

ROLE OF THE GEOGRAPHICAL INSTITUTE IN RISK MANAGEMENT, CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT

Bogotá - Colombia
November 2017



Floods





Avalanche



Earthquakes

Hailstorm





IGAC AND THE RISK MANAGEMENT

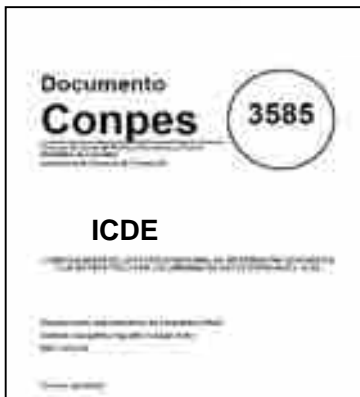
- LAW 1523 OF 2012**

Articulation of the PNGRD with the Information Systems, the Colombian Infrastructure of Spatial Data (ICDE) and the institutional training



**Instancias de Orientación y
Coordinación del SNGRD**

COLOMBIAN SPATIAL DATA INFRASTRUCTURE (ICDE)



1. Strengthen the regulatory framework for management.
2. Improve interagency coordination on the production, acquisition and use.
3. Strengthen production.
4. Improving institutional management capacity.

Sectoral Committees

ENVIRONMENTAL COMMITTEE

Coordinator MAVDT

INFRASTRUCTURE COMMITTEE

Coordinator MinTransporte and MinMinas

DEFENSE AND SEAS COMMITTEE

Coordinator MinDefensa

SOCIOECONOMIC COMMITTEE

Coordinator DANE

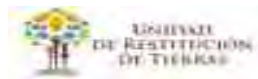
TERRITORIAL AND BORDER COMMITTEE

Coordinator MAVDT, Ministry of Foreign Affairs and IGAC DNP

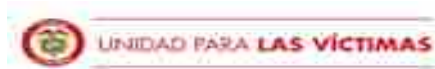
45 institutions involved

ICDE (COORDINATION AND ARTICULATION)

**45 GOVERNMENT
COMPANIES**



MinAgricultura
Ministerio de Agricultura
y Desarrollo Rural



**Gobernaciones /
Alcaldías**

Otras



**Universidades
Privadas**

**Universidades
Públicas**



**Entidades Servicios
Públicos**



We are all part of the ICDE

Customers/Users

Professionals in GIS

Territorial Entities

Citizens



Knowledge Transfer



Advice, Provision and Use
of Information

Advice, control and
monitoring



New Opportunities: Products
and services, High social
impact projects, Creation of
local IDEs

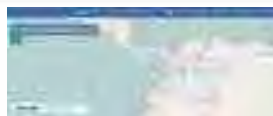
ICDE at the central level



Knowledge management



Information management

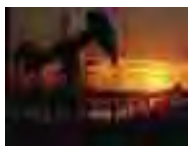


Portfolio management



Regulatory management

Main uses in Colombia of satellite images



AMBIENTAL MANGEMENT

ECOSYSTEMS AND
BIODIVERSITY

WATER RESOURCE

OCEANS AND
COASTAL AREAS

ATMOSPHERE,
METEOROLOGY, WEATHER

SOIL

RISK MANAGEMENT

LANDSLIDE

FLOODS

EARTHQUAKE

VOLCANOES

DROUGHT

WEATHER
PHENOMENA

FIRES

PRODUCTIVE SYSTEMS

AGRICULTURAL

LIVESTOCK

SILVICULTURE

FISHING

MINERAL AND ENERGETIC RESOURCES

HYDROCARBURE

MINING

HIDRIC ENERGY

BIOFUELS

ALTERNATIVES
ENERGYS

REGIONAL URBAN PLANNING

TRANSPORTATION

INFRASTRUCTURE

CADASTRE

HEALTH

EPIDEMIOLOGY

PUBLIC HEALTH

HEALTH
EMERGENCYS

SECURITY AND DEFENSE

ILICIT CROPS

DEFENSE

HUMANITARY
HEALTH

BASIC INFORMATION

GEOLOGY AND
GEOMORPHOLOG
Y

BASE
CARTHOGRAPHY

LANDCOVER AND
LANDUSE

STATISTIC
PRODUCTION

CLIMATE CHANGE

LAND PLANNING

Example : Torrential landslides in Mocoa (Putumayo).

• APPLICANT USERS

- UNGRD.
- ALCALDÍA DE MOCOA
- SGC
- DANE
- MADS

• WHAT INFORMATION WAS AVAILABLE?.

Satellite images, aerial photography, cartography, cadastre and others.

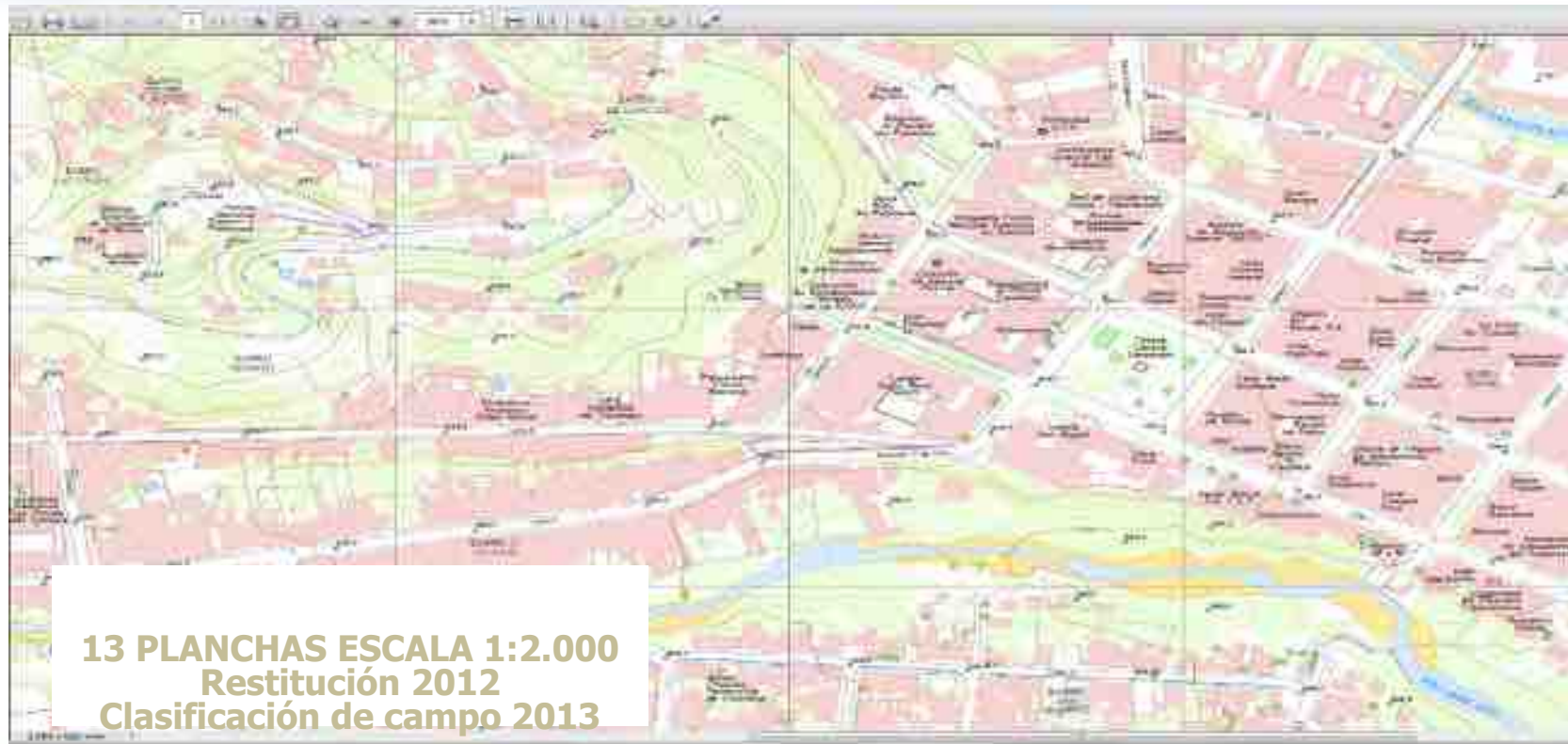


Example : Torential landslides in
Mocoa (Putumayo).

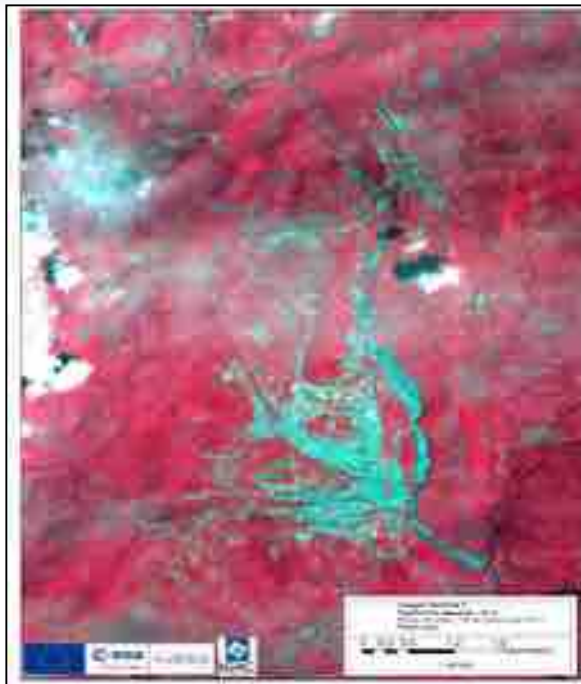


RAPIDEYE (2013)

Example : Torrential landslides in Mocoa (Putumayo).



Example : Torential landslides in
Mocoa (Putumayo).



IMAGES SENTINEL
(FREE ACCESS)

BANCO NACIONAL DE IMÁGENES - BNI



GEOCARTO



SISTEMA NACIONAL CATASTRAL



In the case of Mocoa, the information was arranged in a FTP for access to the entities of the SNGRD

<ftp://132.255.20.145>

User: mocoa04042017

password: igac%2124fA\$



The BNI is a set of policies, organizations, standards and technologies that work together to produce, share and use geographic and satellite information necessary to collaborate in the development of the country. Administered by IGAC.

El Portal Científico Nacional - PCN, constituye el sitio de Selección para visualizar su intervención. Usted Selecciona con

PORTAL GEOGRÁFICO NACIONAL (PGN)

520 IGAC viewing services (WMS)

1582 IGAC Download Services (WFS)

Quitar filtros	Ordenar de menor a mayor	Activar	Service
Agencia Administrativa Local - LAURIMAR - SUITE	Geodatos de parcelas y lotificaciones	WMS	
Departamento Administrativo de Planeación del Estado - DAPE	Cartas geográficas OSM	WMS	
Comandancia	Mapeo	WMS	
Agencia Nacional de Hidrocarburos - ANH	Mapa de Formaciones	WMS	
Agencia Nacional de Hidrocarburos - ANH	Mapa de Formaciones	WMS	
Servicio Geológico Colombiano - SGC	Modelado de Muestras de Suelos	WFS	
Servicio Geológico Colombiano - SGC	Mapa de Suelos de Colombia	WMS	
Servicio Geológico Colombiano - SGC	Cartas de Suelos de Colombia	WMS	
Servicio Geológico Colombiano - SGC	Cartas de Suelos de Colombia	WMS	
Servicio Geológico Colombiano - SGC	Cartas de Suelos de Colombia	WMS	



INFORMATION RELEASED

SCALE 1:500.000



INFORMATION RELEASED

SCALE 1:100.000



INFORMATION RELEASED
SCALE 1:25.000



**INFORMATION IN PROCESS OF BEING
RELEASED
SCALE 1:25000**



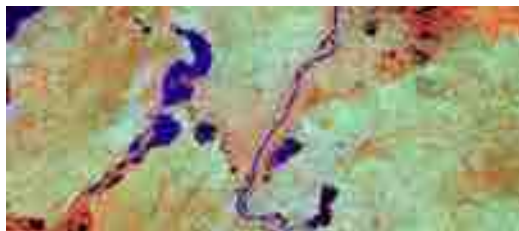


SATELLITE IMAGES
GEOSAR



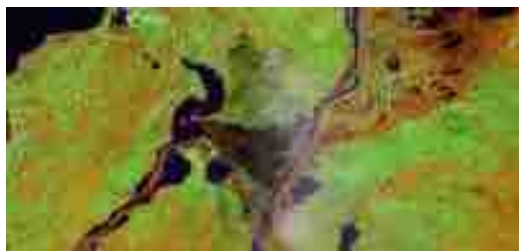
IMSATELLITE IMAGES
RAPIDEYE

Example: Flood monitoring 2010 - 2012



December 2010 declaration of economic, social and ecological emergency due to serious public calamity.

Challenge: Access to images and information to support the monitoring and articulation of entities



International cooperation networks IGAC



International Space Charter of Disasters through the Argentine Space Agency CONAE.



Satellite programs: Monitoring support Floods Colombia

Multiespectrales:

Landsat 5

DMC

Spot 5

RapidEye

Radar

Radarsat 2

Cosmo-Skymed

AlosPalsar



Disaster Monitoring Constellation



Fuente: eoportal/satellite-missions/d/dmc-2g

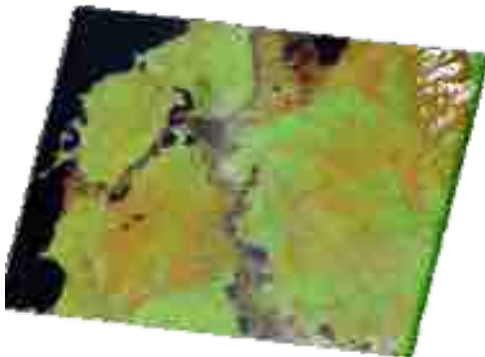


Fecha: 06/12/2010
Res. Espacial: 22 m
Escena: 400 km
Fuente: DMCii



Examples of satellite images supplied

• LANDSAT 5



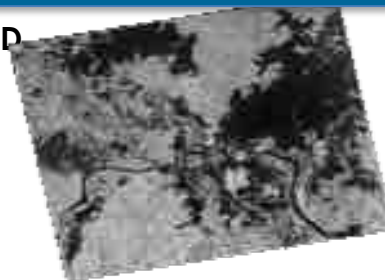
Date: 03/01/2011
 Spatial Resolution: 30 m
 Escena: 200 km
 Fuente: USGS

• ALOS-PALSAR



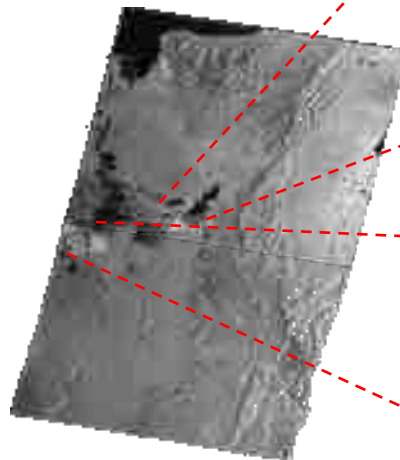
Date: 06/12/2010
 Polarización HH
 Rep. Espacial: 100 m
 Fuente: CONAE

• COSMO-SKYMED

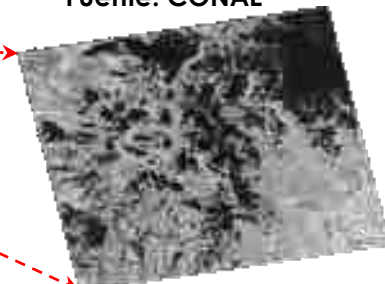


Date: 29/12/2010
 Polarización VV
 Modo: Ultrafino
 Fuente: CONAE

• RADARSAT 2



Date: 05/11/2010
 Polarización HH
 Modo: Estándar



Date: 06/01/2011
 Polarización VV
 Modo: Ultrafino
 Fuente: CONAE

BACKGROUND FLOOD MONITORING 2010 - 2011

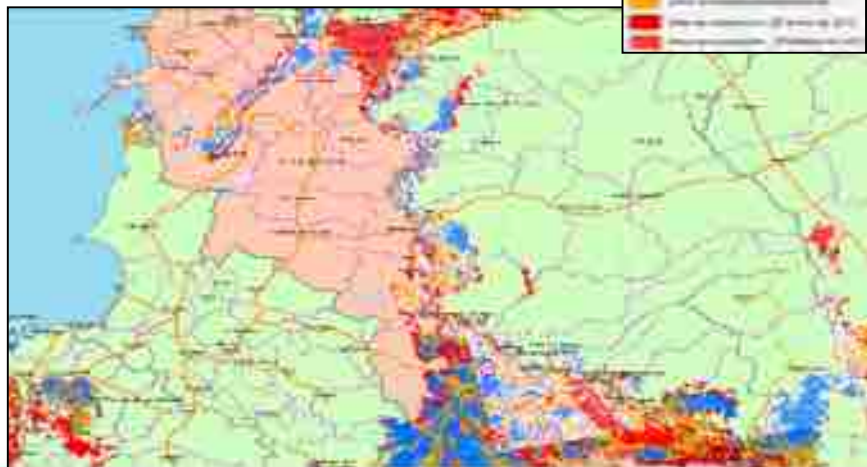
INTERNAL JOINT

IGAC- TECHNICAL AREAS.
(Basic Cartography, Agrological,
Cadastral, image processing,
spatial analysis).

ARTICULATION WITH ENTITIES

OF. NAC. P Y A DESASTRES,
IDEAM, IGAC , DANE

COUNTRY CONTINUING ANSWER MUNICIPAL DEPARTMENTS



**REPORTE DE ÁREAS
AFECTADAS POR
INUNDACIONES 2010 - 2011
RESÚMEN 1-5**

Agosto, 2011



BACKGROUND FLOOD MONITORING 2010 - 2011

• Moment 1. Emergency 2010 - 2011

The area Interpreted for monitoring covered 25 departments: Antioquia, Arauca, Atlántico, Bolívar, Boyacá, Caldas, Caquetá, Casanare, Cauca, Cesar, Choco, Córdoba, Cundinamarca, Huila, La Guajira, Magdalena, Meta, Nariño, Norte de Santander, Quindío, Risaralda, Santander, Sucre, Tolima, Valle del Cauca.

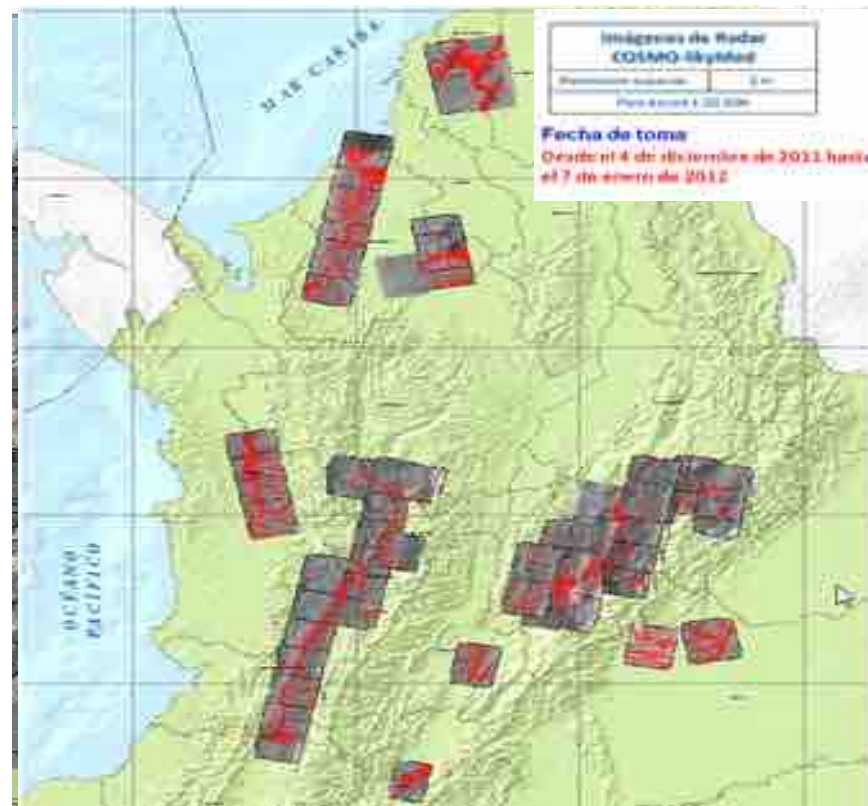
Scale 1: 100,000



ABACKGROUND FLOOD MONITORING 2011 - 2012

Moment 2. Project «Flood Monitoring with geospatial technologies». National Calamity Fund. (2011-2012)

- Generation of layers of water surfaces at 1: 100,000 scale, images from 2011 and 2012. Satellites: Radarsat - 2. Landsat.
- Windows 25,000: Partial coverings Choco, Sábana de Bogotá, Córdoba, Boyacá, Valle del Cauca, Eastern Plain sectors.



ABACKGROUND FLOOD MONITORING 2011 - 2012

Example: Lake Fúquene monitoring. Images interpreted for 4 periods.
 From December 5, 2011 to January 7, 2012.



From December 5 to 9



From December 11 to 16

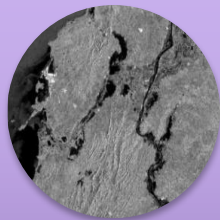


From December 18 to 23



*From Diciembre 26 to January
7*

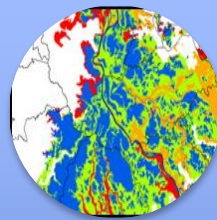
Information Generation - Flood Monitoring



Download
Images



Interpretation
and
Processing



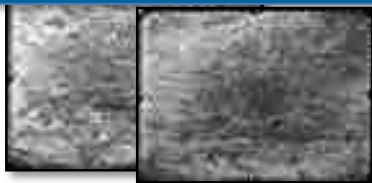
Spatial
analysis for
generating
statistics



Distribution of
the layer
"areas affected
by flood"



Use of geospatial technologies for the generation of threat maps due to floods and mass movements. Jurisdiction CORANTIOQUIA. Phases I-II.



Analog aerial photographs.



Aerial photographs Vexcel-Ultracam

3D visualization, digital models



Optical images Spot- RapidEye



Radar images
Radarsat2- Cosmoskymed

Elevation Models.



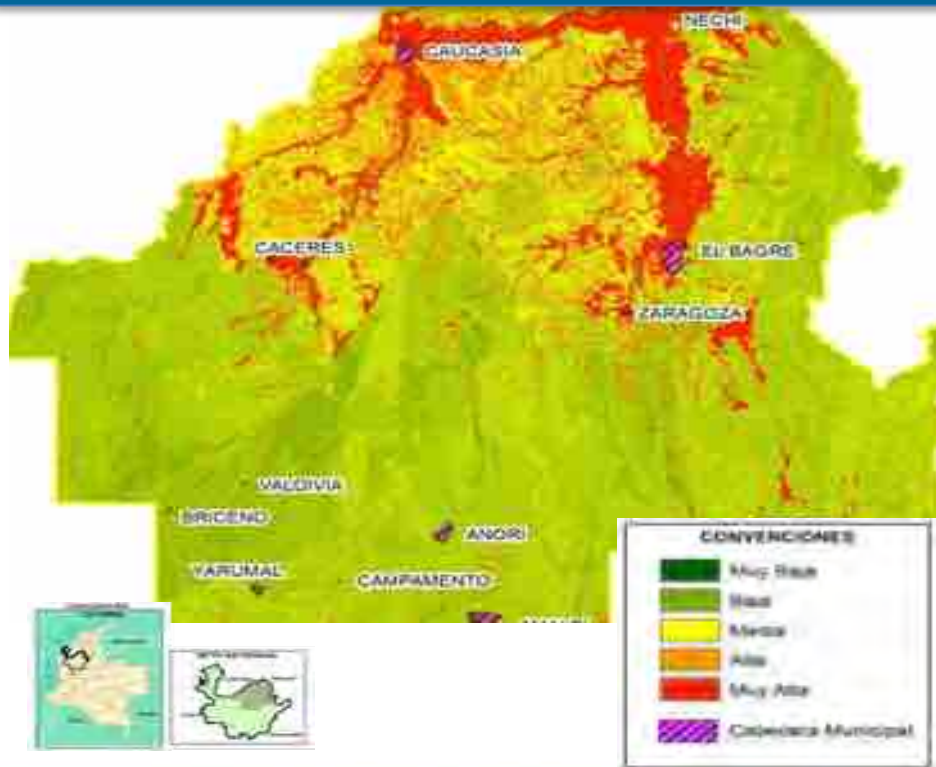
Drains generated from
elevation models.



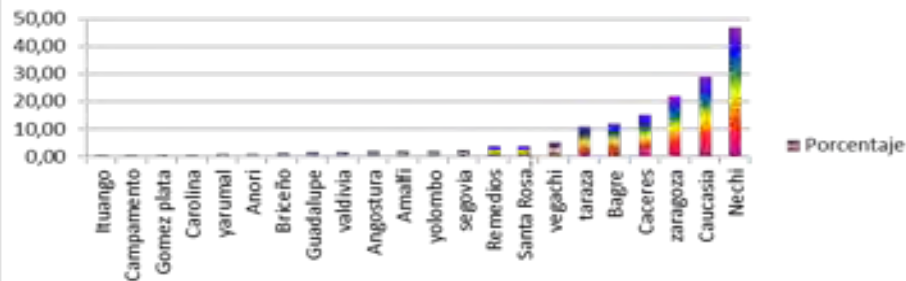
Mosaics



Use of geospatial technologies for the generation of threat maps due to floods and mass movements. Jurisdiction CORANTIOQUIA. Phases I-II.



**PORCENTAJE DE AREAS POR MUNICIPIO CON
 SUSCEPTIBILIDAD ALTA - MUY ALTA**



**Municipios Mayor
 porcentaje**

- Nechí
- Caucasia
- Zaragoza
- Cáceres
- El Bagre
- Taraza

Percentage of Affected Areas

CLASE	%
Muy Baja	1.4
Baja	82.4
Mediana	4.71
Alta	6.25
Muy Alta	5.04

PROJECTS INFORMATION OF INTEREST - FLOODING

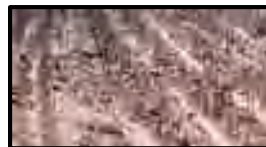


IGAC-CORPOICA Project. Support for agroclimatic risk analysis: Drought-Floods. 3 Municipalities by Department. (18 departments).

- **Multitemporal analyzes:**

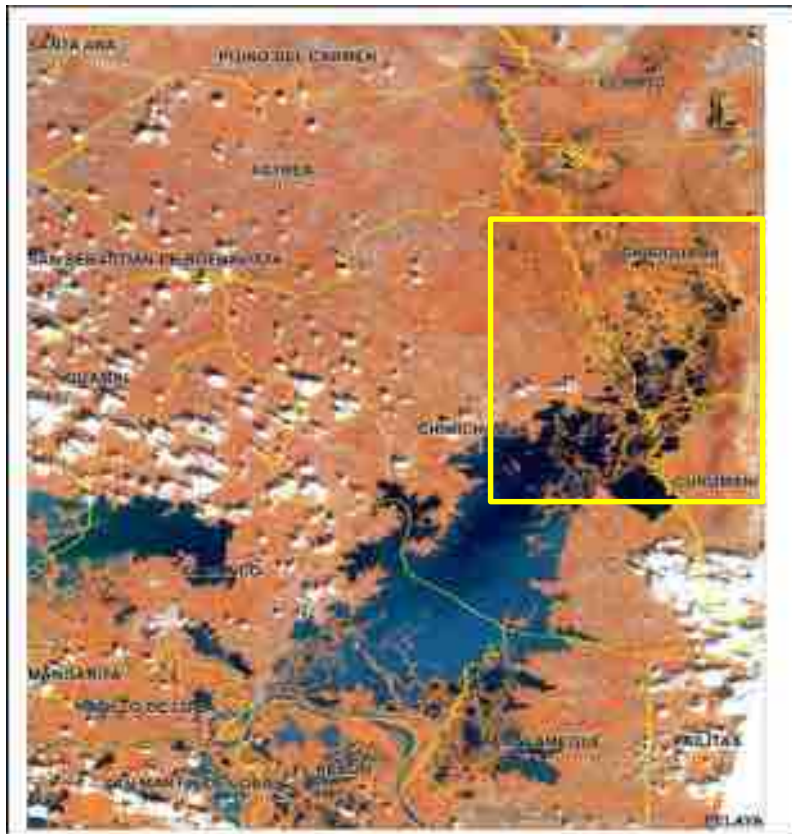


Expansion dynamics
 and contraction of bodies
 of water.
 (Scale 1: 25,000)

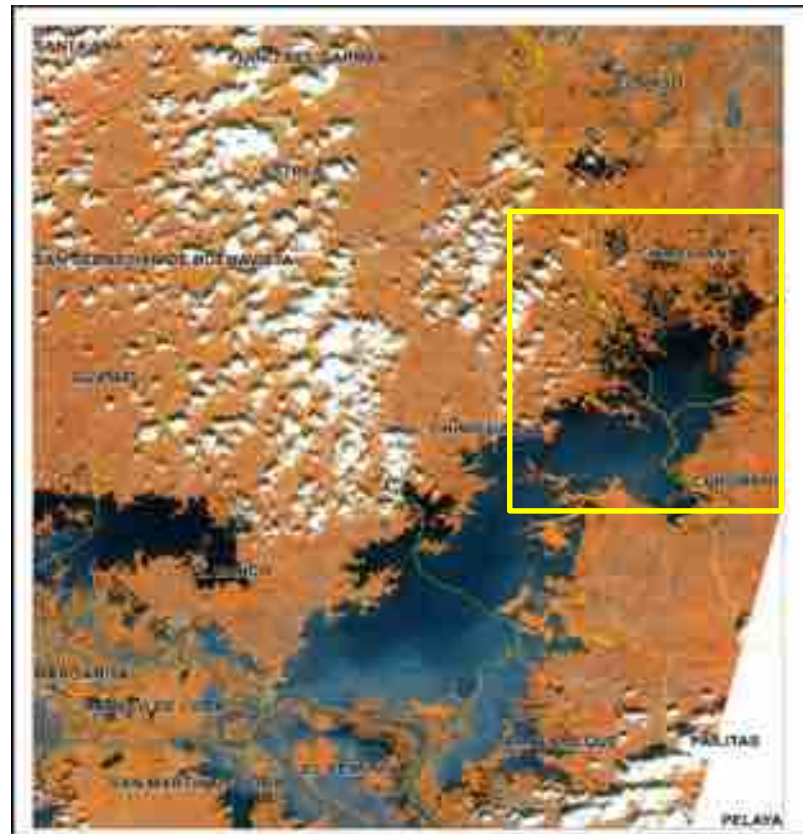


Dry conditions from
 spectral indices.
 (Scale 1: 100,000).

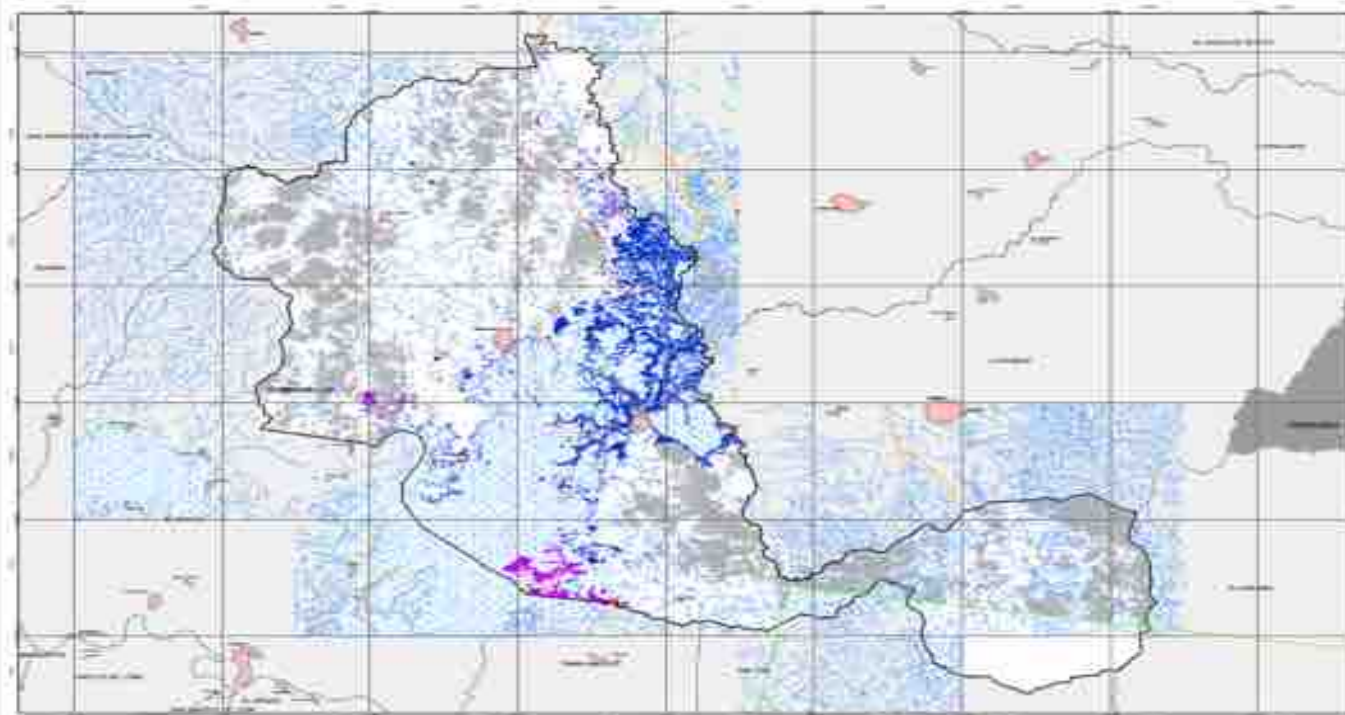
RESULTS IN THE DEPARTMENT OF CESAR



Child's phenomenon -2009



phenomenon of the girl -2011



MAPA DE DISTRIBUCIÓN DE CUERPOS DE AGUA EN EL MUNICIPIO DE CHIMICHAGUA (COLOMBIA) AL AÑO 2011

Escala: 1:100,000

Proyecto: Mapeo de Recursos Hídricos

Elaborado por: [Institution]

Fecha: 04-09-12/2011

Legenda:

Tipos de cuerpos de agua:

Agua dulce

Agua salada

Agua estancada

Agua corriente

Agua subterránea

Agua superficial

Agua de lluvia

Agua de riego

Agua de drenaje

Agua de inundación

Agua de evaporación

Agua de condensación

Agua de precipitación

Agua de infiltración

Agua de exfiltración

Agua de transpiración

Agua de sublimación

Agua de desublimación

Agua de fusión

Agua de congelación

Agua de evaporación y condensación

Agua de infiltración y exfiltración

Agua de transpiración y sublimación

Agua de desublimación y fusión

Agua de congelación y evaporación

Agua de fusión y condensación

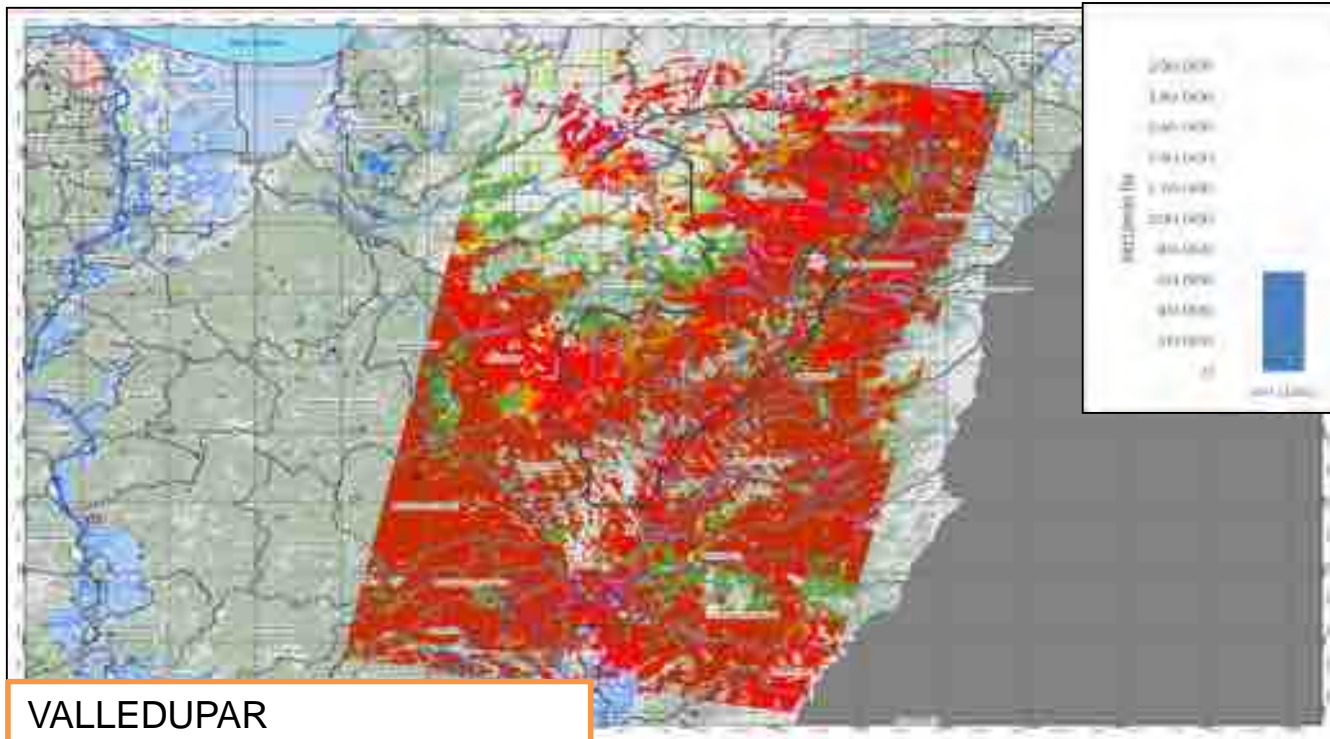
Agua de evaporación y infiltración

Agua de infiltración y exfiltración

Agua de transpiración y sublimación

Phenomenon of the girl: 04-09/12/2011

Spatially the dynamics of expansion and contraction of water bodies -Chimichagua and Curumani, was evidenced in the areas that are part of the swamp complex of Zapatos, located between the departments of Cesar and Magdalena.



MAP OF COMPARISON OF THE NORMALIZED VEGETATION INDEX - NDVI - BETWEEN THE
 CHILD EVENT (FEBRUARY 2003) AND THE NEUTRAL EVENT (FEBRUARY 2000)

TRANSFER AND DISSEMINATION OF KNOWLEDGE.



[Inicio](#)
[Aplicación Espacial](#)
[Riesgos y Desastres](#)
[Enlaces](#)

Prácticas Recomendadas



Cuando se usa, tecn...
 durante la respuesta...
 a los datos y program...
 tanto de los métodos...
 particular.

En tal sentido, los socios y las Oficinas Regionales de Apoyo de ONU-SPIDER están elaborando una serie de prácticas recomendadas que proveen consejos prácticos e instrucciones sobre cómo usar la información satelital en el caso de diversos tipos de amenazas, así como en varias fases del ciclo de la gestión de desastres.

Si tiene alguna pregunta o quisiera compartir sobre su experiencia en la aplicación de estas prácticas, háganos el favor usar la sección de comentarios.

Navegar por las Prácticas Recomendadas

- Recommended Practice: Flood Mapping
- Recommended Practice: Flood Hazard Mapping
- Recommended Practice: Drought monitoring using the Vegetation Condition Index (VCI)
- Práctica recomendada: La Generación de Mapas de Extensión y Contracción de Cuerpos de Agua
- Recommended Practice: Exposure Mapping
- Recommended Practice: Drought monitoring using the Standardized Vegetation Index (SVI)

TRANSFER AND DISSEMINATION OF KNOWLEDGE.



El salvador

Teacher: Nelson Andres Nieto Valencia

Course: "Interpretation and analysis of radar-type satellite images - Sentinel 1: Applied to the detection of flooded areas during an emergency", organized by the National Coordinator for Disaster Reduction of El Salvador.

TRANSFER AND DISSEMINATION OF KNOWLEDGE.



Guatemala I
Teacher: Nelson Andres Nieto
Valencia

Course: "Interpretation and analysis of radar-type satellite images - Sentinel 1: Applied to the detection of flooded areas during an emergency", organized by the National Coordinator for Disaster Reduction of Guatemala.

TRANSFER AND DISSEMINATION OF KNOWLEDGE.



Guatemala II
Teacher: Nelson Andres Nieto
Valencia

Course: "Interpretation and analysis of radar-type satellite images - Sentinel 1: Applied to the detection of flooded areas during an emergency", organized by the National Coordinator for Disaster Reduction of Guatemala.

Students trained in Colombia - short courses

VIRTUAL COURSES



Technical Specifications
and Quality of Geographic
Information



Geographic Metadata



Fundamentals of Spatial
Data Infrastructure



Geographic Information



Implementation of Geographic
Information Services Online
Continuing Specification OGC

<http://geoservice.igac.gov.co/moodle>

REGIONAL TELECENTRO



Trained students in 2017:
Online Courses: 1525
Courses: 900

THANK YOU VERY MUCH