

Strengthening Disaster Risk Reduction Across the Americas: A Regional Summit on the Contribution of Earth Observations

CEOS Working Group on Disasters Meeting # 8

**CONAE Recent Projects and Presentation of
Disaster-related activities in the context of future
collaboration with the CEOS WG Disasters**

Laura Frulla

**4 a 8 de septiembre, 2017
Buenos Aires (ARGENTINA)**



Receiving Station-1 (Córdoba)



end 2017 / beginning 2018

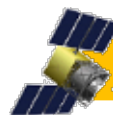
* 13 m

* 5 m

* 3 m

Receiving Station-2, *Tolhuin* (*Tierra del Fuego*)





satellite data

- ✓ SAC-D/Aquarius
- ✓ Landsat 5
- ✓ Spot 4, 5, 6, 7
- ✓ Feng-Yun
- ✓ Terra/Modis
- ✓ Aqua/Modis
- ✓ NOAA
- ✓ NPP
- ✓ METOP
- ✓ Feng-Yun
- ✓ GOES 12, 13, 16 (R)
- ✓ COSMO Skymed 1, 2, 3, 4
- ✓ ERS 1 and 2
- ✓ Radarsat-1
- ✓ ALOS-1
- ✓ Sentinel 2
- ✓ UAVSAR
- ✓ SARAT

Córdoba Receiving Station



<http://catalogos.conae.gov.ar/catalogo-de-imagenes.html>



field data

✓ *in-situ*
sensors

↪ SPOT 6 and 7:

- ✓ multispectral: 6 m
- ✓ panchromatic: 1,5 m
- ✓ all the countries inside the área
- ✓ any use
- ✓ registration is required
- ✓ licence to use

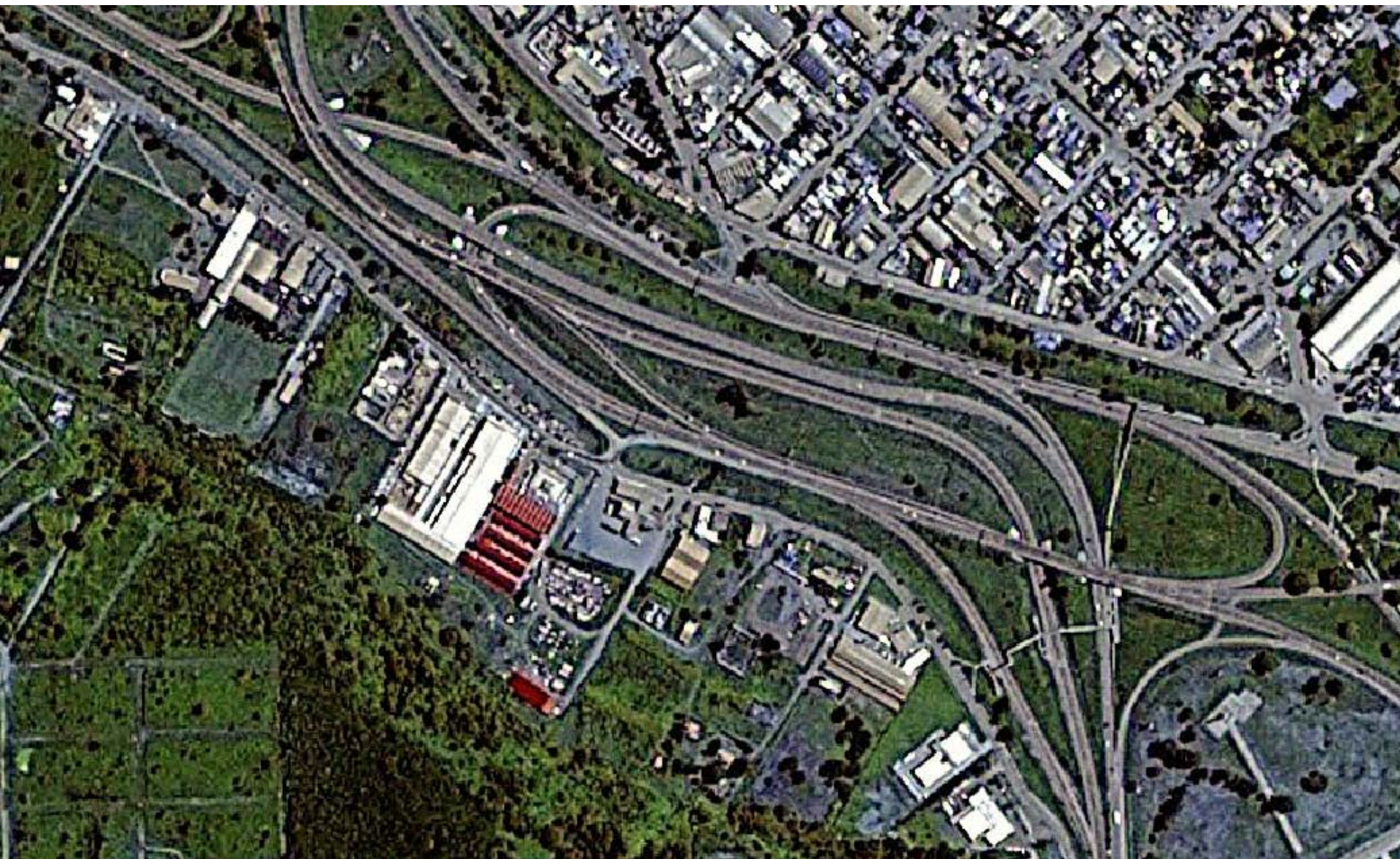
↪ SPOT 4 and 5:

- ✓ archived
- ✓ Argentina only

↪ COSMO:

- ✓ Argentina only
- ✓ registration is required
- ✓ licence to use







Catálogo de Imágenes y Productos

Productos Derivados

- ▶

 - ▶

 - ▶

 - ▶

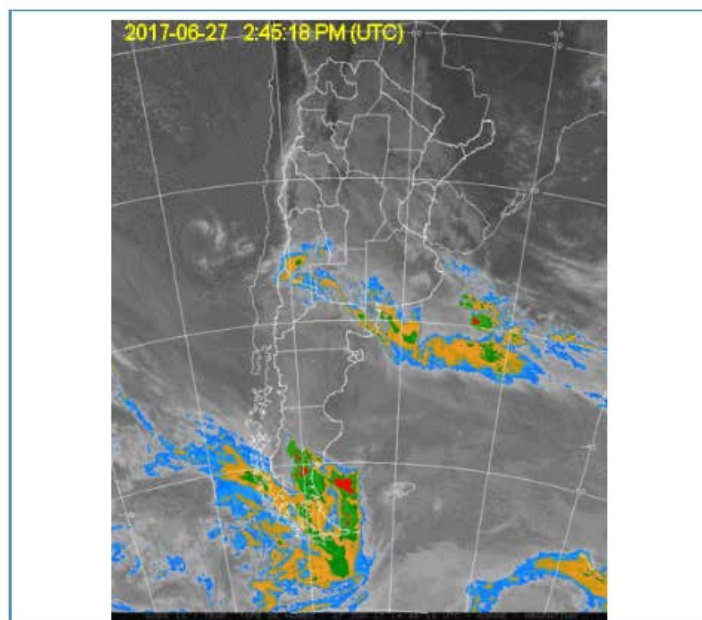
 - ▶

- (*) Acceso Libre
(**) Acceso con Registración
(L) Acceso bajo Licencia

- ### Productos Derivados
- ▶
 - ▶
 - ▶
 - ▶
 - ▶
- (*) Acceso Libre
(**) Acceso con Registración
(L) Acceso bajo Licencia
- ### Servicios SIG
- ▶

Registración

Regístrese para acceder a los catálogos individuales



Referencias: -32° -40° -52° -60° -70° Otras Vistas Disponibles

Nota: Las horas de las imágenes se encuentran expresadas en formato UTC (Hora Universal Coordinada) que corresponde al Meridiano de Greenwich. Para conocer el momento de la toma de imágenes según la hora oficial Argentina, deben restarse: **3 horas.**

- ### Satélites
- ▶
 - ▶
 - ▶
 - ▶
 - ▶
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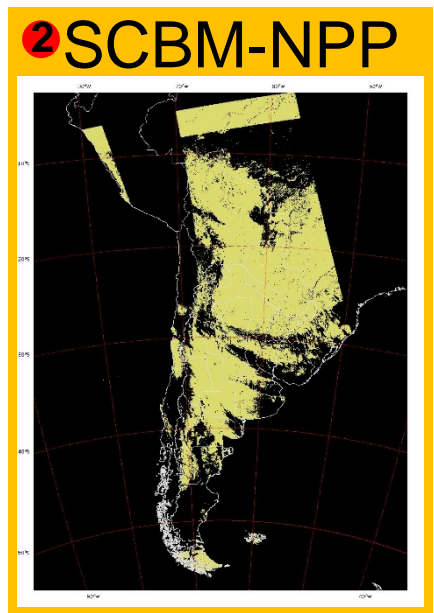
Servicio Segmento del Usuario
Av. Paseo Colón 751. Buenos Aires (1603)
T: 5411-4331-0074 int. 5413/1084
Por consultas y pedidos de imágenes contactarse a
ssu.atencionUsuarios@conae.gov.ar

- 1**
- CENIZA (ASH)
 - CLOROFILA (CHL)
 - INDICE DE AGUA NORMALIZADO (NDWI)
 - INDICE DE VEGETACIÓN MEJORADO (EVI)
 - INDICE DE VEGETACIÓN NORMALIZADO (NDVI)
 - TEMPERATURA SUPERFICIAL DE LA TIERRA (LST)
 - TEMPERATURA SUPERFICIAL DEL MAR (SST)

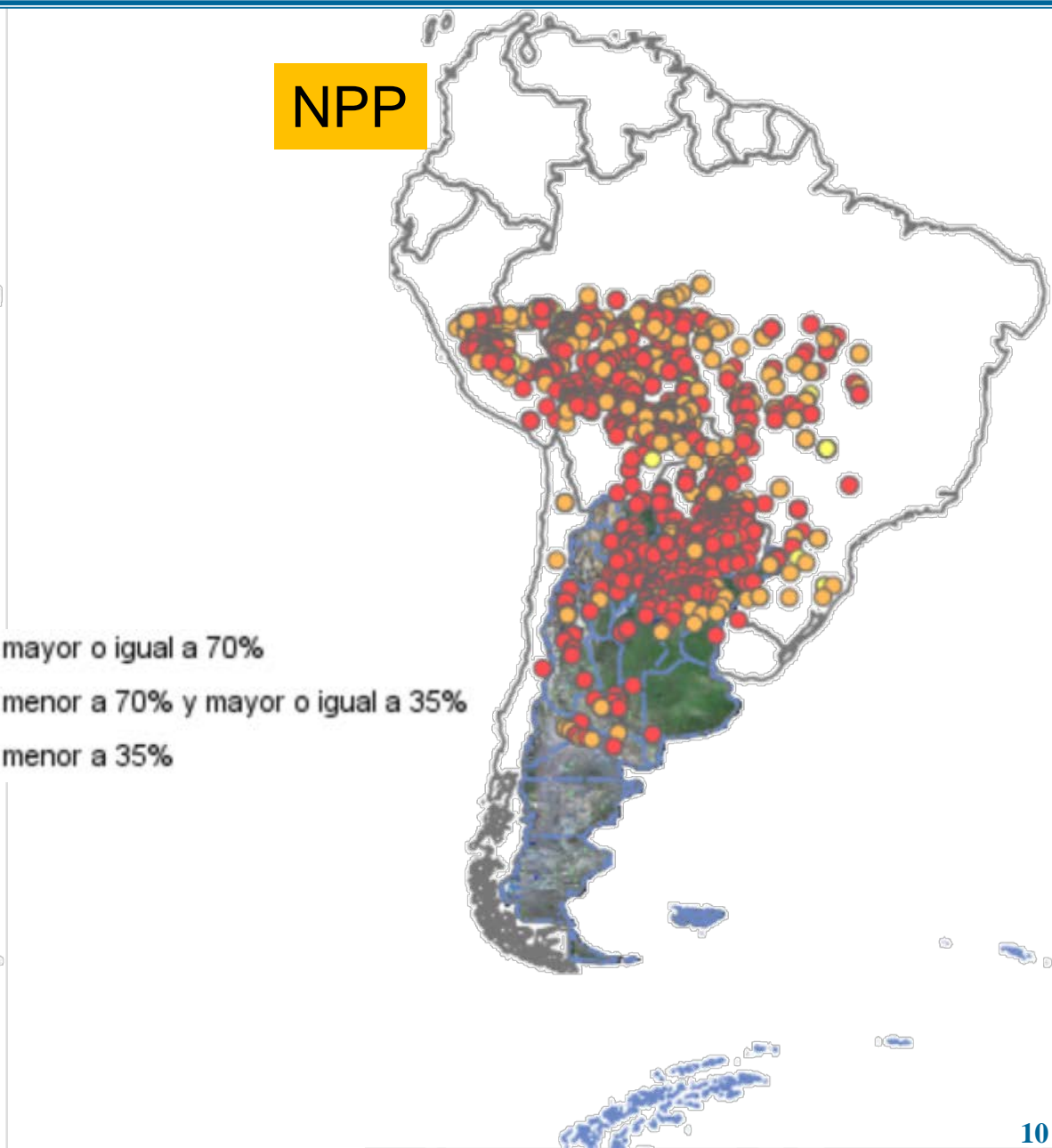
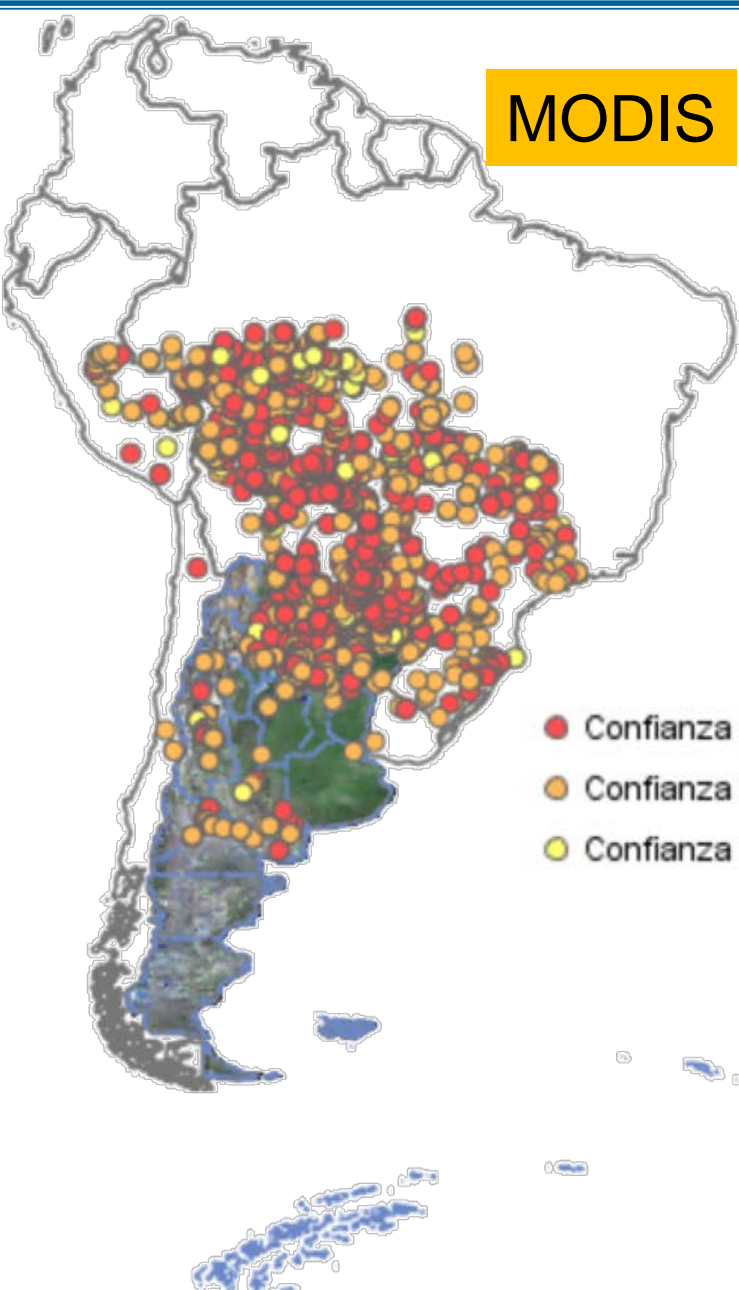
- ### Productos Derivados
- MODIS Valor Agregado (**)
 - NPP Valor Agregado (**)
 - Humedad de Suelo
 - Rugosidad de Suelo (L)
 - Índice de Vegetación (L)
 - Precipitación
 - Áreas Urbanas
 - GEONET Cast Americas
 - USGS
 - OTROS
- (*) Acceso Libre
(**) Acceso con Registración
(L) Acceso bajo Licencia



- (Todos)
- ASH (Ash) **1**
 - CHL (Chlorophyll concentration)
 - EVI (Enhanced Vegetation Index)
 - LST (Land Surface Temperature)
 - NDVI (Normalized Difference Vegetation Index)
 - SCMO (SnowCover Binary Map) **2**
 - SST (Sea Surface Temperature)



Hotspots Maps



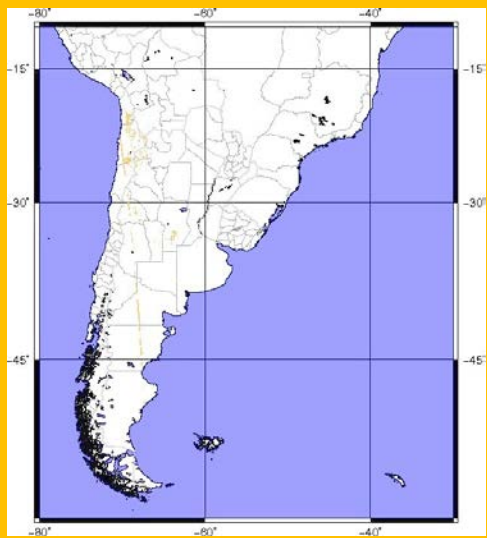
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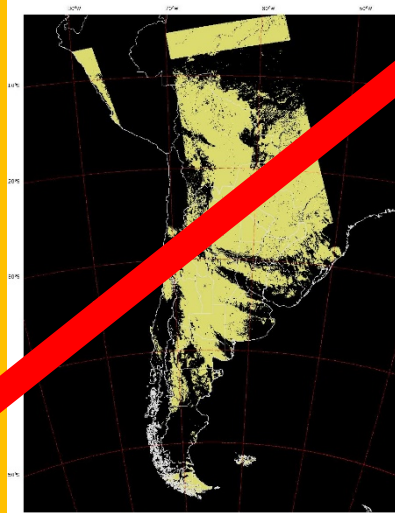
1 ash



(Todos)

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2 SCBM-NPP



Humedad de Suelo

- SAC-D Aquarius (**)
- SMOS (**)
- COSMO (L) **●**

COSMO SkyMed
abril 2016

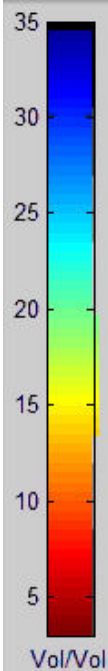
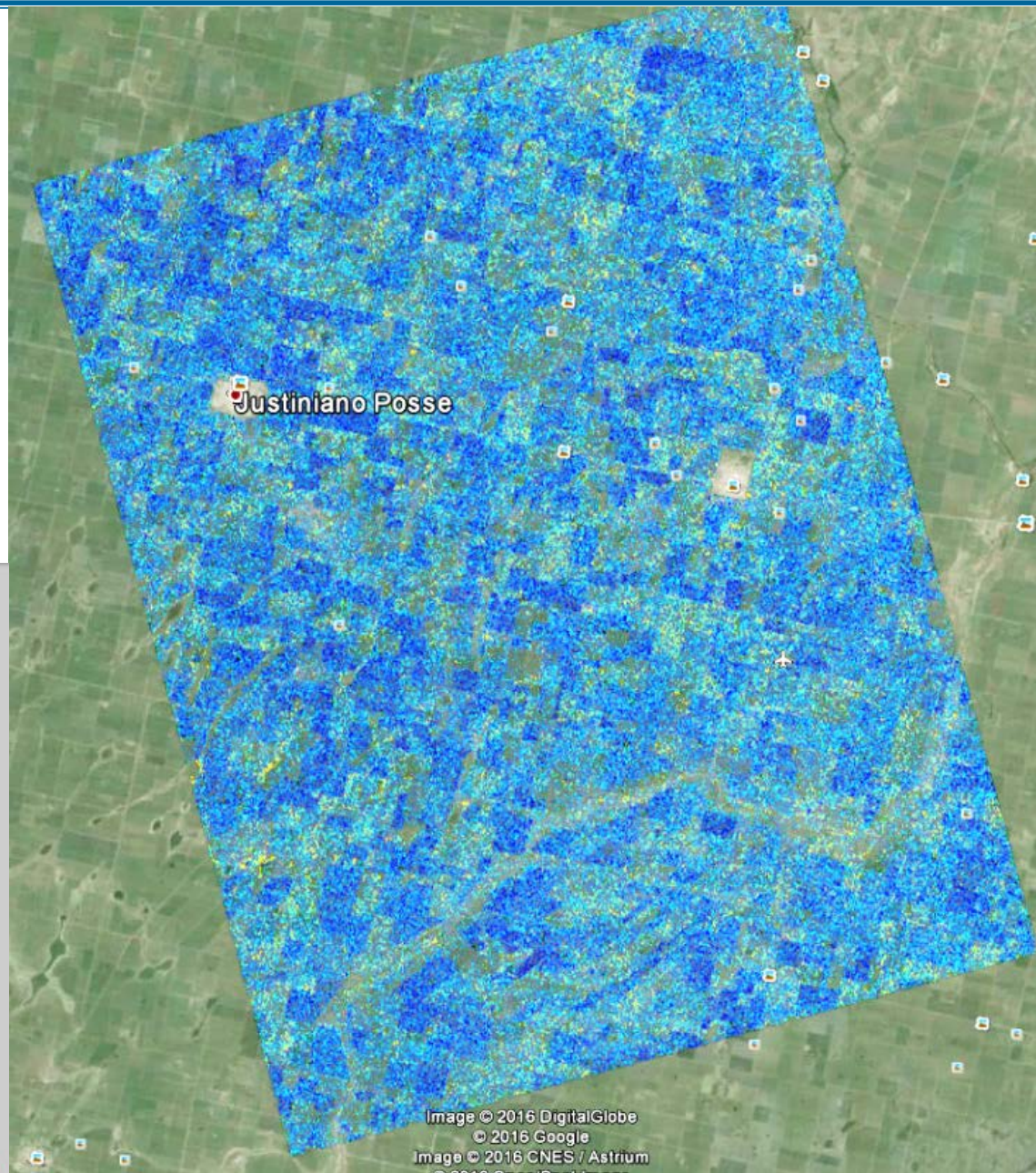


Image © 2016 DigitalGlobe
© 2016 Google
Image © 2016 CNES / Astrium

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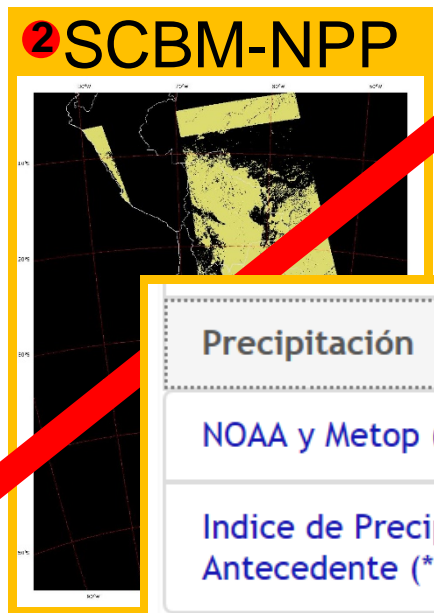
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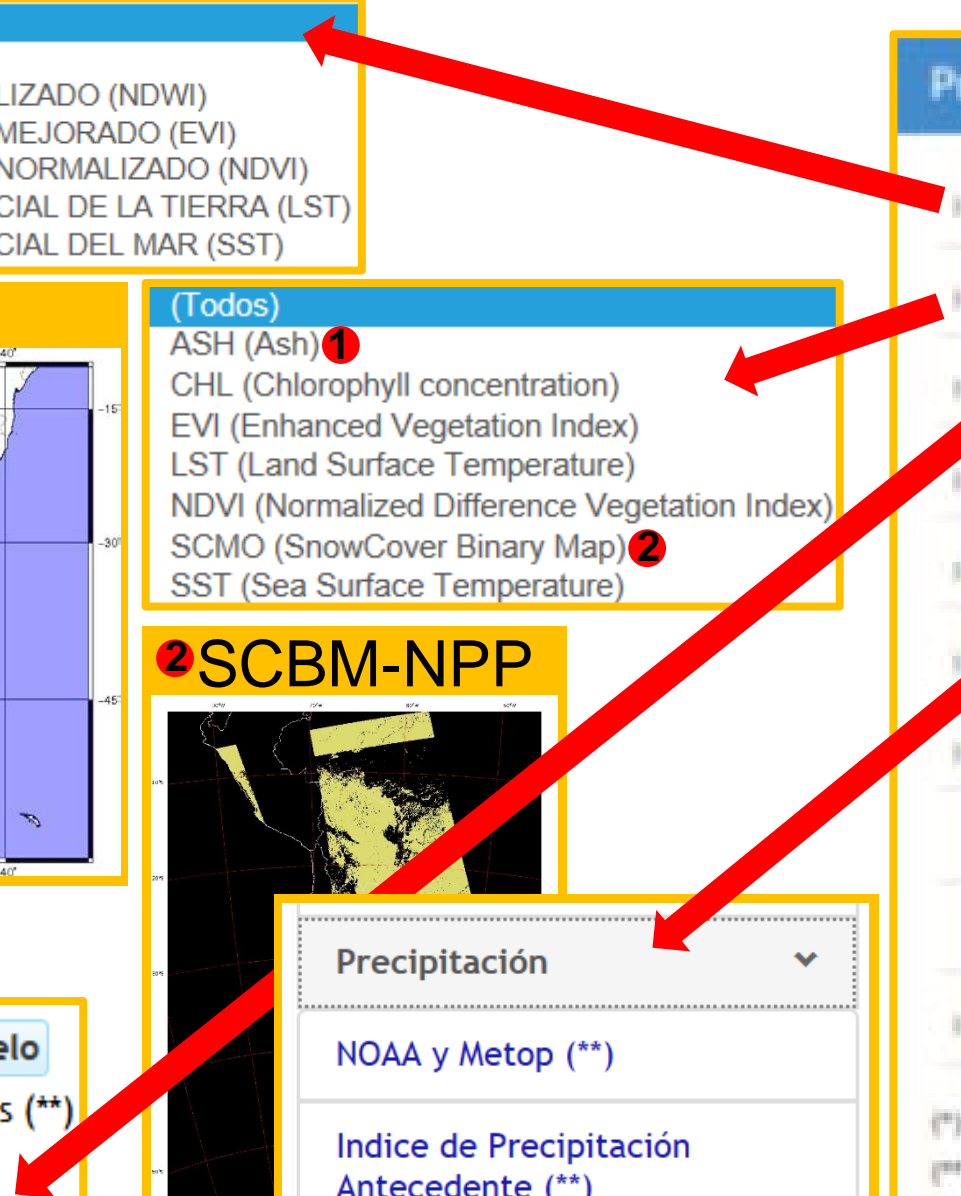
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- Humedad de Suelo**
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 - COSMO (L) **●**

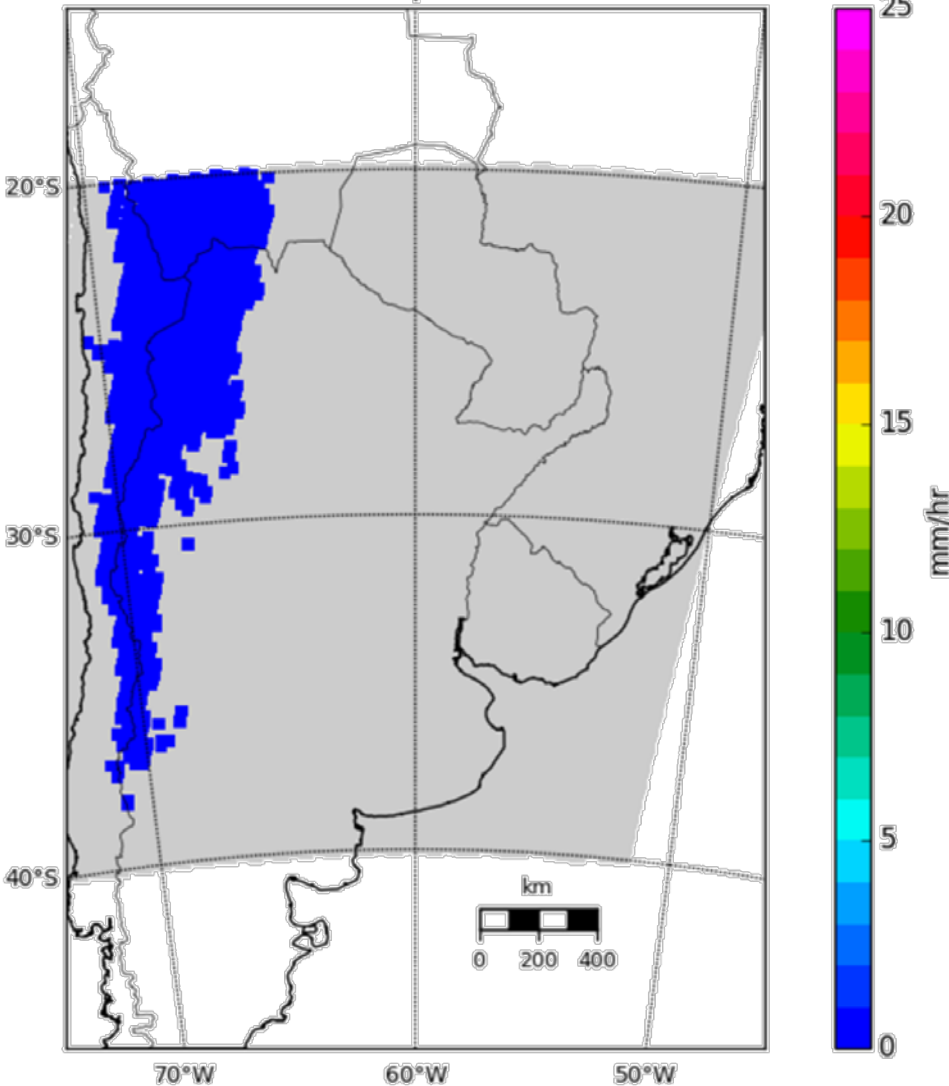
Precipitación

- NOAA y Metop (**)
- Índice de Precipitación Antecedente (**)



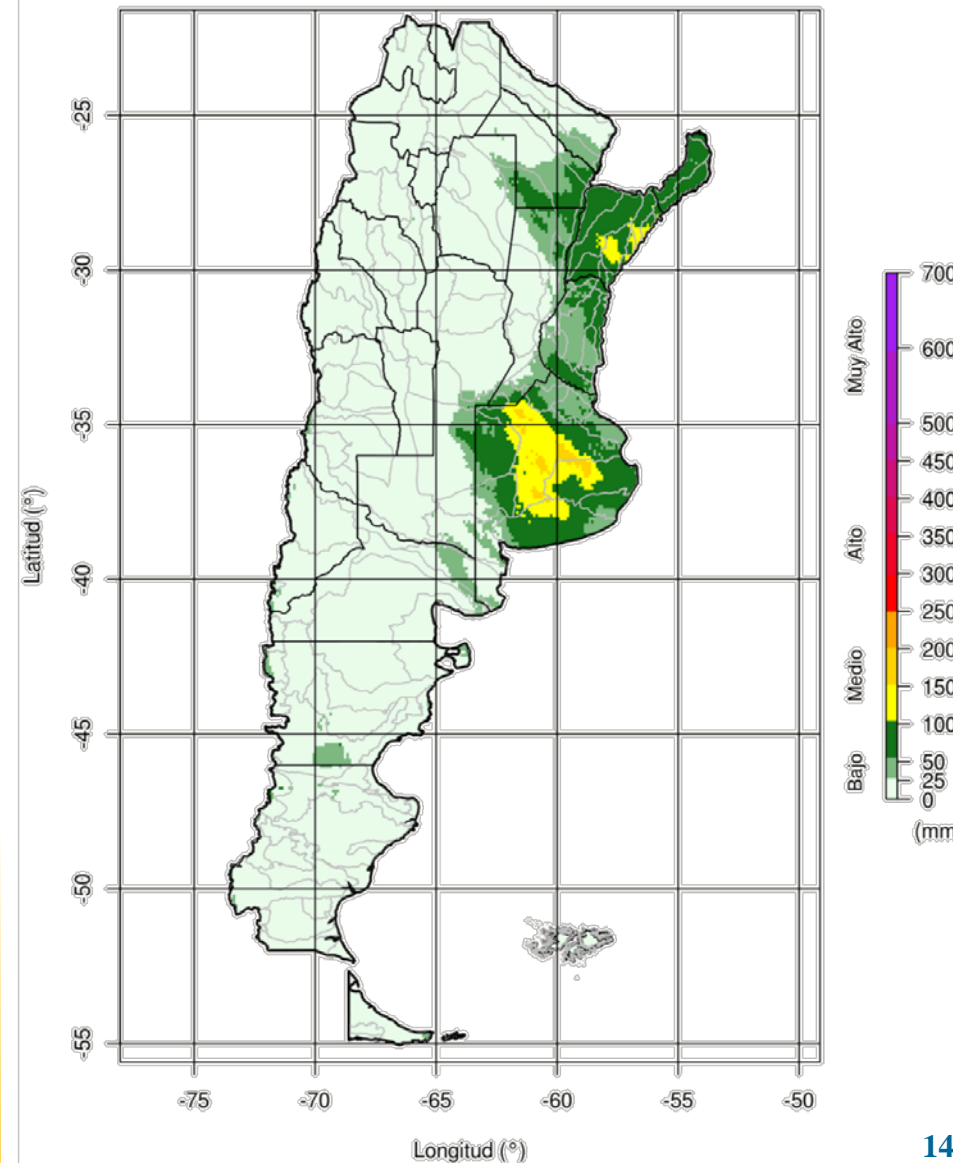
precipitation estimation [mm/hr]

NOAA18: 02 Sep 2017 10:54:00 UTC



API [mm] (TRMM)

Hora de evaluación: 09HOA del 2017-08-19



ISAGRO: Other Useful Products

SEQUÍA

Genera los siguientes productos: sequía actual y sequía actual anómala.

FUEGO

Focos de calor; interfase con áreas urbanas; áreas quemadas, frecuencia de cada área quemada en los últimos diez años.

HELADAS

Genera un índice de helada histórico y uno de pronóstico de heladas.

ÁREA FORESTADA

Genera dos productos que son los mapas de áreas forestadas y los mapas de alerta de deforestación.

frost

HUMEDAD DE SUELO

Mapas semanales de Humedad del Suelo a partir de Datos Aquarius (Misión SAC-D/Aquarius)

METEOROLOGÍA

Grupo de productos provenientes de modelos numéricos WRF, está compuesto por indicadores a 24, 48 y 72 horas

INDICE DE VEGETACION DE DIFERENCIA NORMALIZADA

Indicador del vigor de la vegetación presente en las coberturas del suelo

INDICE DIFERENCIAL DE AGUA NORMALIZADO

Indicador relacionado con el contenido de agua de la planta.

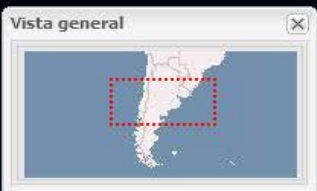


✓ institutions

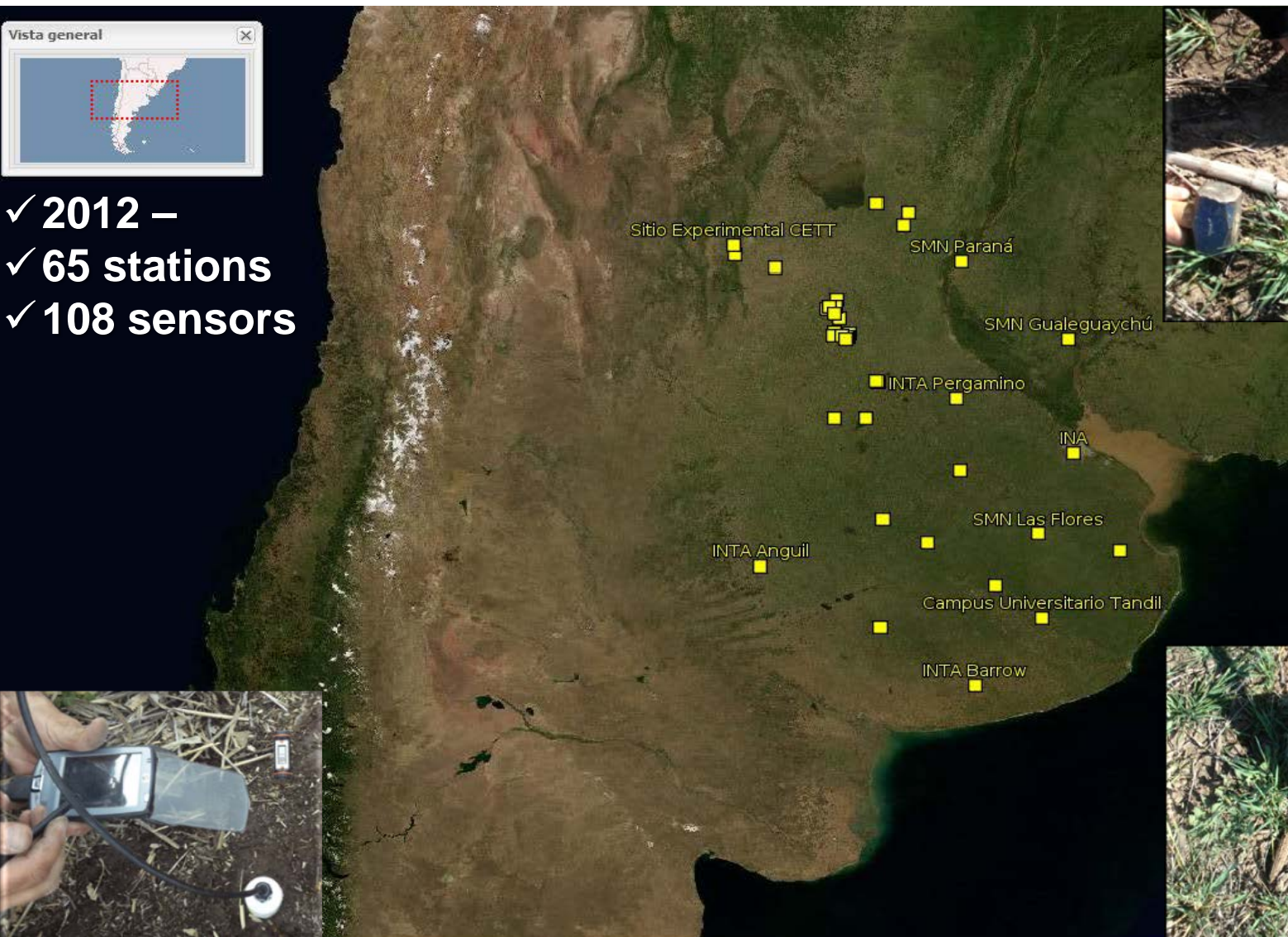
✓ Regional Public Goods

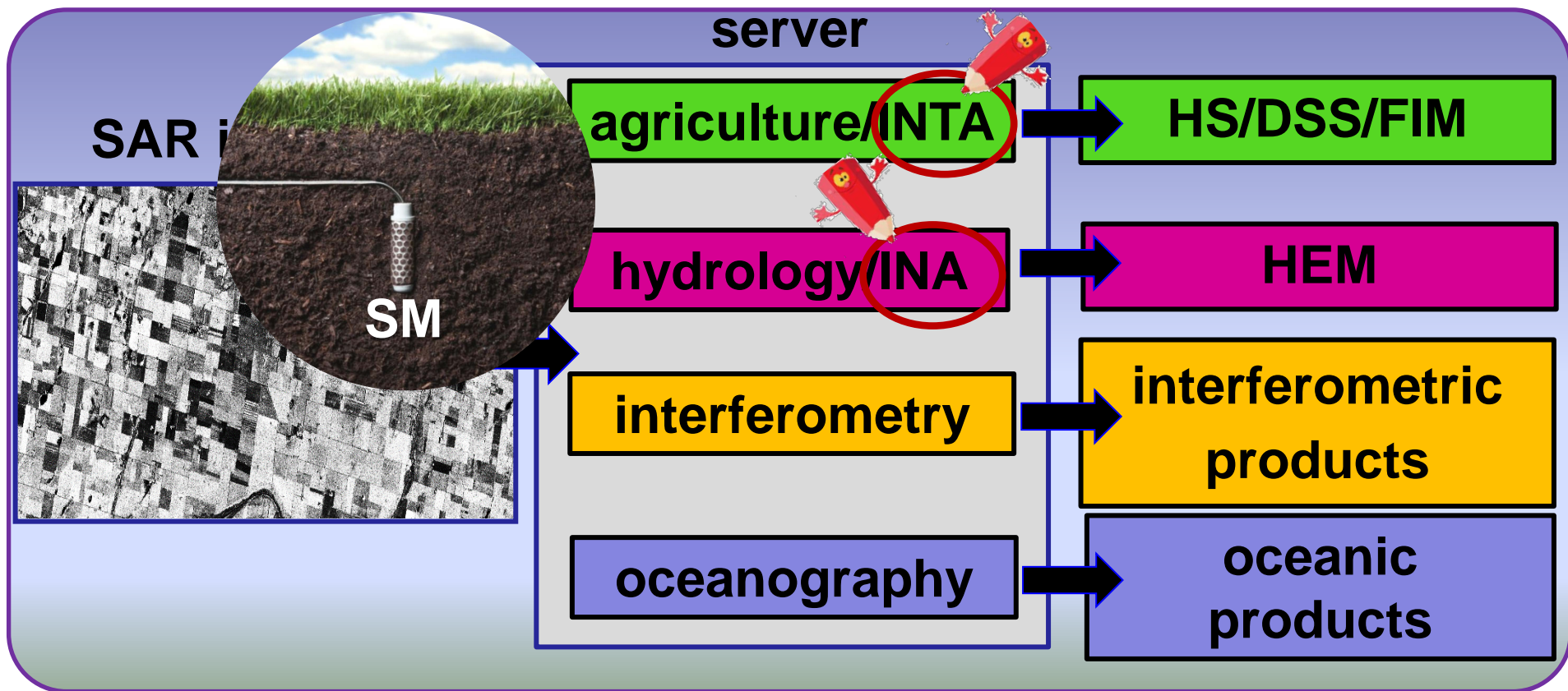
Program of the Inter-American Development Bank

Field Data: In-situ Network for Measurement of Soil Moisture, Temperature and Salinity

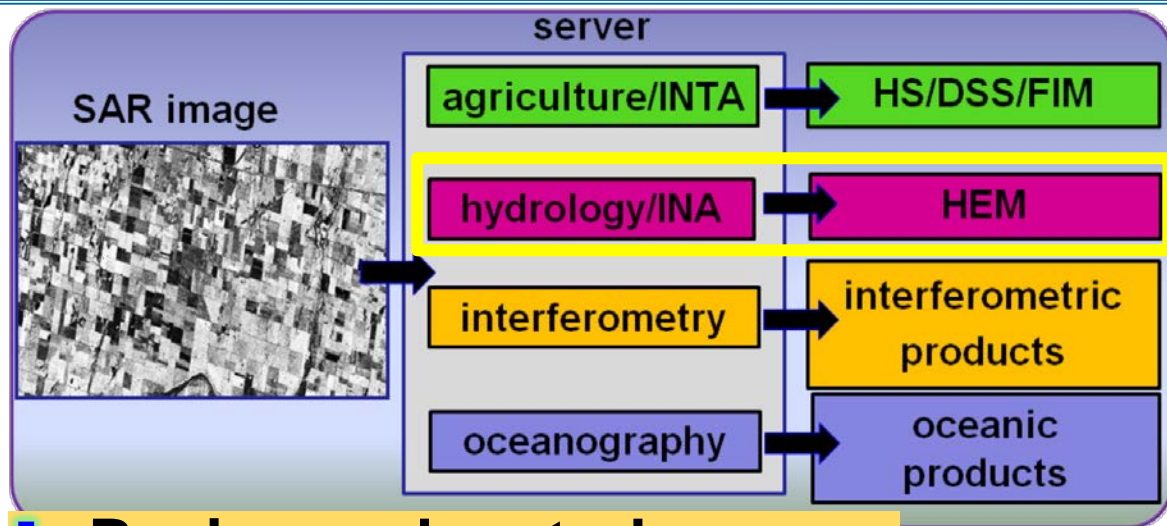


- ✓ 2012 –
- ✓ 65 stations
- ✓ 108 sensors

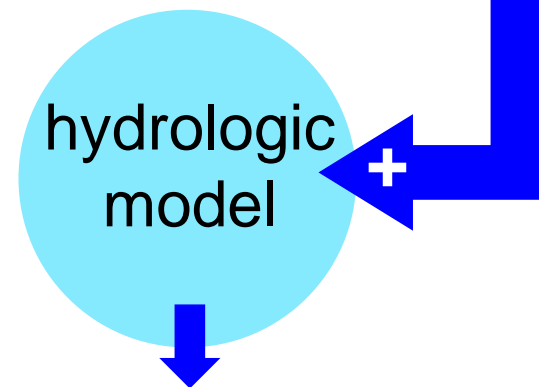




Product Processors for SAOCOM/SIASGE (Hydrology)

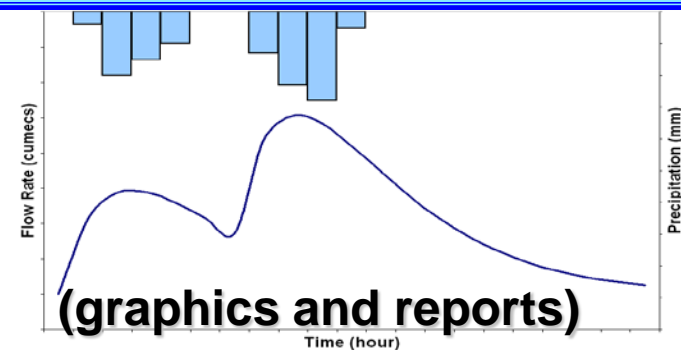
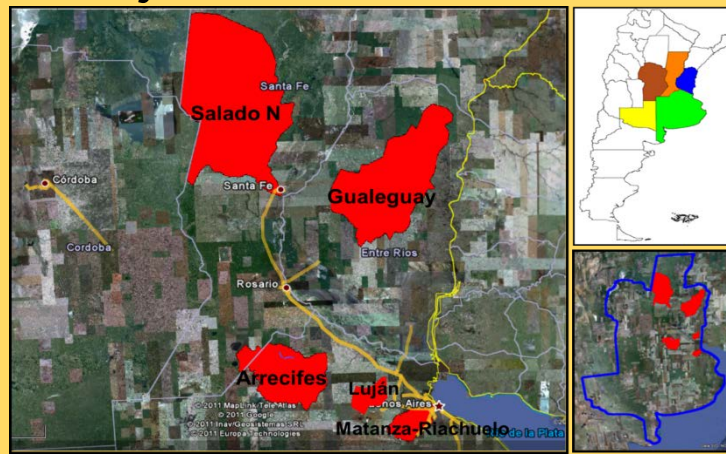


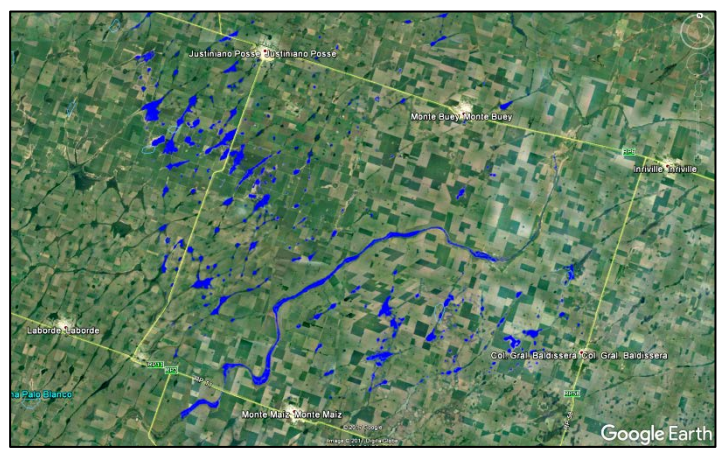
- ❖ precipitation
- ❖ evapotranspiration
- ❖ SM (SAR)



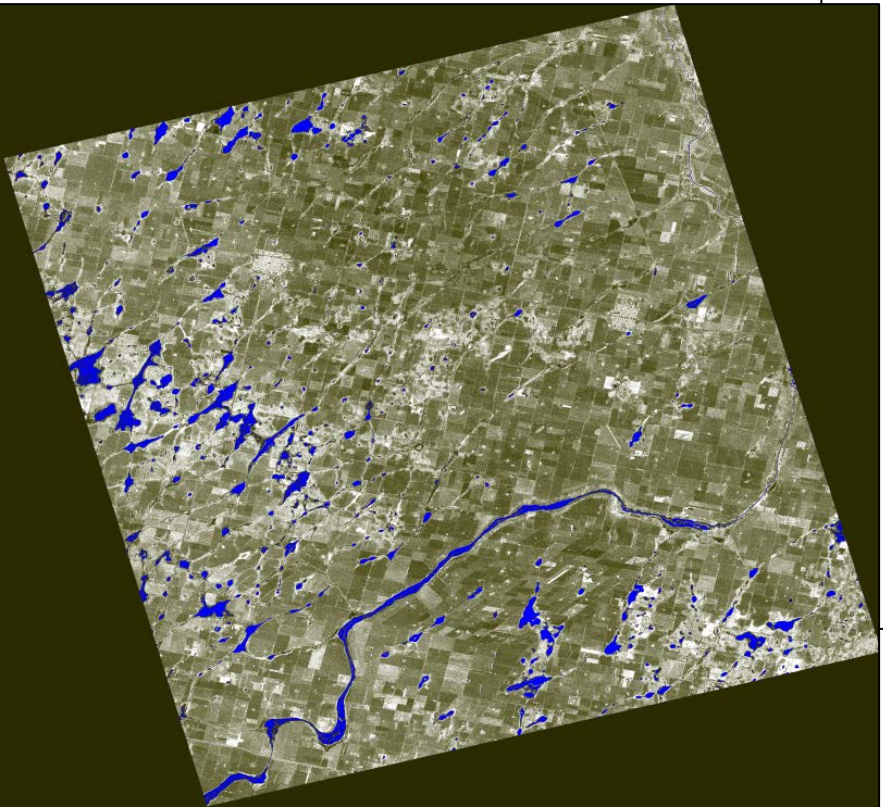
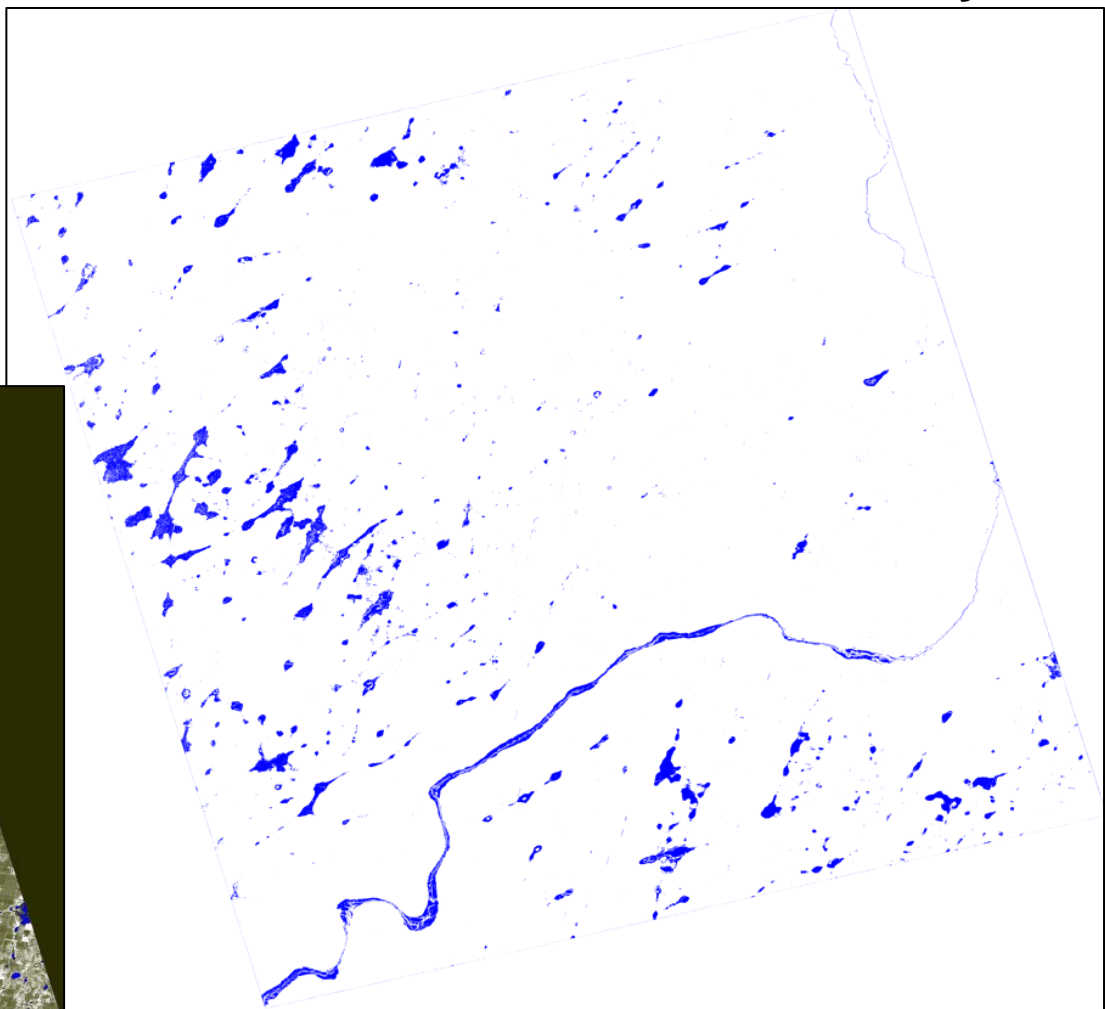
- ✓ deterministic forecast
- ✓ probabilistic forecast
- ✓ flood guidance

- Basins under study:
- ✓ Salado Norte
 - ✓ Gualeguay
 - ✓ Arrecifes
 - ✓ Luján Matanza-Riachuelo





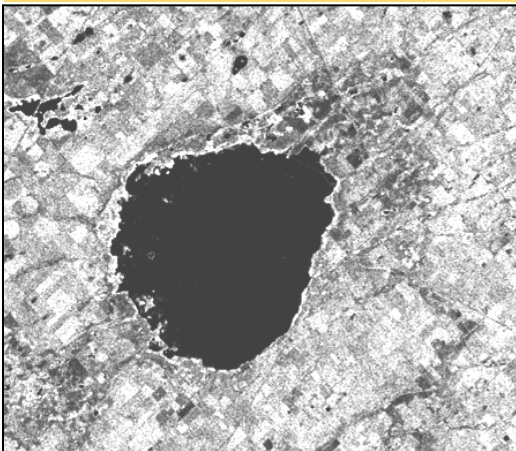
COSMO SkyMed



**SAR Capacity Building
(Wednesday)**

Water Recurrence Maps: Wetland Melincué Lake (1986 a 2016)

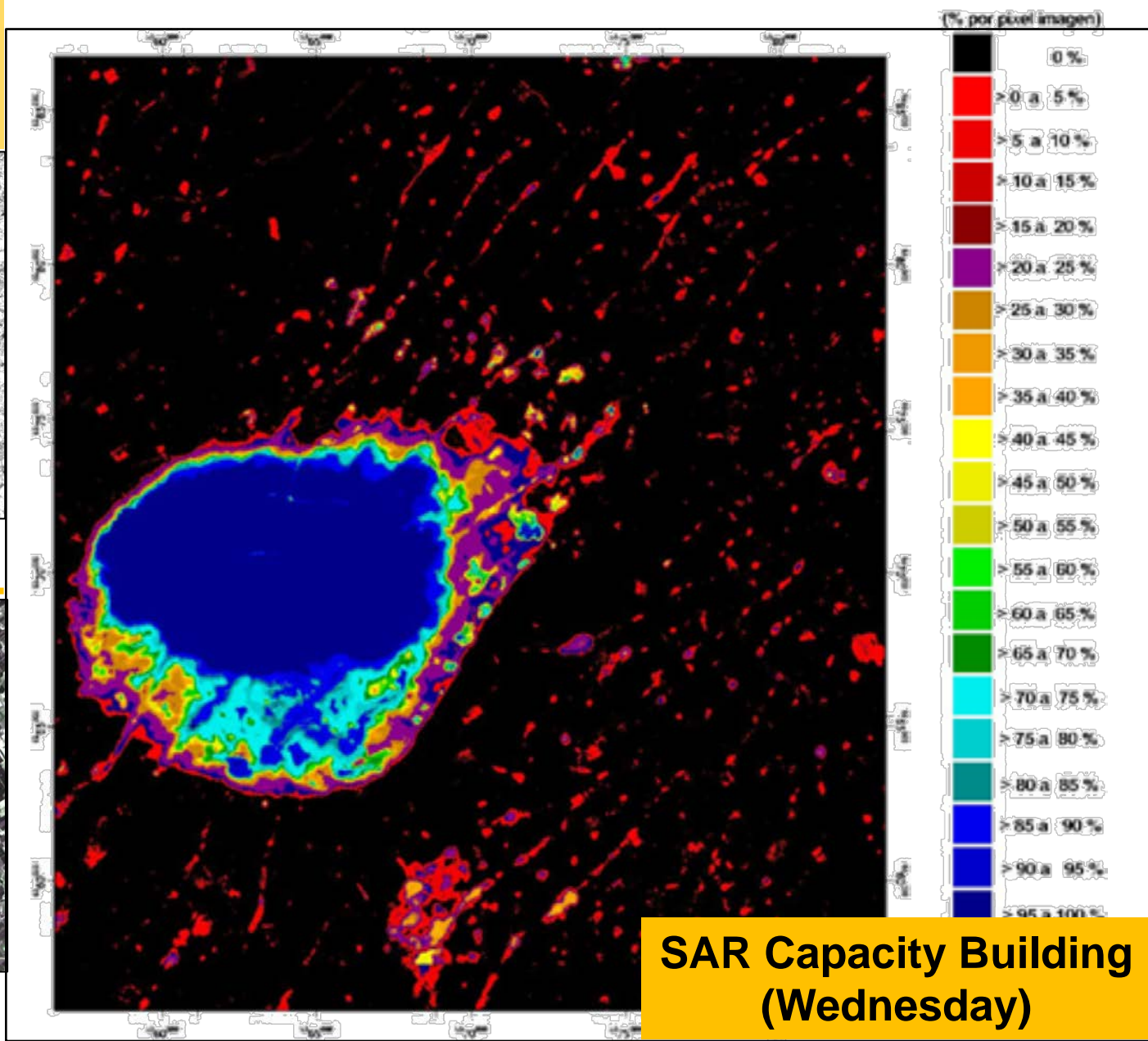
↪ 65 images
Landsat and COSMO-
SkyMed

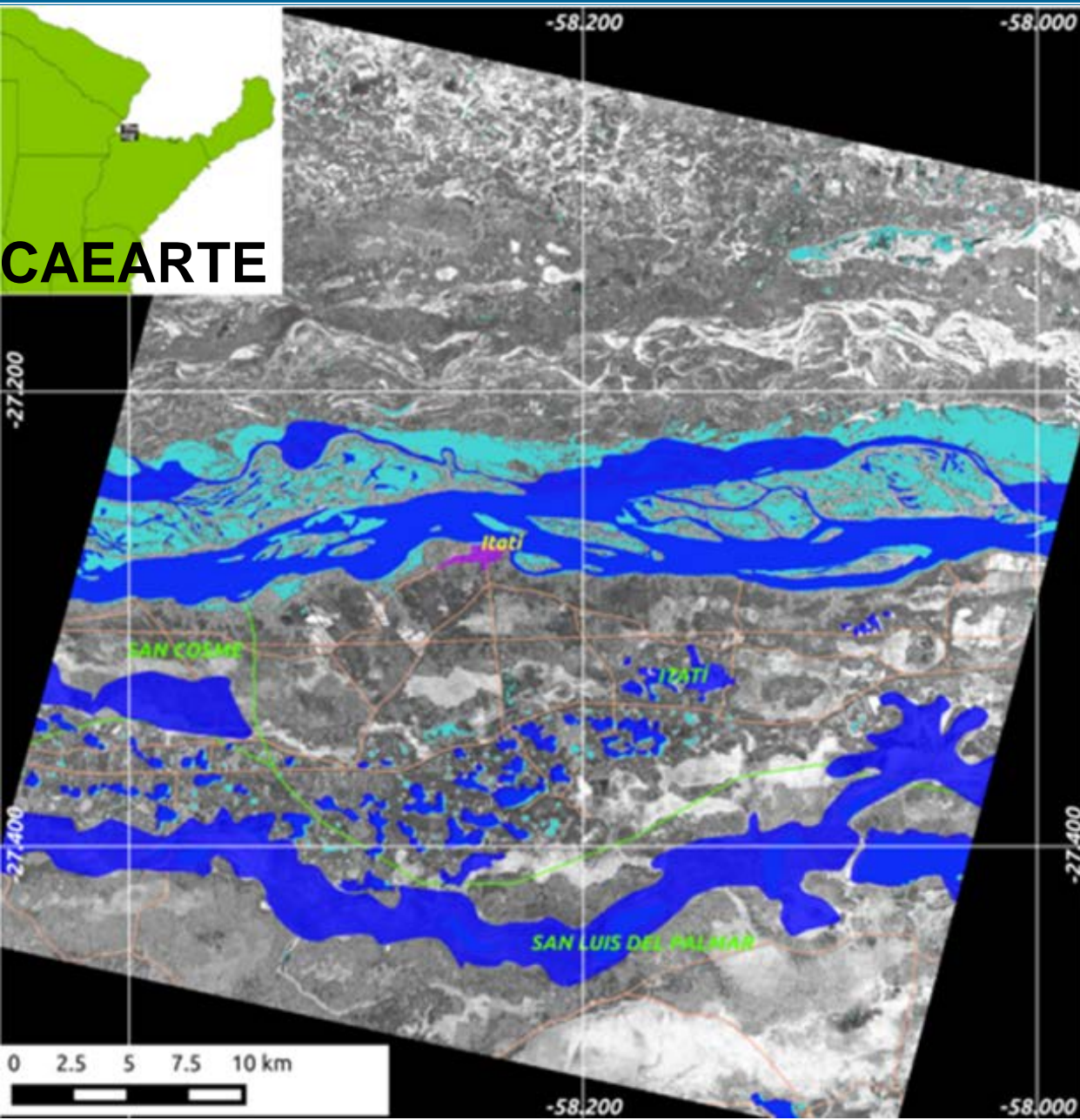







COSMO/SIASGE
27/03/2016



Landsat 8/OLI
06/02/2016

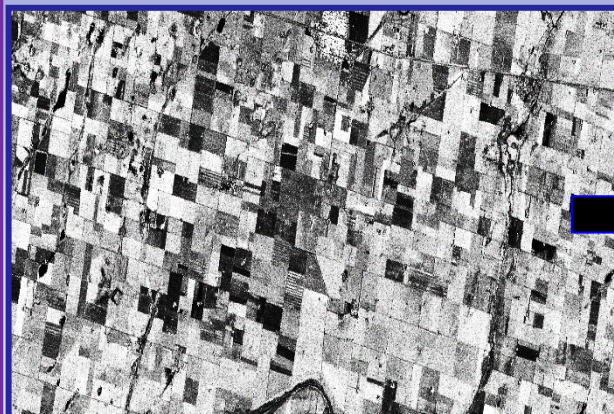




-  detected bodies of water
-  permanent bodies of water
-  urban areas
-  departmental division
-  road network

CAEARTE

SAR image



server

agriculture/INTA

HS/DSS/FIM

hydrology/INA

HEM

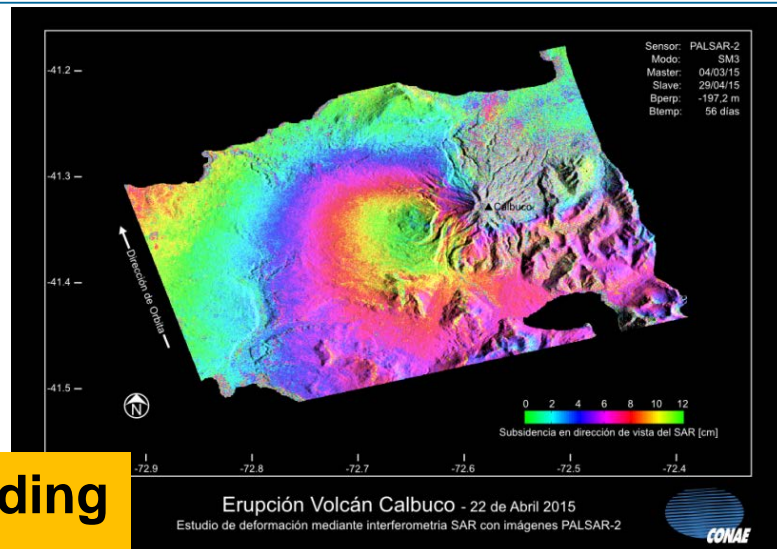
interferometry

interferometric
products

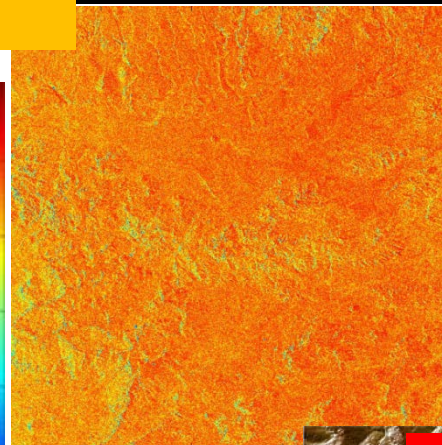
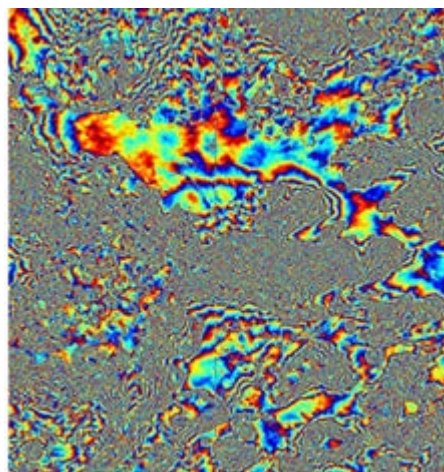
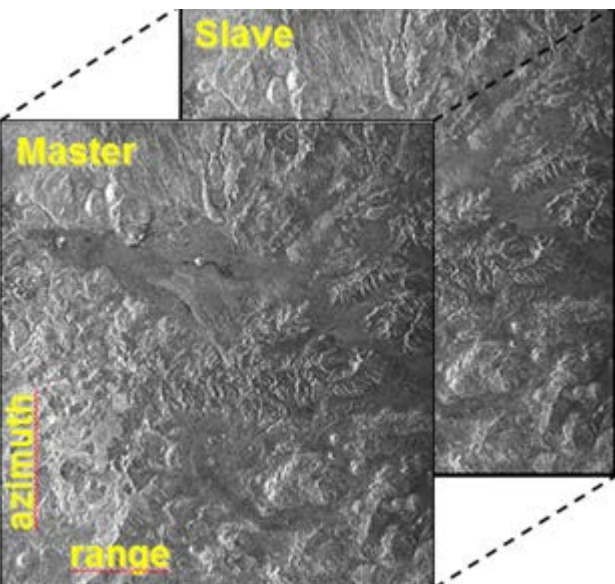
oceanography

oceanic
products

- ✓ pair of corregeistered images
- ✓ interferometric corregeistered pair
- ✓ interferometric phase image
- ✓ interferometric coherence
- ✓ subsidence maps
- ✓ DEMs



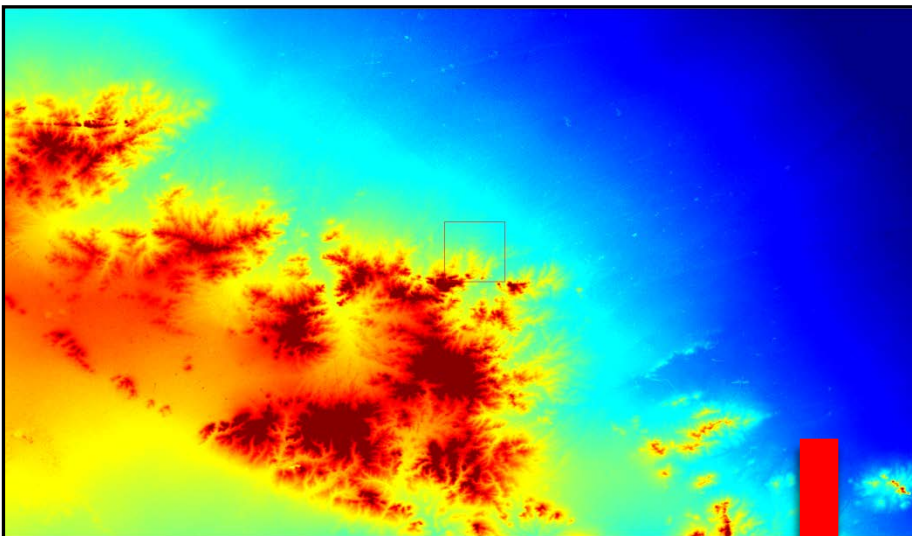
SAR Capacity Building (Wednesday)



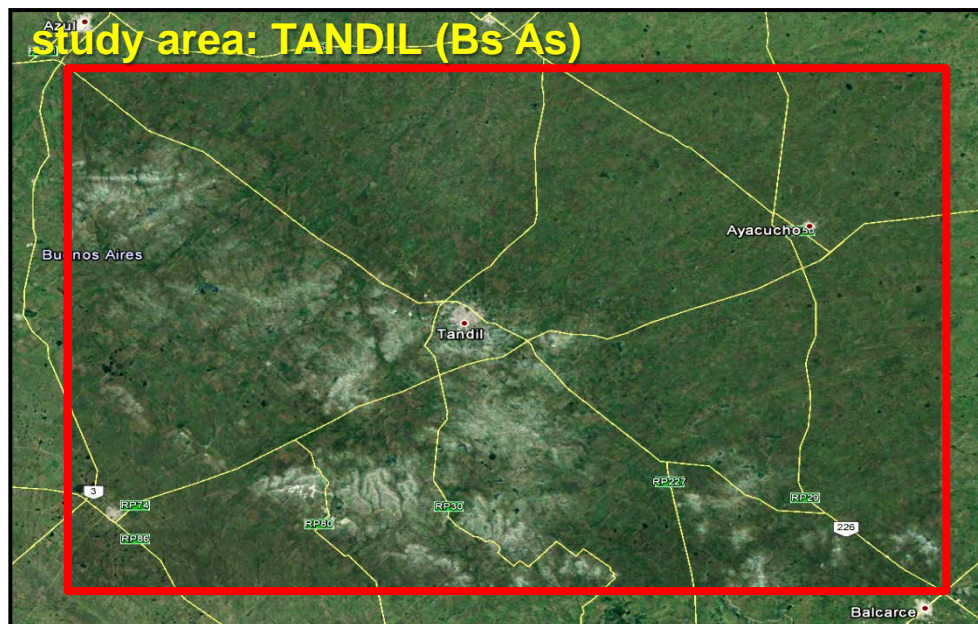
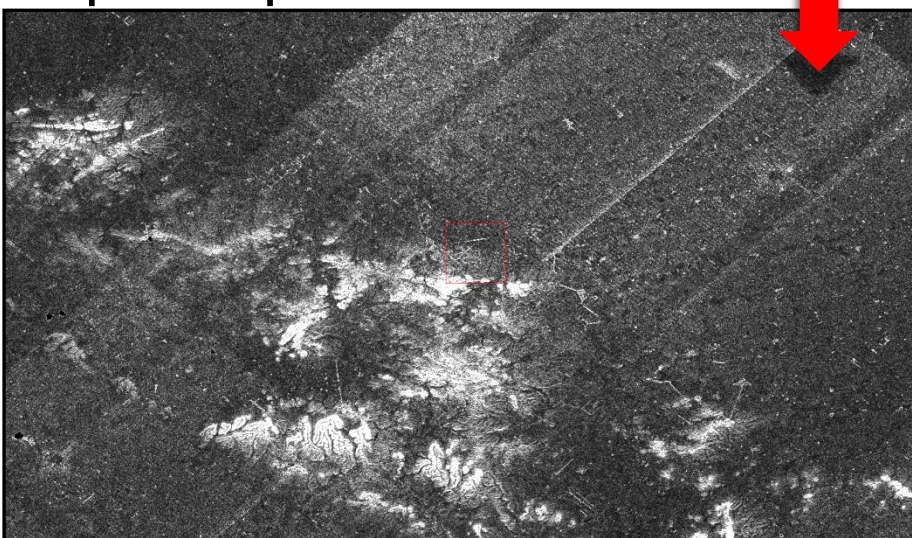
derived products

COSMO SkyMed (10 m)
Error ~1,63 m

USGS DEM SRTM-30 m



slope maps



slope statistics [%]			
Min	Max	Media	St Dev.
0.00	141.023	5.10	4.34

slope statistics (angles[°])			
Min	Max	Media	St Dev.
0.00	54.70	2.91	2.42



spatial decorrelation
(interferogram)

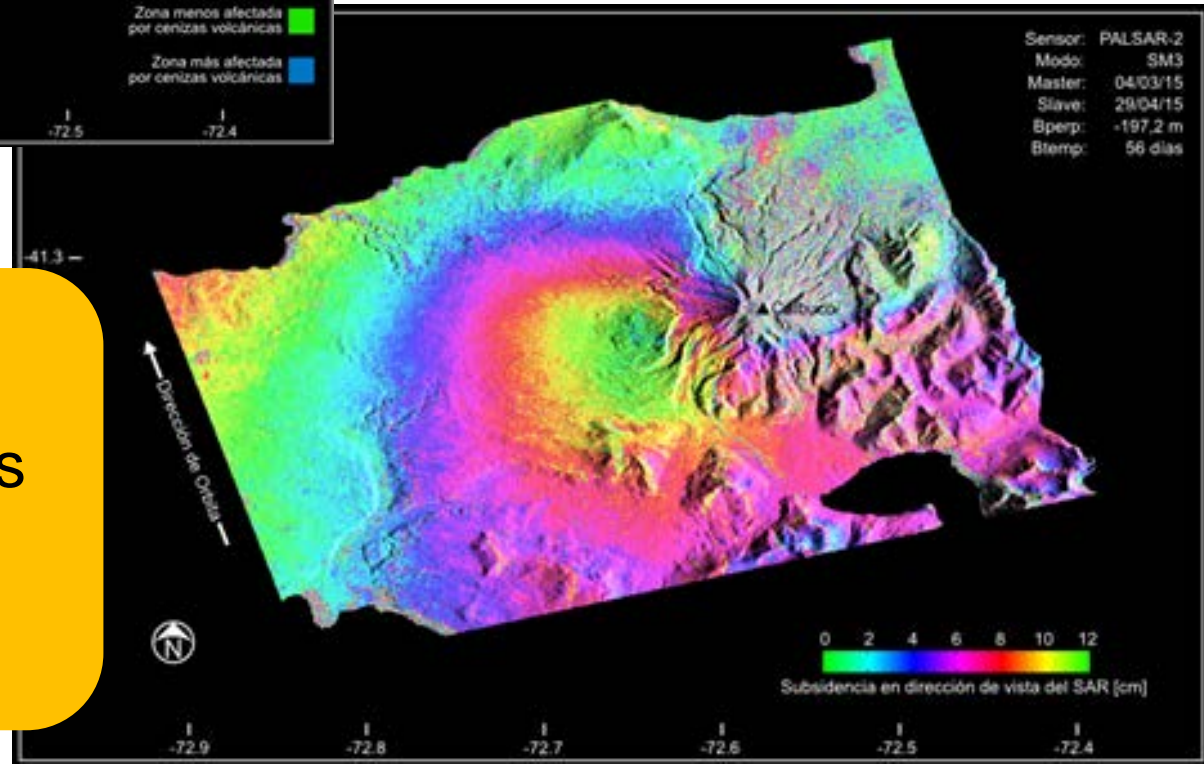
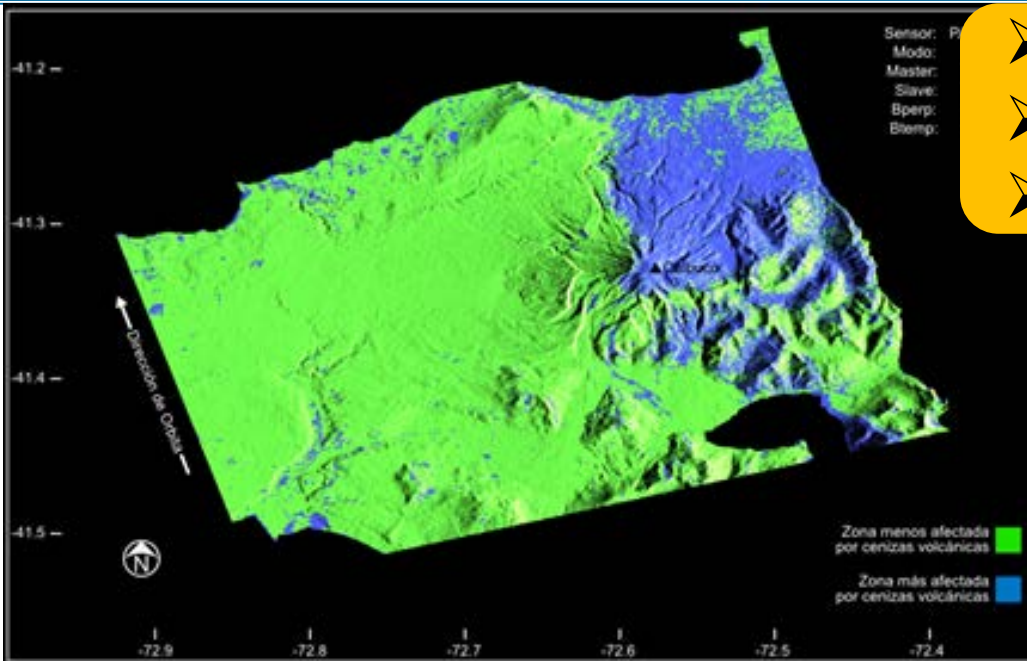


temporal decorrelation
(coherence)



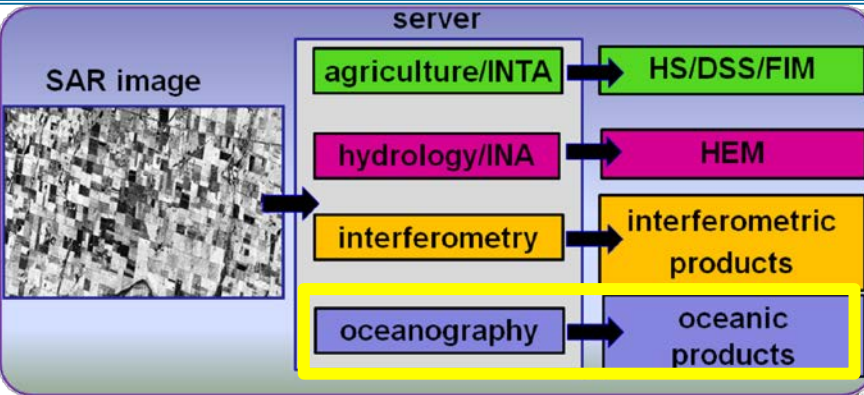
➤ change detection

- areas affected by ashes
- NE, the most affected región
- ~ 100 km²

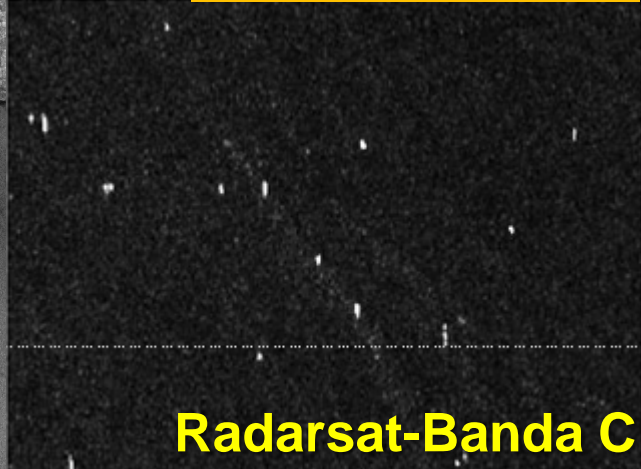


- changes were quantified
- precision ~ centimeters
- the West hillside suffered a subsidence ~ 12 cm

Product Processors for SAOCOM/SIASGE (Oceanic Products)^(1/2)



Ship detection



Radarsat-Banda C

Reporte de ubicación
y tamaño de embarcaciones

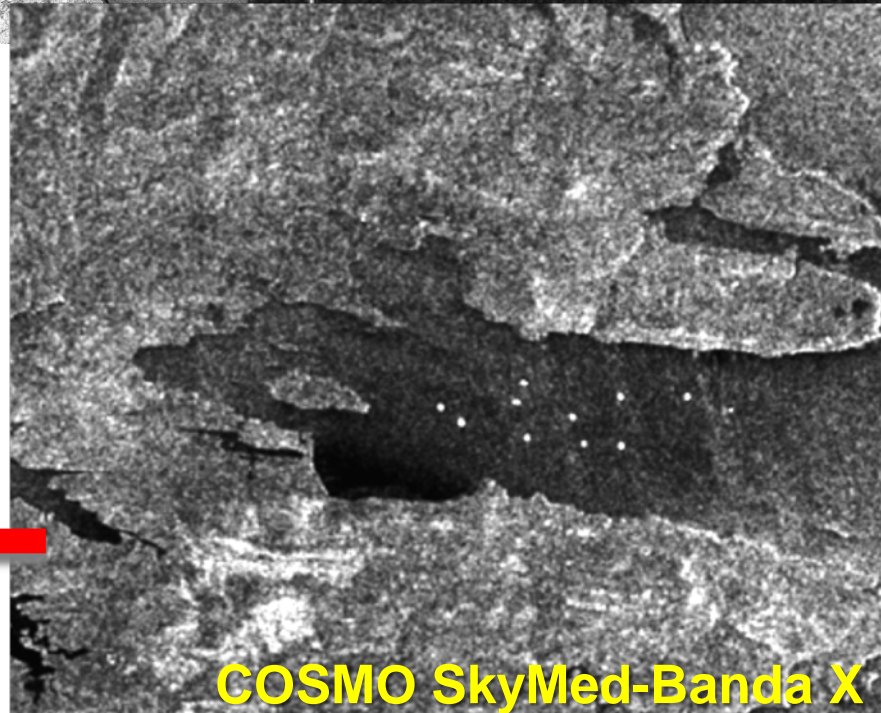
latitud	longitud	eslora	manga	diagonal_esl
-35.2742615	-54.7364311	200	250	320
-35.2724228	-54.7073631	50		71
-35.2636185	-54.8476791	50	50	71
-35.26185	-54.4874916	50	50	71
-35.278557	-54.6537	50	50	71
-35.2243729	-54.576	100	100	141
-35.2141075	-54.46683	100	150	180
-35.2131386	-54.42015	100	200	
-35.2047997	-54.4666405	150	150	212
-35.1942444	-54.256443	250	200	320
-35.1705284	-54.5022926		50	

latitude

longitude

ship width

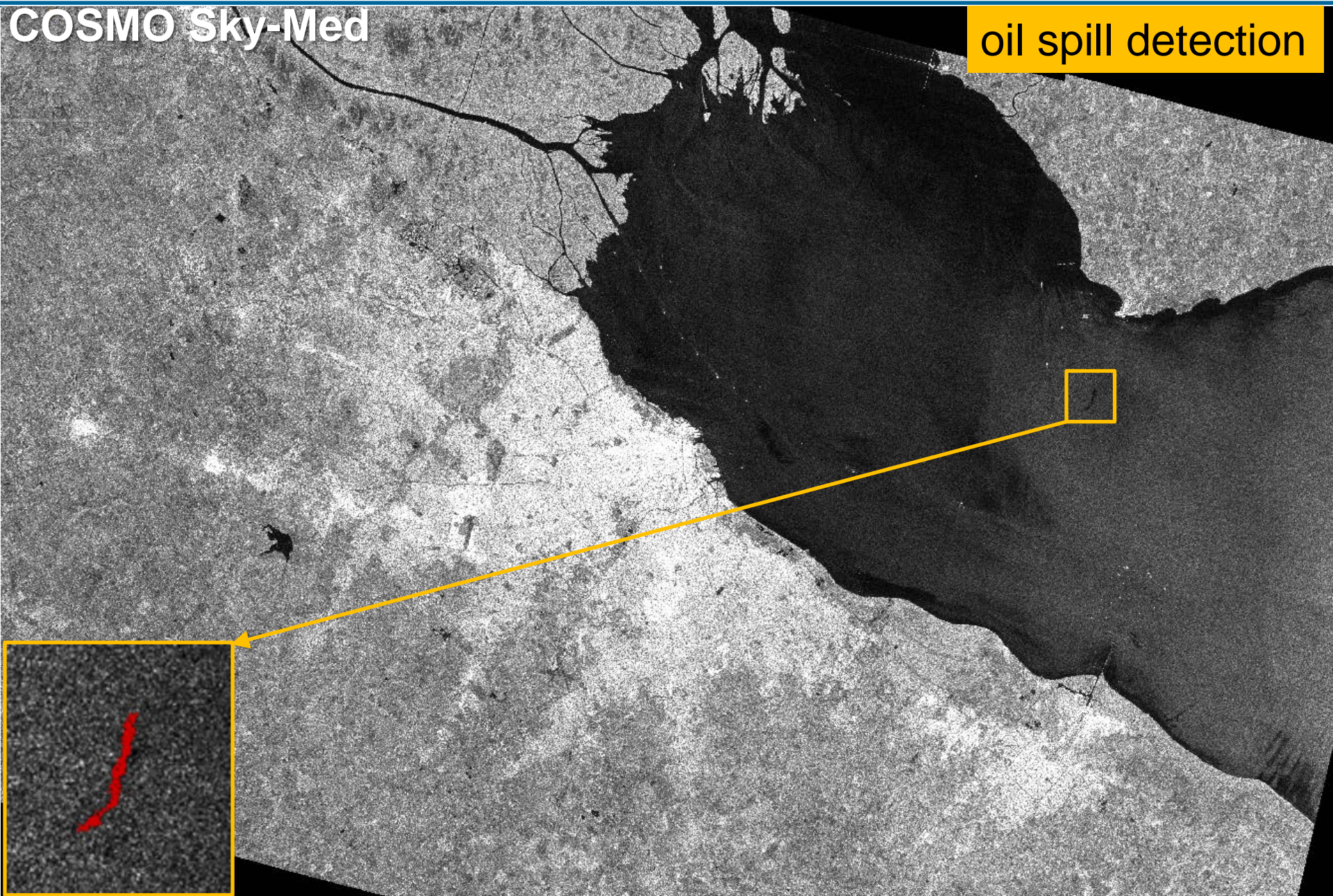
length



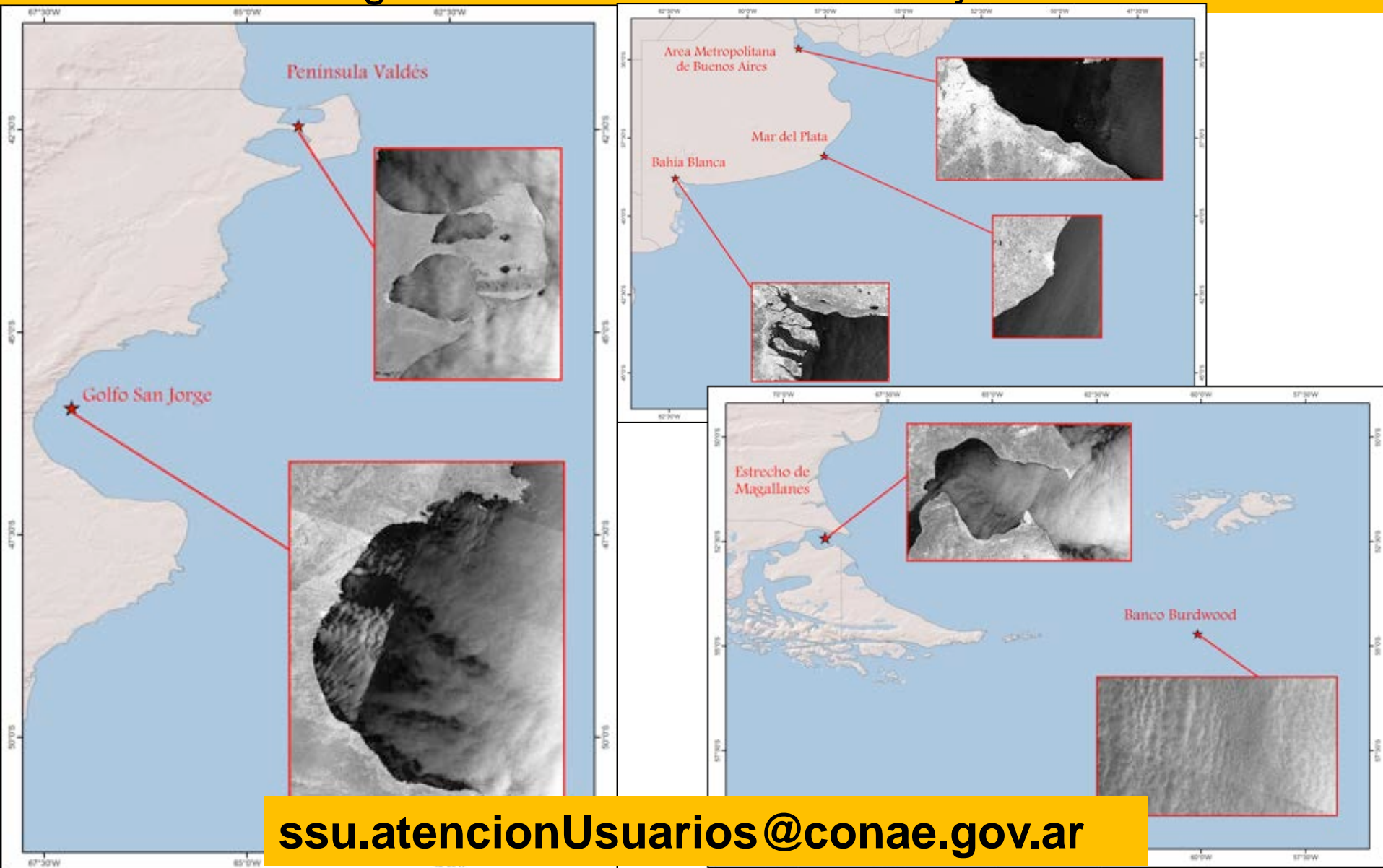
COSMO SkyMed-Banda X

COSMO Sky-Med

oil spill detection



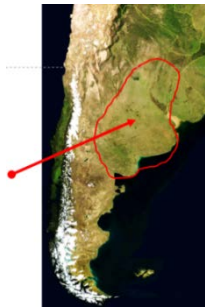
argentine coasts – COSMO SkyMed



ssu.atencionUsuarios@conae.gov.ar

Baseline mission (fixed acquisitions)

- **Soil moisture**
over Pampas



- Calibration purposes:
 - ↪ the **rain forest**
 - ↪ specific **point targets**

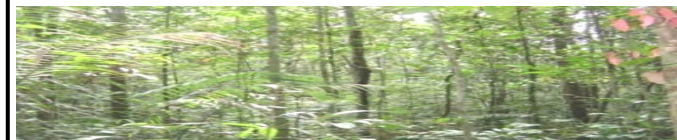


Foreground mission (variable acquisitions)

- User requests
(national / from
abroad)

Background mission (useful data base)

- Over **Argentina**:
 - ↪ emergencies
 - ↪ maritime
 - ↪ forest biomass
 - ↪ the mountain chain at the West (the Andes): plates, glaciers movement
- Over **Latin America** and the **rest of the world**:
 - ↪ forest biomass



Different Regions of interest according:

- Users interests (knowledge from the agreements)
- Scientific and operational objectives
- Best temporal window for the acquisitions
- Observation frequency
- Best operating mode and type of beam (angle, polarization, etc.) according to the type of application
- Type of pass (asc/desc)

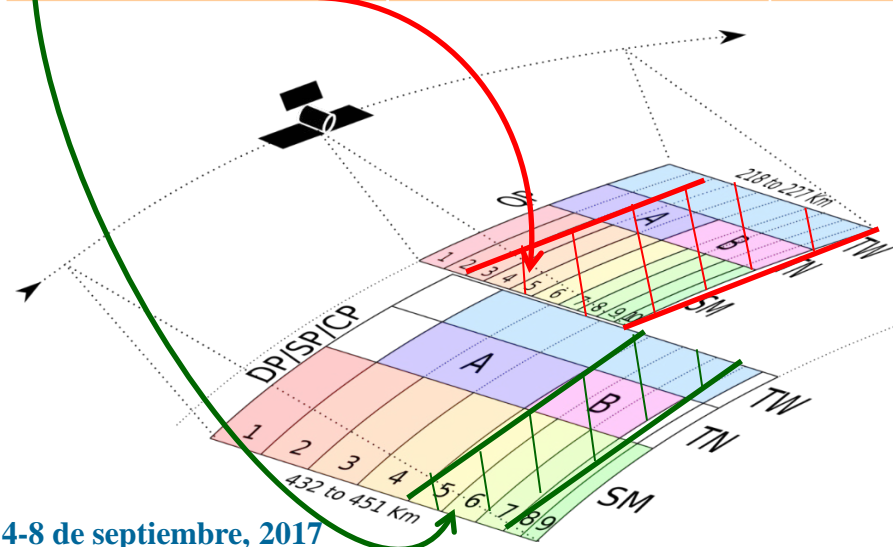
Acquisition Plan for Flood Monitoring (SAOCOM/ARG-2)

- **Temporal window:** November to February
 - **Type of pass:** ASC
- ✓ SAO1A: 16 acq./year

↙ TNBDP: 8 acq.

↘ TWQP: 8 acq..

acquisition mode	polarization mode	swath	spatial resolution	incidence angles range
TOPSAR Narrow B	DP: HH/HV o VV/VH	> 150 km	< 30 m	25° - 45°
TOPSAR Wide	QP: HH/HV/ VH/VV	> 220 km	< 100 m	20° - 35°



- **user support:**
 - ✓ `ssu.atencionUsuarios@conae.gov.ar`

- **emergencies events:**
 - ✓ `emerg@conae.gov.ar`
 - ✓ `caearte@conae.gov.ar`

- **Institutional agreements:**
 - ✓ `convenios@conae.gov.ar`

- **training support:**
 - ✓ `capacitacion.sopi@conae.gov.ar`
 - ✓ `capacitacion2mp@conae.gov.ar`

- **COSMO SkyMed derived products:**
 - ✓ `productos.SIASGE@conae.gov.ar`

- <http://www.conae.gov.ar/index.php/espanol/>

