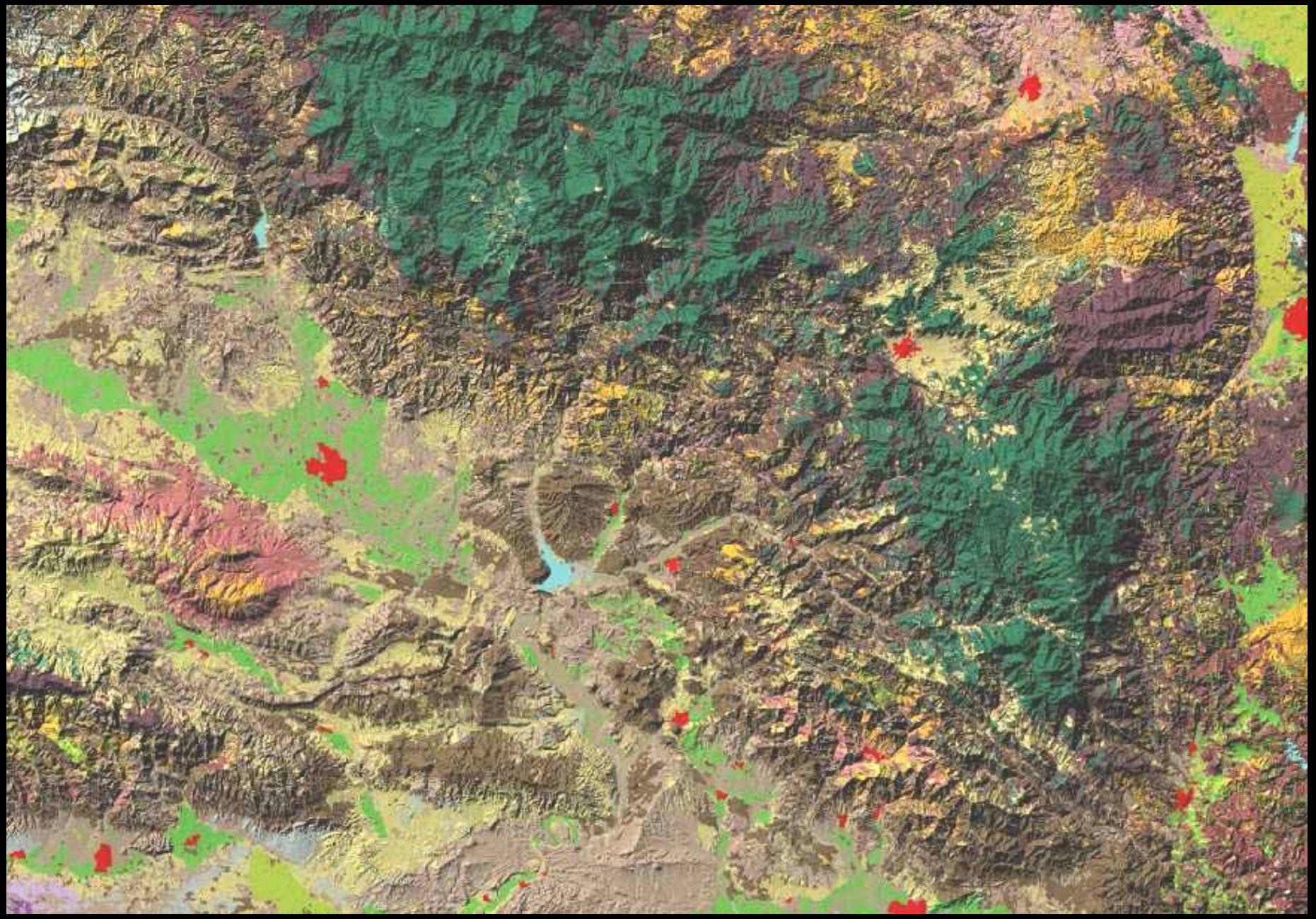
Stream map: Dominican Republic



Synthetic Stream Network

The production of the streamlines layer posed a challenge, since it is difficult to model the streamlines in flat areas using the SRTM data. The product is thus considered and intermediate product. We are awaiting collaboration from local agencies to improve its accuracy in the low lands, by combining it with existing hydrography maps.

Use and coverage with SRTM outlines



Example of Applications of the SRTM data

- General planning tool for the development of infrastructure.
- Visibility analysis (for example: planning of the location of TV antennas, microwaves or mobile transmission).
- Simulated flight in 3D between two selected points in South America.
- Mapping of areas where landslides and floods could occur.
- Generation of contour lines.
- Development of basin and sub-basin maps.
- Prevention and response to natural disasters.
- Analysis of species distribution.
- Modeling of the distribution of illnesses transmitted by vectors.

GeoSUR Relief Geoservice

- Basin delimitation
- Stream simulation
- Raindrop
- Visibility analysis
- Altitudinal profile
- Shaded relief
- Classified shaded relief
- Slope
- Slope: classified
- Aspect

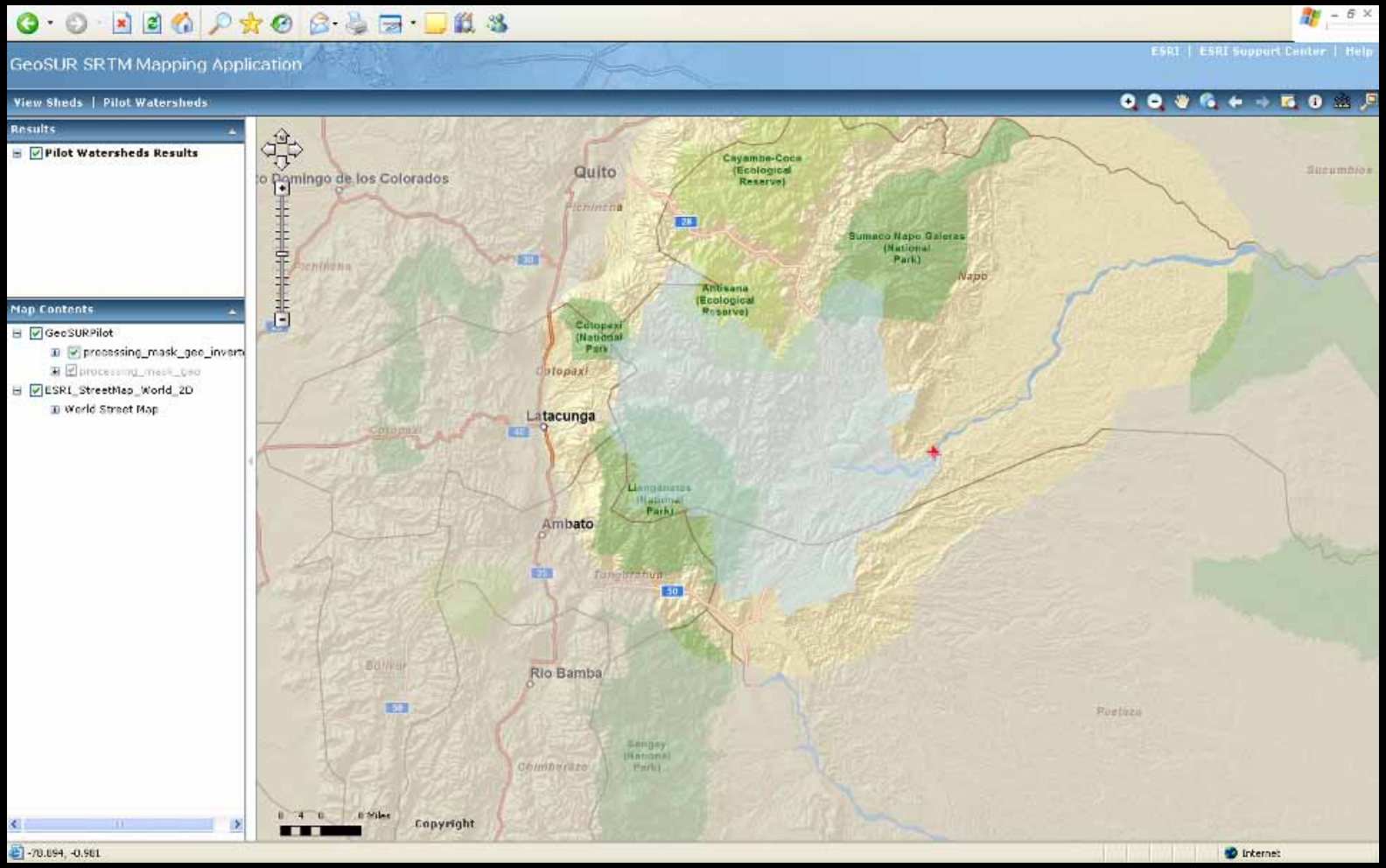
What is the relief geoservice?

It is a map service that allows to generate elevation derived maps from several elevation models in South America.

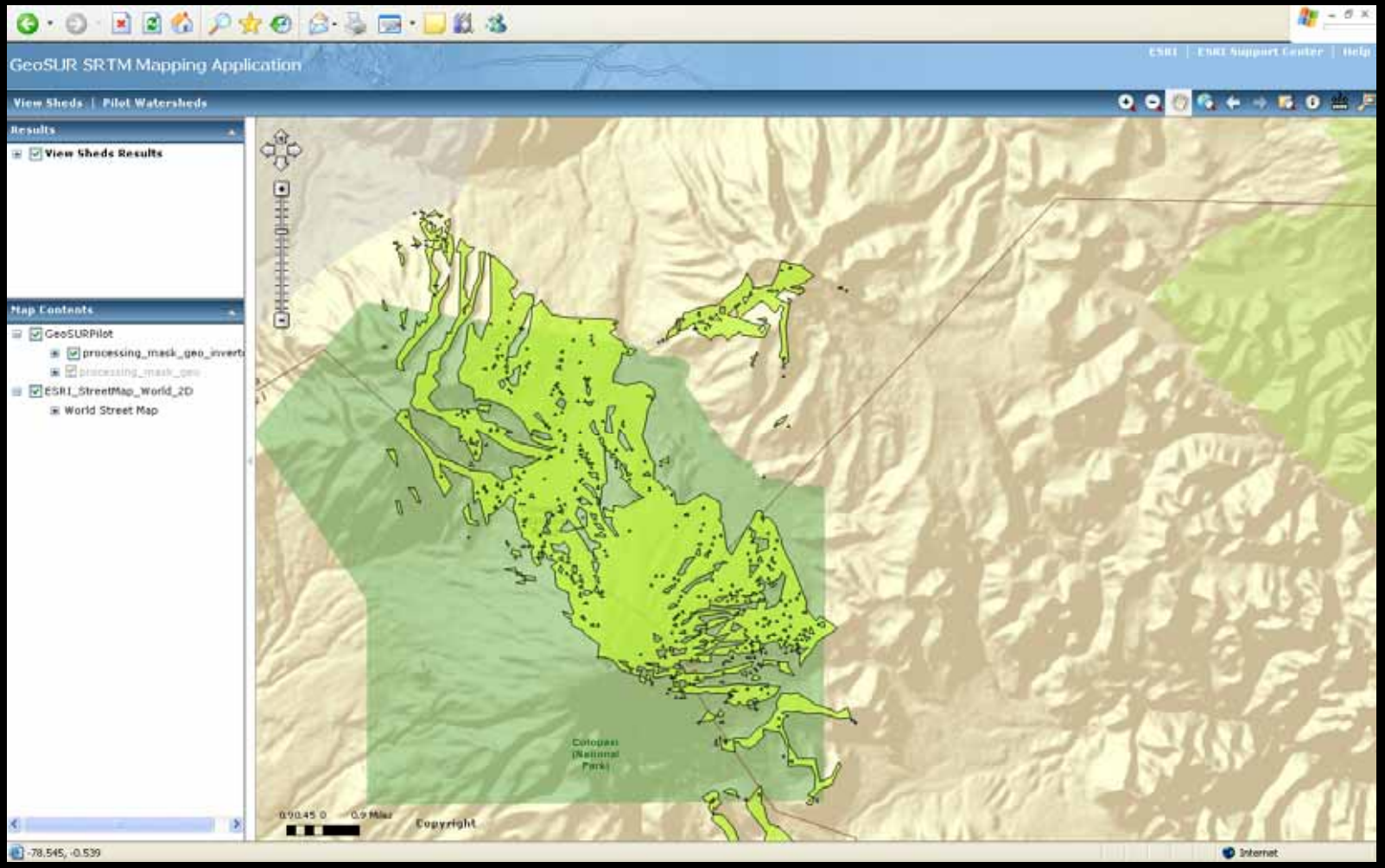
The service generates digital maps that may be downloaded by the user. To use it, a browser and an Internet connection are the only necessary devices.

The service was developed with the support of the U.S. Geological Survey and is the first in its type in Latin America. It uses the same SW used by the GeoSUR regional map service and by Cóndor.

Elevation derived maps



Hydrological models



Data sources

- GTOPO 30: 1 Km.
- GTOPO 30: 500 m.
- GTOPO 30: 250 m.
- HydroSheds: 90 m.
- SRTM: 90 and 30 m.
- Lidar models of 1 and 5 m. (to future)
- National MDEs.