

The International Charter

Presenter Name: Richard J. Kotapish GISP

Title: GIS Director

Organization: Lake County, Ohio



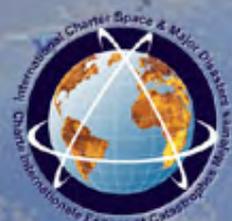
2009 Ohio GIS Conference

September 16-18, 2009

Crowne Plaza North Hotel

Columbus, Ohio

International Charter Space and Major Disasters



History and Operations

Operational Personnel Roles

Satellite Resources

Activation Examples

Recommendations



Purpose



An International agreement among Space Agencies to support with space-based data and information relief efforts in the event of emergencies caused by major disasters.

- **Disaster response**
- **Multi-satellite data acquisition planning**
 - Fast data turn-around – priority acquisition
- **Archive retrievals and spacecraft tasking**
- **Data processing at pre-determined level**
- **Space Agency contribution in image/data**
- **Space Agency initiative for value-added-data fusion**



Charter History

- Following the UNISPACE III conference held in Vienna, Austria in June 1999.
- ESA and CNES initiated the International Charter in July 1999.
- CSA (Canadian Space Agency) signed the Charter on October 20, 2000.
- Charter implementation by identifying and creating a number of functional units and preparing the necessary policies and plans.
- Charter declared operational as of November 1, 2000 after formal rehearsals and qualification tests.
- First activation of the Charter: Slovenian landslide November 11, 2000.



ERS and ENVISAT



SPOT



RADARSAT



POES, GOES



IRS

Charter History

- The US National Oceanic and Atmospheric Administration (NOAA), and the Indian Space Research Organization (ISRO) became members in September 2001.
- In July 2003, the Comision Nacional de Actividades Espaciales (CONAE) joined the Charter.
- Detailed operational procedures established and kept under document configuration control.
- In 2005, the Japanese Space Agency (JAXA) joined the Charter in February, the United States Geological Survey (USGS) in April as part of the US membership, and the Disaster Monitoring Constellation (DMC) Consortium in November.
- The China National Space Administration (CNSA) joined the Charter in May 2007.
- Two hundred and fourteen (214) disasters covered to date in various parts of the world.



SAC-C



ALOS



Landsat



ALSAT
BILSAT
NigeriaSat
UK-DMC
TopSat



CBERS

Charter Member Agencies



CSA 
Canada

NOAA 
USGS 
USA

CONAE 
Argentina

CNES 
France

ESA 
DMC 
Europe

CNSA 
China *JAXA* 
Japan

ISRO 
India

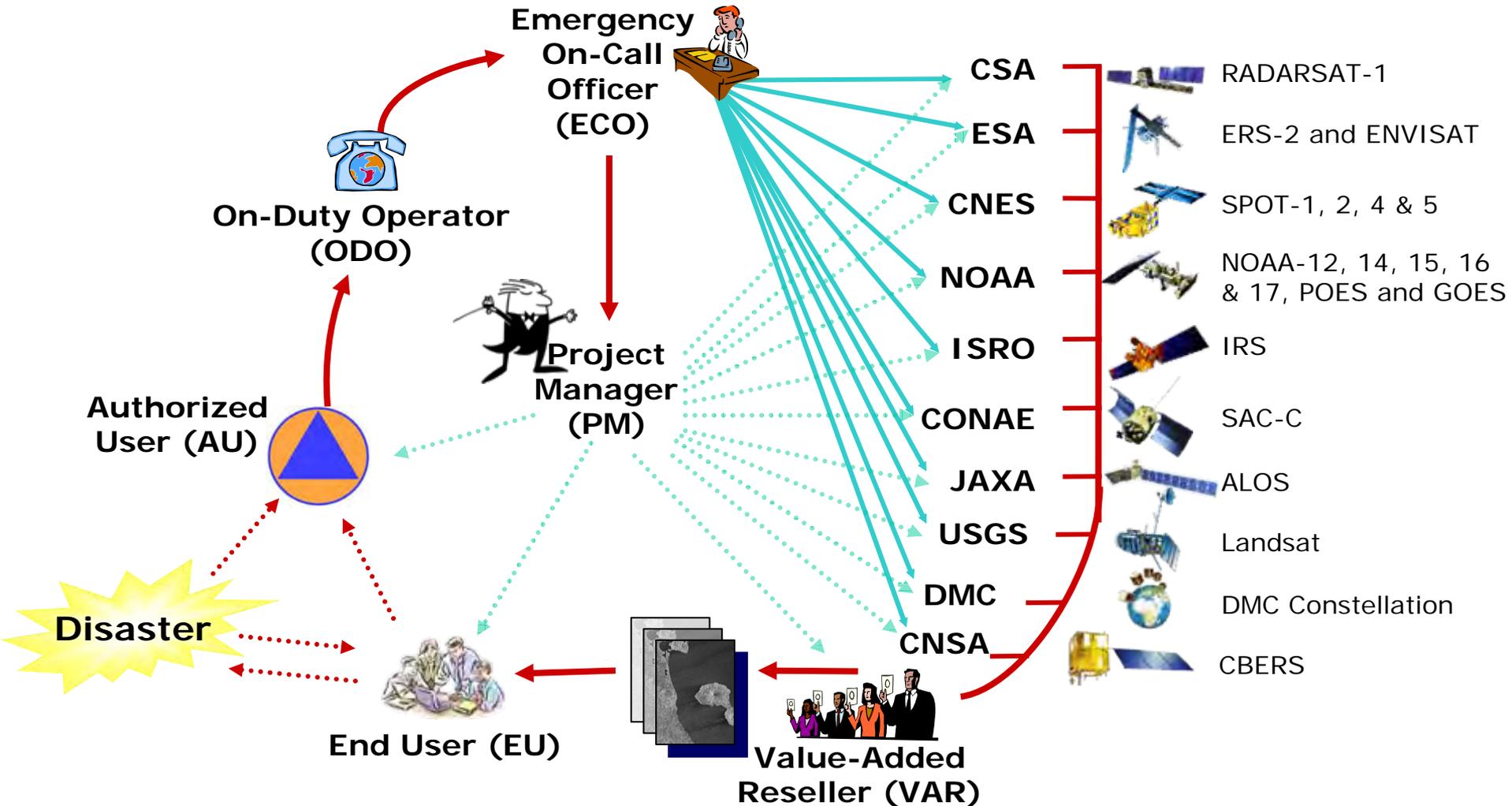
Charter Functional Units



- **Authorized Users (AUs)**
- **On-Duty Operator (ODO)**
- **Emergency on-Call Officer (ECO)**
- **Project Manager (PM)**
- **Data processing and distribution facilities**
- **Value-Added Resellers (VARs)**



Charter Operational Loop



Activation Criteria



These requests should not be accepted:

1. **Non emergency situations :**

Oil spill monitoring operations

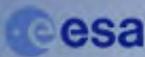
Ice monitoring operations except for specific event

2. **Emergencies falling out of Charter scope :**

War or armed conflicts

Humanitarian actions not linked to a specific disaster

Search and rescue support not linked to a specific disaster



Activation Criteria



3. Emergencies with doubtful/no benefit from space assets

Droughts

Routine epidemiological outbreaks

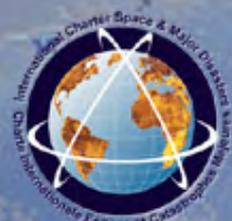
4. Calls beyond emergency period

As a rule of thumb, a Charter activation occurring more than 10 days after the actual crisis start should be rejected.

In addition, the duration of a Charter call should be limited to a maximum of 15 days after activation and the request should be rejected if the size of the disaster is not compatible with the resolution of the available satellites.



International Charter Space and Major Disasters



Operational Personnel Roles

AU – Authorized User

ODO – On Duty Operator

ECO: Emergency On-Call Officer

PM - Project Manager



AU: Authorized User

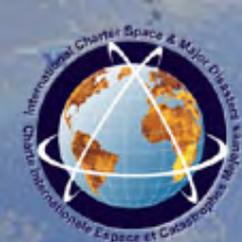


Authorized users are normally Civil Protection Agencies

- Only an AU can request a Charter activation.
- UNOOSA and UNOSAT have the capability to request an activation for other UN agencies.
- United States : Brenda Jones, USGS Center for Earth Resources Observation and Science (EROS)



ODO: On Duty Operator



On-Duty Operator (ODO)

- AU calls the ODO and submits the User Request Form (URF)
- ODO checks the identity of the calling AU
- ODO confirms the reception of the URF and its completeness
- The ODO is available 24 hrs/ 7 days a week
- ODO is hosted at ESRIN (ESA), Frascati (ITALY)
- He receives and records incoming calls from AU's
- He checks the consistency of the request (URF)
- He transfers the request to the on duty ECO



ODO: On Duty Operator



User Request Form		
To be filled by ODO Call ID _____		
1. Date and time of the call	DATE _____ MONTH (Spell) _____ YEAR _____	
	TIME _____ LOCAL TIME ZONE _____ UTC TIME _____	
2. Name of the organization and caller Phone _____ Fax _____ Cellular phone _____ E-mail _____ to be used for call back		
3. Type of disaster		
<input type="checkbox"/> flood	<input type="checkbox"/> hurricane	<input type="checkbox"/> earthquake
<input type="checkbox"/> landslide	<input type="checkbox"/> fire	<input type="checkbox"/> oil spill
<input type="checkbox"/> volcano	<input type="checkbox"/> ice	<input type="checkbox"/> other (specify) _____
4. Geographical location		5. Co-ordinates
Approximate geographical location and surface extent Location From _____ To _____ Extent (km ²) _____	a) by center co-ordinates Lat. _____ Long. _____  Maximum radius of 30 Km	b) by upper left co-ordinates Lat. _____ Long. _____  Lower right co-ordinates Lat. _____ Long. _____ Maximum 60x60 km ²
	6. Approximate date/time of occurrence or predicted occurrence	
	7. Additional information on the disaster	
	8. Additional instructions (shipping instructions)	
To be filled by ODO Authorized User <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>		



Emergency On-Call Officer



- The ODO calls the ECO for this week.
- If the call was made via pager or a message in a mobile phone, the ECO should respond to the ODO inside a 20 minutes period.
- If there is no response after this 20 minutes period, the ODO calls the ECO again.
- The ODO sends the URF to the ECO by fax and by E-mail.



ECO: Emergency On-Call Officer



The ECO is an operator that is available

- One week each **N** weeks (N= number of agencies providing the ECO function)
- 24 hours/day Seven days a week (Starts on Monday 12:00 UTC)
- Reviews the activation request.
- Selects the image acquisitions for this kind of scenario.
- Plans the image acquisition.
- Sends the image request (ERF) to the Order Desk of the agencies



ECO: Emergency On-Call Officer



- ECO calls the AU for information on the Disaster
- Only the ECO initiates the call and obtains the AU input
 - Geographical location of the affected area
 - Type of disaster
 - Extent of disaster
 - Type of data processing/product (if applicable)
 - Target delivery time
 - Delivery medium and address
 - Any additional information



PM - Project Manager

- PM contacts directly the ECO if required
- PM obtains further information on the requirements
- PM appraises the AU with regard to the data acquisition planning
- PM solicits AU's appraisal of the Charter activation

The PM has experience base in the following areas:

- Remote sensing satellites, their supporting ground systems;
- Data delivery networks;
- Remote sensing data application, particularly in disaster management
- Civil Protection Agencies and their mandates;
- Remote sensing data value adding;
- Project management



Project Manager Role



The Executive Secretariat designates the PM by taking into consideration the following criteria:

- Geographical region of the disaster occurrence;
- Disaster type;
- Sensor(s) used to cover the disaster;
- Availability of potential PMs among Parties/Partner Agencies;
- Fair distribution of PMs among Parties/Partner Agencies;
- Value-added processing proposal by a Party/PA according to the AU request.

The PM receives the Dossier on the disaster from the ECO. The PM interacts with the AU on all the data and information requirements and with other parties for any required delivery of value-added products and information.



Project Manager Role

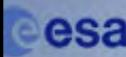
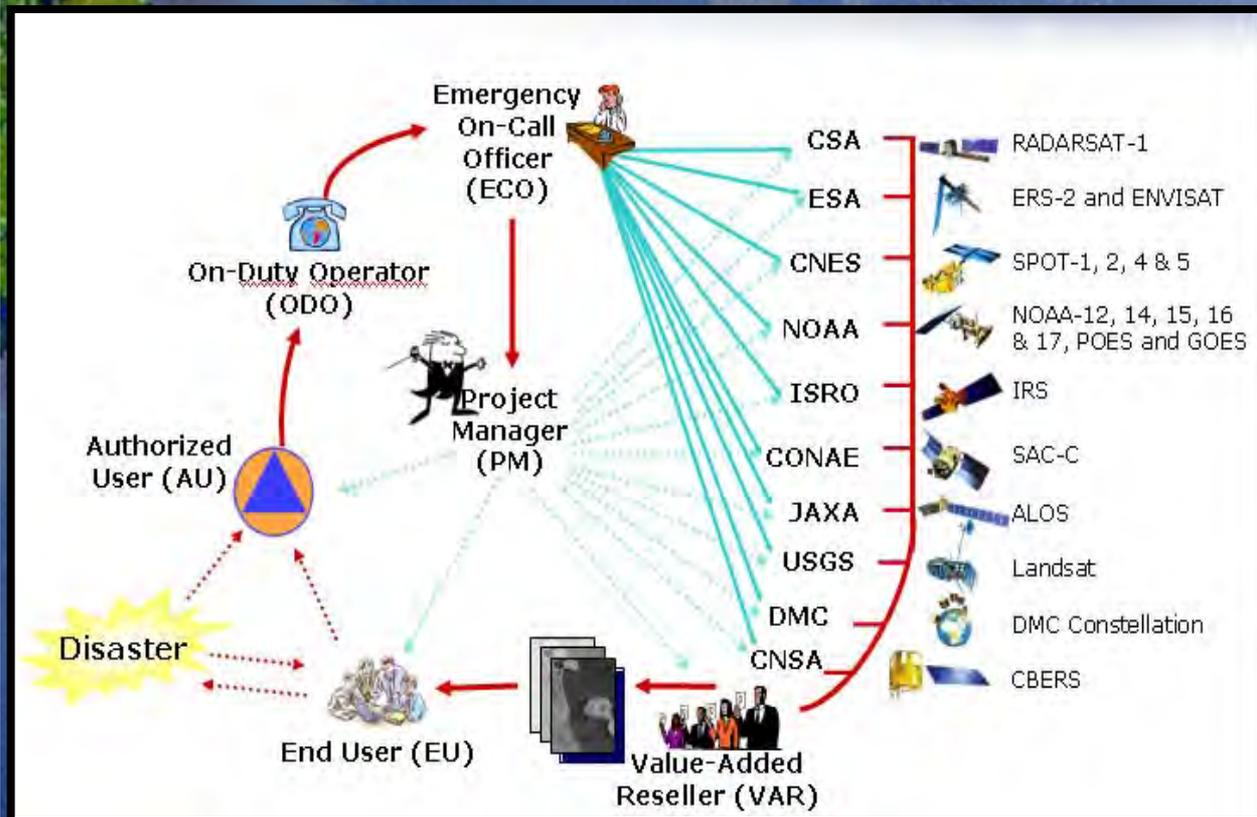


Project Manager (PM)



Project Manager (PM)

- Is identified by the Executive Secretariat when the Charter is activated
- Is available during normal working hours
- Ensures data is sent to the end user
- Confirms accuracy of data sent to user
- Is able to interpret data
- Coordinates, when required, the delivery of value-added products and information
- Completes the dossier on an activation and closes it out with a Preliminary Report and a Final Report.



Project Manager (PM) Interfaces



PM and Authorized User (AU)

- The PM contacts the AU to obtain further description of the disaster, special data and information needs
- The PM provide updated information concerning data acquisition and special data or information product delivery.



Project Manager (PM) Interfaces



PM and Emergency On-Call Officer (ECO)

- PM contacts the ECO concerning the reception of the dossier. The PM receives the Dossier of the disaster event from the ECO.



Project Manager (PM) Interfaces



PM and Executive Secretariat (ES)

- Suggests improvements, if any, in the implementation procedure of the predefined PM Scenario.
- **Writes up a final operation report - for delivery to the ES within 45 days of Charter activation - taking into account comments from participating bodies affected by the disaster.**



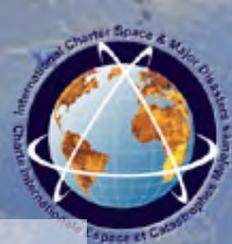
Responsibilities of the PM



- PM acquires an in-depth knowledge of the disaster and the data requirement.
- The PM ensures fast data, information and services delivery directly to the requestor or through the Civil Protection Agency concerned, or through such channels as those allowing quick turnaround.
- The PM builds a preliminary report of the event based on the Dossier forwarded by the ECO



Responsibility of the PM



The PM builds a final report which contains the following information:

- **An small introduction with purpose and scope**
- **A summary of the intervention:**
 - Project details
 - Chronology of events
 - Available satellite data
- **The assessment of the Intervention:**
 - Main project issues
 - Results of value-added processing if provided
 - User feedback
 - Conclusions on the project
 - Recommendations for improving Scenarios
- **In Appendixes:**
 - General information – Map of the area
 - Media coverage of the disaster (national TV, radio, news agencies/papers, web sites, etc.)
 - User Request Form (URF)
 - Emergency Data Request Submission forms for the various satellites tasked
 - Copy of final value added products delivered



Standard Map Product Template (on-going)



International Charter - Space and Major Disasters FLOOD EMERGENCY DATABASE TEMPLATE

Agency	Satellite/sensor	Programmed	Archived	Suggested	Comments
CONAE	SAC-C(HSTC)				
	SAC-C (MMRS)				
	SAC-C(HRT)				
CNES	SPOT-1				
	SPOT-2				
	SPOT-3				
	SPOT-4				
	SPOT-5 (HRG)				
	SPOT-5 (HRS)				
	SPOT-5 (Veg)				
CNSA	FORMOSAT				
	CBERS(WFI)				
	CBERS(CCD)				
CSA	CBERS(IMS)				
	RADARSAT-1				
	RADARSAT-2				
DMCii	UK-DMC				
	TopSat				
	Beijing-1				
	NigeriaSat-1				
	Bilsat-1				
ESA	Alsat-1				
	ERS SAR				
ISRO	ENVISAT ASAR				
	ENVISAT MERIS				
	PROBA CHRIS				
JAXA	IRS 1C/ID/P6 PAN				
	IRS 1C/ID/P6 LISS-II				
	IRS 1C/ID WiFS				
	IRS P6 AWiFS				
	IRS P4 OCM				
NOAA	Cartosat-1				
	ALOS(PRISM)				
	ALOS(AVNIR-2)				
USGS	ALOS(PALSAR)				
	POES				
USGS	GOES				
	Landsat-5				
	Landsat-7				
	IKONOS (NGA)				
DIGITALGLOBE	Quickbird				
	Worldview				
	GEOEYE-1				
OUTSIDE CHARTER					
USAF-EagleVision or SPOT direct	USGS				
	SPOT-1				
	SPOT-2				
	SPOT-3				
	SPOT-4				
	SPOT-5 (HRG)				
	SPOT-5 (HRS)				
DOD	SPOT-5 (Veg)				
	FORMOSAT				
	P-3				
NASA	SCAVIEW				
	ASTER				
DHS	HSIP Freedom				
	Elevation data				These need to be properly identified once HSIP Freedom data is rec'd
	NHD				
	Jurisdiction Boundaries				

DRAFT



Charter Activation Cases (disaster types)



		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Sub-totals	Total
Solid Earth	<i>Earthquake</i>		3	1	3	5	3	2	5	4		26	50
	<i>Landslide</i>	1	1	2	2			1			2	9	
	<i>Volcano</i>		1	1	2	2	1	1	2	3	2	15	
Weather / Atmospheric	<i>Storm/hurricane**</i>			1	2	3	6	1	8	8	1	30	151
	<i>Ice/snow hazard</i>								1			1	
	<i>Flood/ocean wave*</i>		3	8	4	9	13	16	22	23	7	105	
	<i>Fire</i>				5	1	2		4	2	1	15	
Technological	<i>Oil spill</i>		3	2				4	3			12	13
	<i>Others</i>					1						1	
Total / year		1	11	15	18	21	25	25	45	40	13		

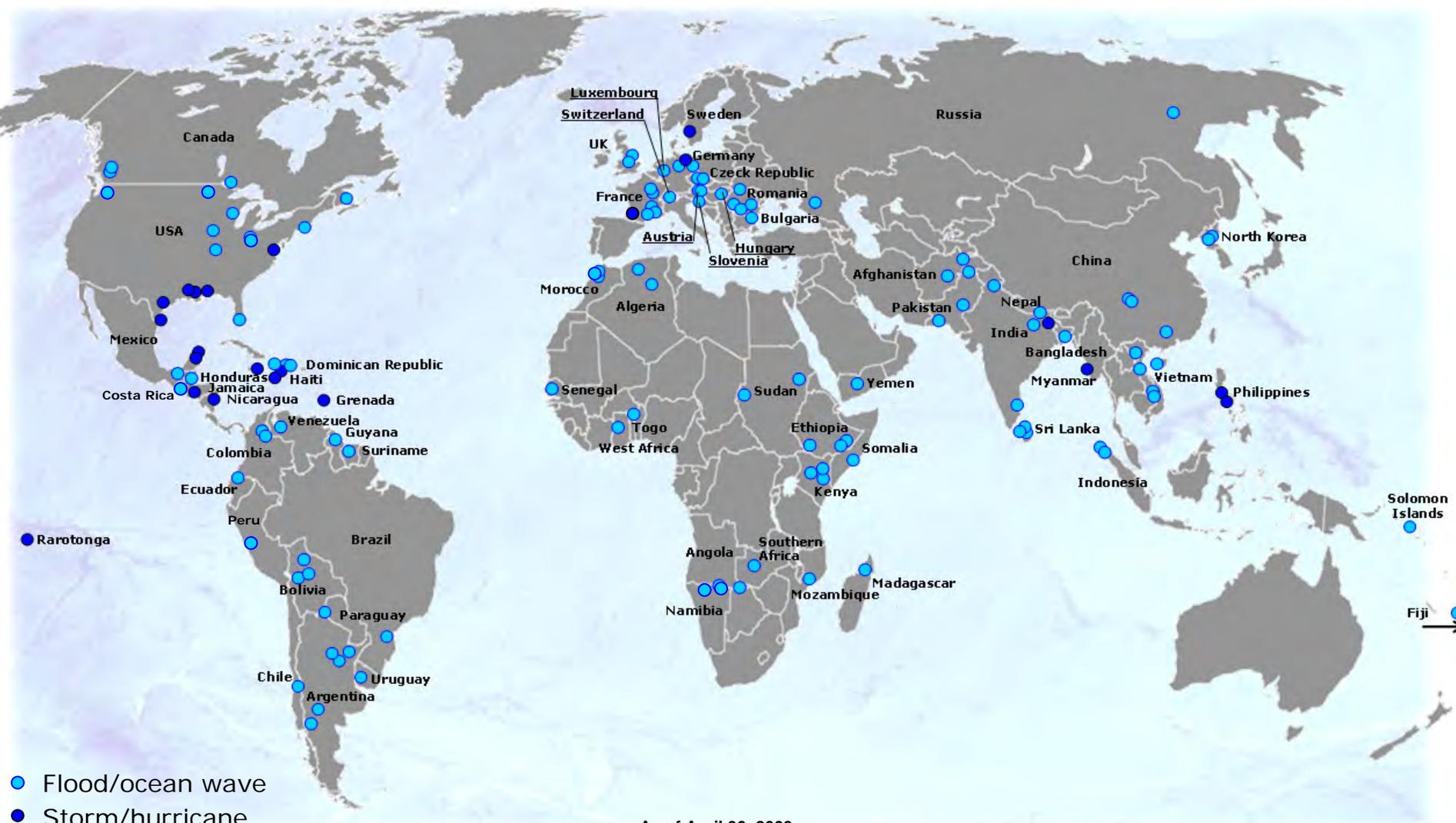
214

*includes solid earth related phenomenon of a tsunami

**includes all wind type storms (hurricane, cyclone, typhoon and tornado)

Activation Distribution

Floods and storms

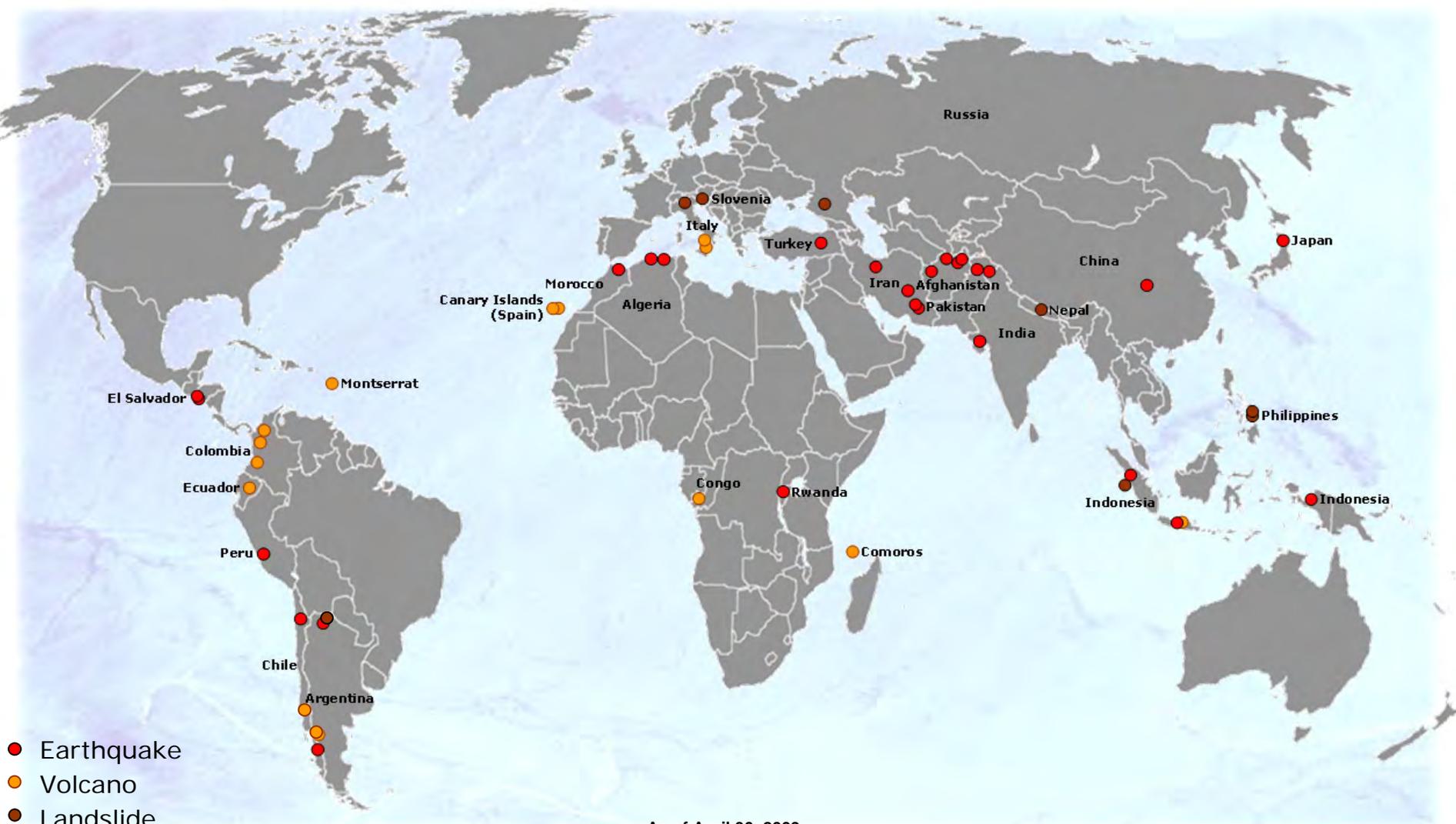


- Flood/ocean wave
- Storm/hurricane

As of April 30, 2009

Activation Distribution

Earthquakes, volcanic eruptions and landslides

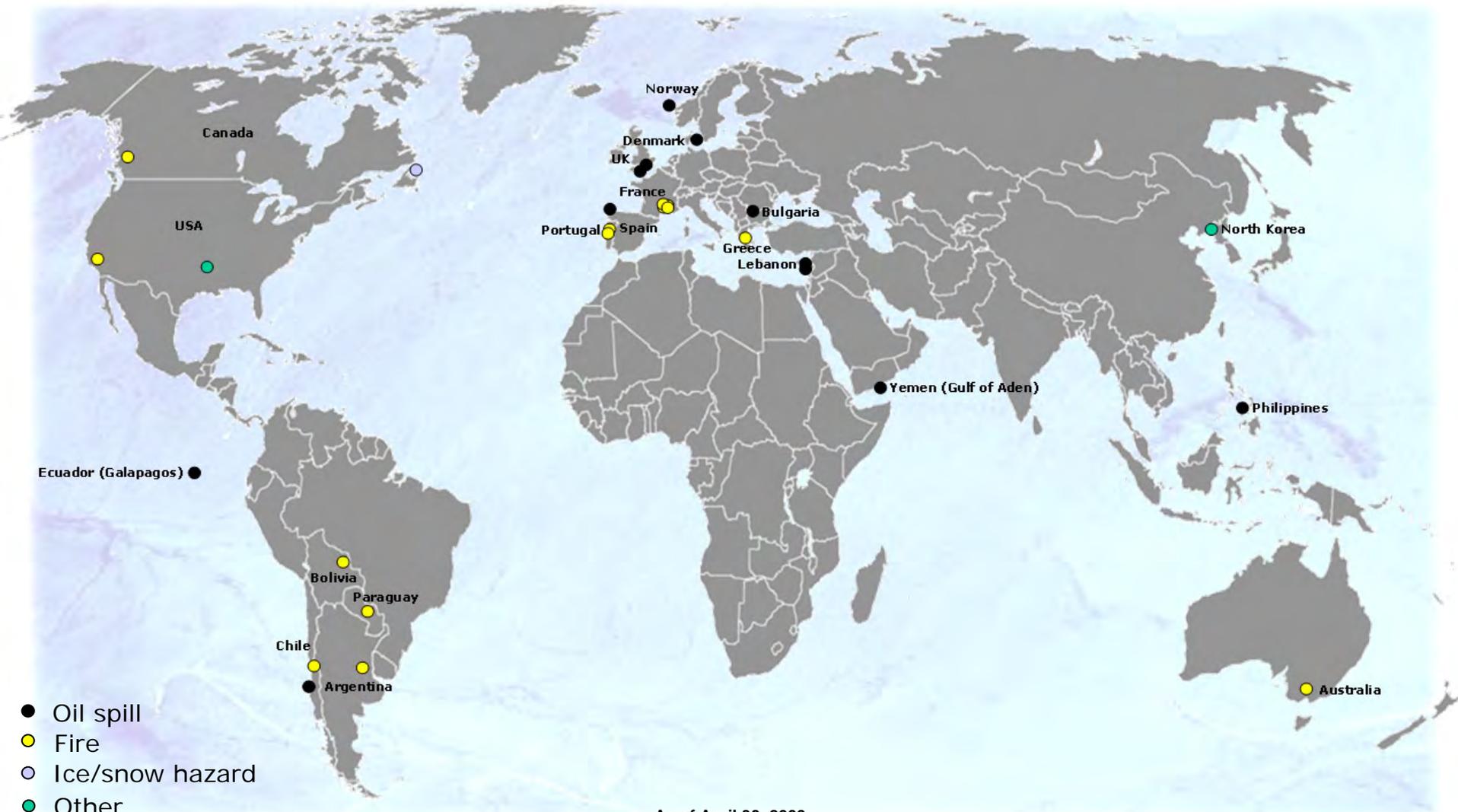
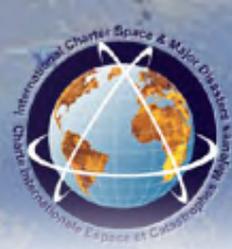


- Earthquake
- Volcano
- Landslide

As of April 30, 2009

Activation Distribution

Oil spills, forest fires and other hazards



As of April 30, 2009



International Charter "Space and Major Disasters" Satellites



Argentina's Comision Nacional de Actividades Espaciales (CONAE)



SAC-C

Country: Argentina
Satellite: SAC-C

Sensor: HYC - High Sensitivity Camera (Night View)

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
234 m	5	450-520 nm	300 Lines		

Sensor: XMES - Multispectral Medium Resolution Scanner

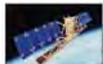
Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
175 m	2	400-550 nm	300 Lines		
	3	440-500 nm			
	4	550-690 nm			
	5	700-830 nm			
	6	1350-1700 nm			

Sensor: HREC - High Resolution Technological Camera

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
15 m	5	400-900 nm	90 km		



Canadian Space Agency (CSA)



RADARSAT-1

Country: Canada
Satellite: RADARSAT-1
Sensor: Advanced Radar/C Band/HH Polarization

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
8m	1	50 x 80 km			1-3 Days
25m	1	100 x 160 km			
30m	3	150 x 175 km			
100m	2	300 x 300 km			
150m	3	500 x 350 km			
25m	1	75 x 75 km			
15m	1	150 x 150 km			



Centre National d'etudes Spatiales (CNES)



Spe L233AS



FORMOSAT-2

Country: France
Satellite: Spe L233 (Spe L2, 3 are used for archive data only)

Sensor: HRV (x 2)

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
20m	1	50 x 50 km	60 km (120 km) 1-3 Days		
	2	60 x 60 km			
	3	70 x 70 km			
	4	80 x 80 km			

Satellite: Spe 4

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
20m	1	50 x 50 km	60 km (120 km) 1-3 Days		
	2	60 x 60 km			
	3	70 x 70 km			
	4	80 x 80 km			

Satellite: Spe 5

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
10 m	1	50 x 50 km	60 km (120 km) 1-3 Days		
	2	60 x 60 km			
	3	70 x 70 km			
	4	80 x 80 km			

Satellite: Spe 4.5

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
115 m	1	150 x 150 km	225 km	Daily	
	2	450 x 450 nm			
	3	700 x 850 nm			
	4	1350 x 1700 nm			

Country: Taiwan
Company: NSM
Distributor: SPOC IMAGE
Satellite: FORMOSAT-2
Sensor: HYC - High Sensitivity Camera (Night View)

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
8 m	1	450-520 nm	24 km	Daily	
	2	120-600 nm			
	3	450-690 nm			
	4	700-850 nm			
	5	1350-1700 nm			



Disaster Monitoring Constellation (DMC)



UK DMSP

Satellite 1

Nightwatch 1

Planet 1

Planet 2

Country: UK (INTL)
Satellite: UK DMSP
Sensor: DMSP

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
32 m	1	520-600 nm	600 km	Daily	
	2	630-690 nm			
	3	720-900 nm			

Country: China (EMIT)
Satellite: Beijing-1
Sensor: DMSP

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
32 m	1	520-600 nm	600 km		
	2	630-690 nm			
	3	720-900 nm			

Country: Nigeria (NASIRID)
Satellite: NigerianSat-1
Sensor: DMSP

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
32 m	1	520-600 nm	600 km		
	2	630-690 nm			
	3	720-900 nm			

Country: Turkey (BULENT)
Satellite: Bulent-1
Sensor: DMSP

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
20 m	1	520-600 nm	600 km		
	2	630-690 nm			
	3	720-900 nm			

Country: Algeria (CNES)
Satellite: Alsat-1
Sensor: DMSP

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
32 m	1	520-600 nm	600 km		
	2	630-690 nm			
	3	720-900 nm			



European Space Agency (ESA)



ERS



ENVISAT



PROBA

Country: 17 European members (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Norway, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom).

Satellite: ERS
Sensor: AMI SAR (satellite since 1991)

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
27 m	1	50 x 50 km	100 km	~ 12-20 days	

Satellite: ENVISAT
Sensor: ASAR

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
25 m (WV)	1	100 km (Swath)	100 km		
	2	400 km			
	3	400 km			

Satellite: PROBA
Sensor: CHRIS (Visible Spectral)

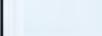
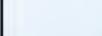
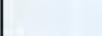
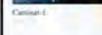
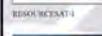
Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
16 m	1	400 x 300 km	14 km	~ 7 Days	

Satellite: PROBA-2
Sensor: HRV (High Resolution Camera)

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
7 m	1	7 km	7 km	~ 7 Days	



Indian Space Research Organisation (ISRO)



Country: India
Satellite: RESOURCESAT-1 (RS-1)
Sensor: IRS-4

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
5.8 km	2	420-500 nm	22 km	ADSS	3 Days
	3	620-690 nm			
	4	730-840 nm			

Sensor: IRS-3
Spatial Res.

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
23.5 m	2	520-590 nm	14 km	24 Days	
	3	620-690 nm			
	4	770-860 nm			
	5	1350-1700 nm			

Sensor: IRS-1C
Spatial Res.

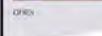
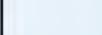
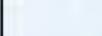
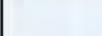
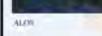
Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
6 m	2	520-590 nm	140 km	7 Days	
	3	620-690 nm			
	4	770-860 nm			
	5	1350-1700 nm			

Satellite: Cartosat-1 (IRS-4)
Spatial Res.

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
2.5 m	1	50 x 60 km	30 km	3 Days	



Japan Aerospace Exploration Agency (JAXA)



Country: Japan
Satellite: ALOS
Sensor: PRRM

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
2.5 m	1	50 x 70 km	35 km	10 km wide	

Sensor: AVNIR-2
Spatial Res.

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
10 m	1	420-500 nm	30 km	2 Days	
	2	620-690 nm			
	3	660-690 nm			
	4	760-860 nm			

Sensor: PALSAR
Spatial Res.

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
10 m	1	Band III or VV polarization	70 km	2 Days	
	2	Band III or VV polarization			
	3	Band III or VV polarization			
	4	Band III or VV polarization			



National Oceanic and Atmospheric Administration (NOAA)



Country: United States
Satellite: POES
Sensor: AVHRR/NOAA 7, 11, 12, 14

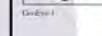
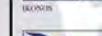
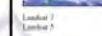
Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
1100 m	1	560-680 nm	2444 km	Daily	
	2	725-1100 nm			
	3	12.05-13.05 um			
	4	3.75-3.90 um			
	5	4.05-4.15 um			
	6	11.05-12.05 um			

Satellite: GOES
Sensor: GOES-1.0M

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
1000 m	1	550-700 nm	Full Earth Disc	Daily	
	2	3800-4000 nm			
	3	10.3-13.0 um			
	4	11.20-11.120 um			
	5	13.05-12.05 um			



United States Geological Survey (USGS)

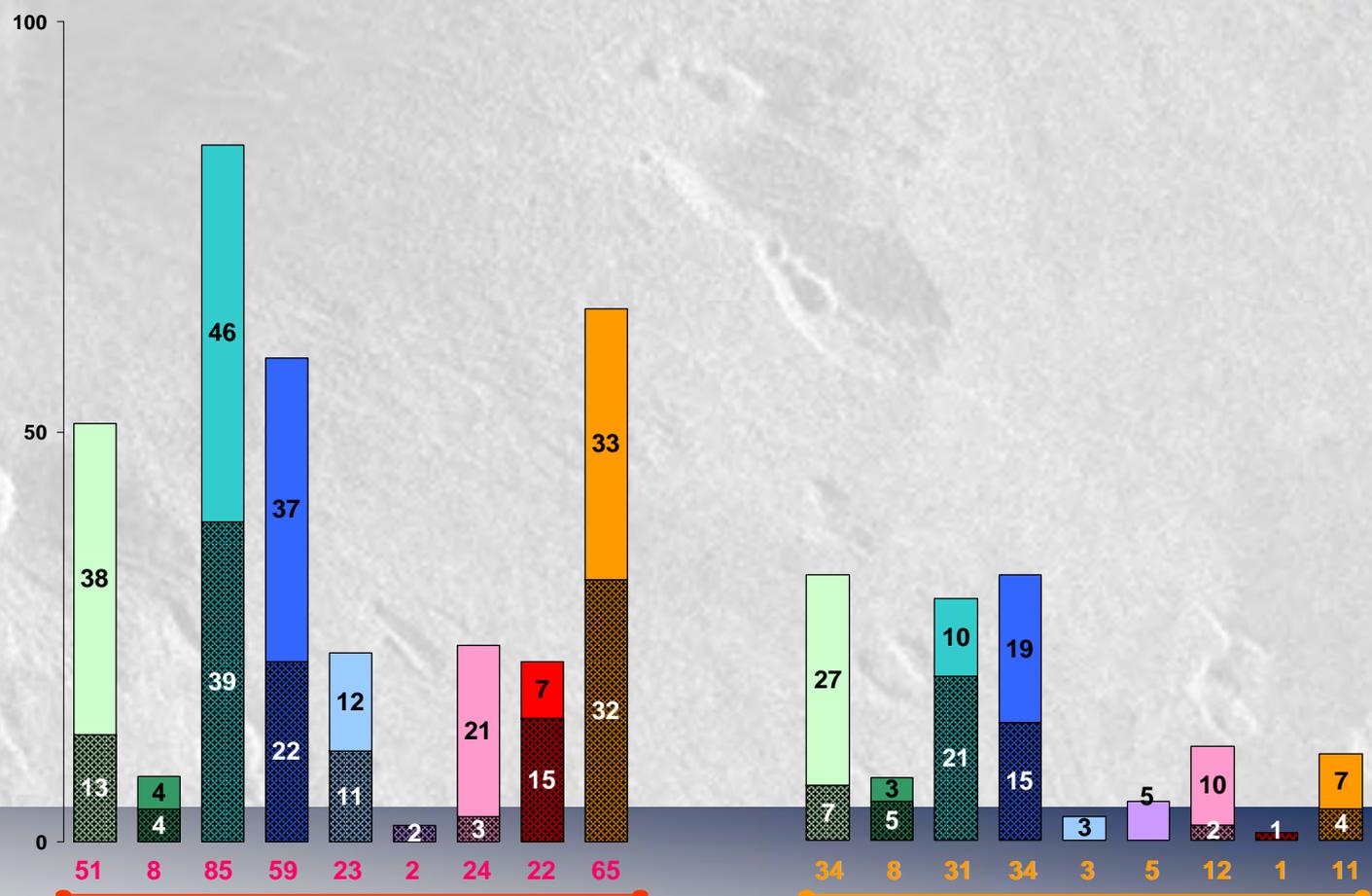


Country: United States
Satellite: Landsat 7
Sensor: ETM+ Enhanced Thematic Mapper Plus

Spatial Res.	Spectral Bands	Spectral Range	No. Beams	Swath Width	Revisit Time
30 m	1	450-520 nm	183 km	10 Days	
	2	520-600 nm			
	3	630-690 nm			
	4	660-			



Data Units Used for Various Disasters



Earthquake 339
26 activations

Volcano 139
15 activations

As of April 30, 2009

New	ERS	SPOT	RADARSAT	IRS	SAC-C	DMC	Landsat	ALOS	CBERS	POES
Archive	ERS	SPOT	RADARSAT	IRS	SAC-C	DMC	Landsat	ALOS	CBERS	POES

Lena river flood, Russia

Activation information



Activation 09

⊕ Authorized User: **Foreign Office (Auswaertiges Amt)**

⊕ Date of activation: **May 22, 2001**

⊕ Emergency On-Call Officer of that week: **CSA**

⊕ Project Manager: **ESA-ESRIN**

⊕ Value-Added Reseller: **GAF, Germany**

⊕ End User: **Foreign Office**

⊕ Data Used: **RADARSAT-1**: 1 archive (S6), 4 new

SPOT-1: 6 new (P)



esa

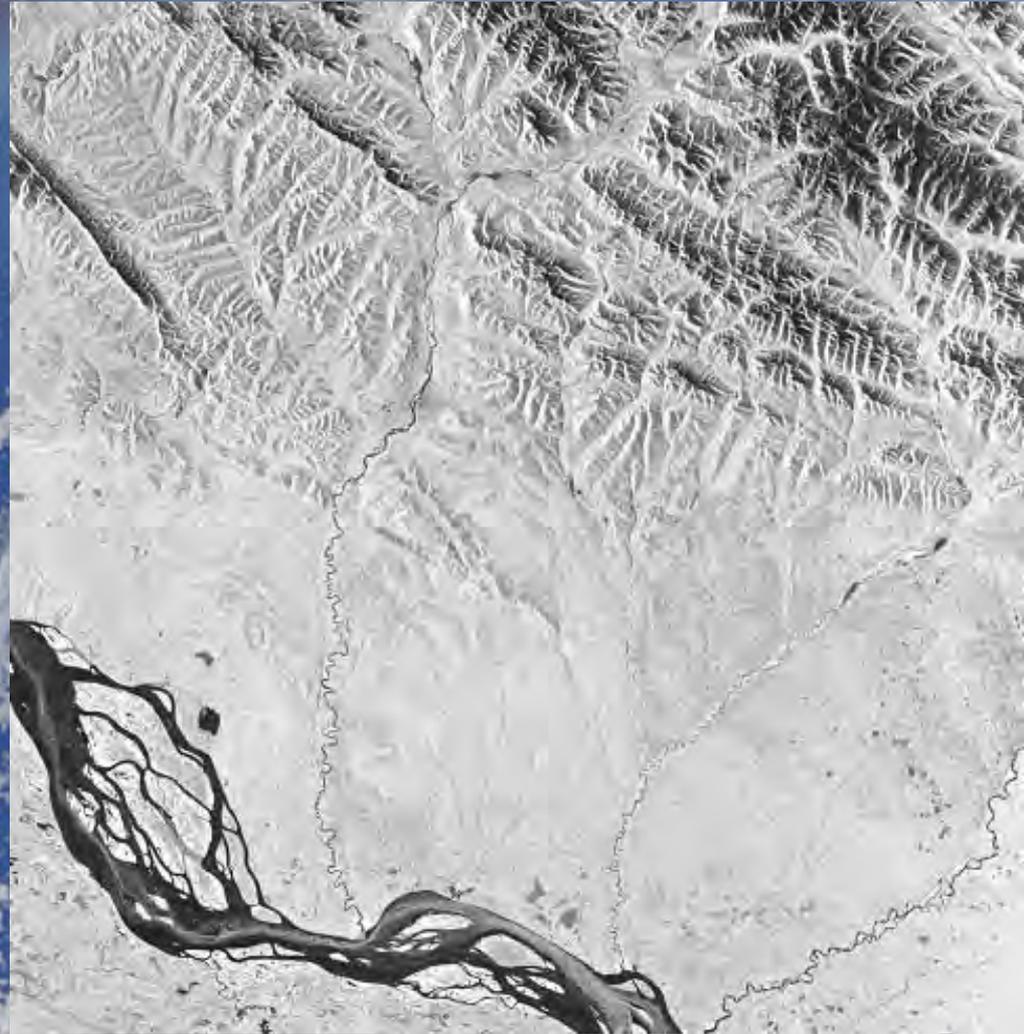




Lena river flood, Russia

Chronology

- On May 22, the Charter was activated following the spring flooding of the Lena river in Siberia.
- The disaster located mainly in the Siberian region of Yakutia. The city of Yakutsk, which has ~ 200,000 residents, was most affected.



RADARSAT-1 S6 image acquired on May 23, 2001

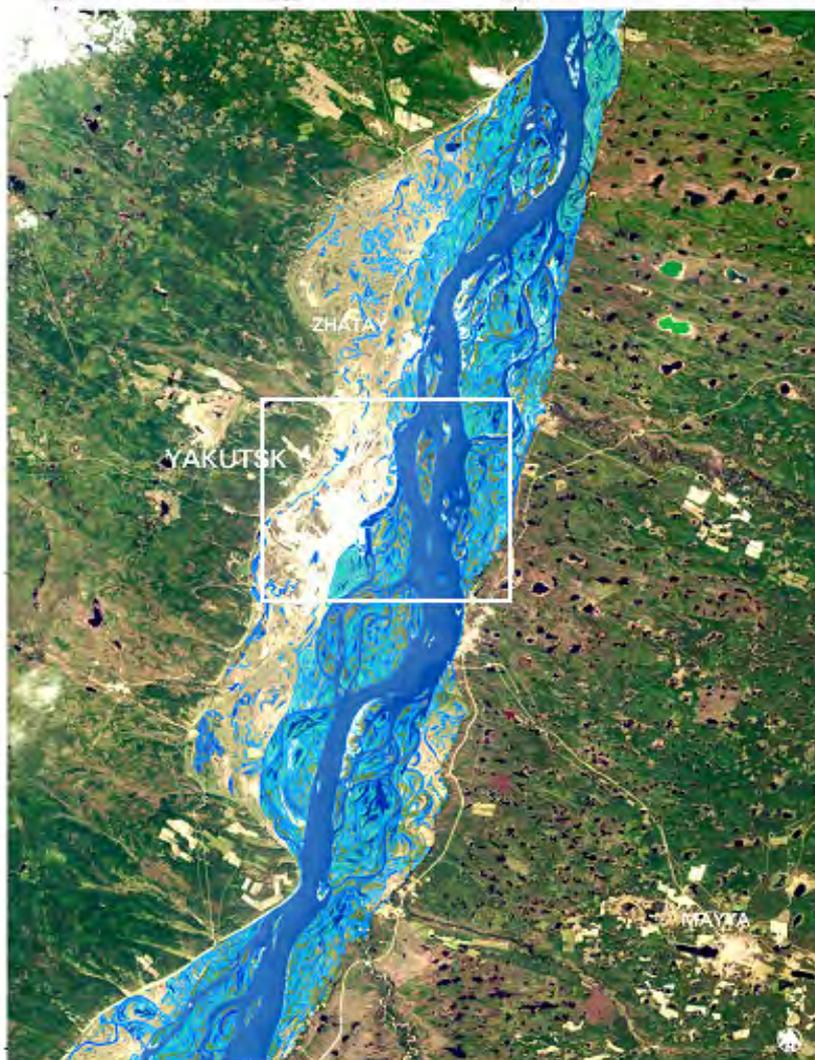




Lena river flood, Russia

Flooded area extracted from RADARSAT and SPOT

YAKUTSK FLOOD ON 24th OF MAY 2001



0 5 10 Kilometers
1 : 170,000

Flooded area extracted from Radarsat and SPOT acquired on 24th of May 2001

- Legend:
- Urban Area
 - Water Body
 - Forest
 - Agriculture
 - Area covered by water

Data Source: Landsat ETM 321/18 121/17 100600
Radarsat 240501, SPOT image 34 ES 01
© CNRS and Spot/Image for SPOT 2001
© CSA for Radarsat 2001
© EDC 2000

Cartography: GAF

Manitoba flood, Canada

Activation information



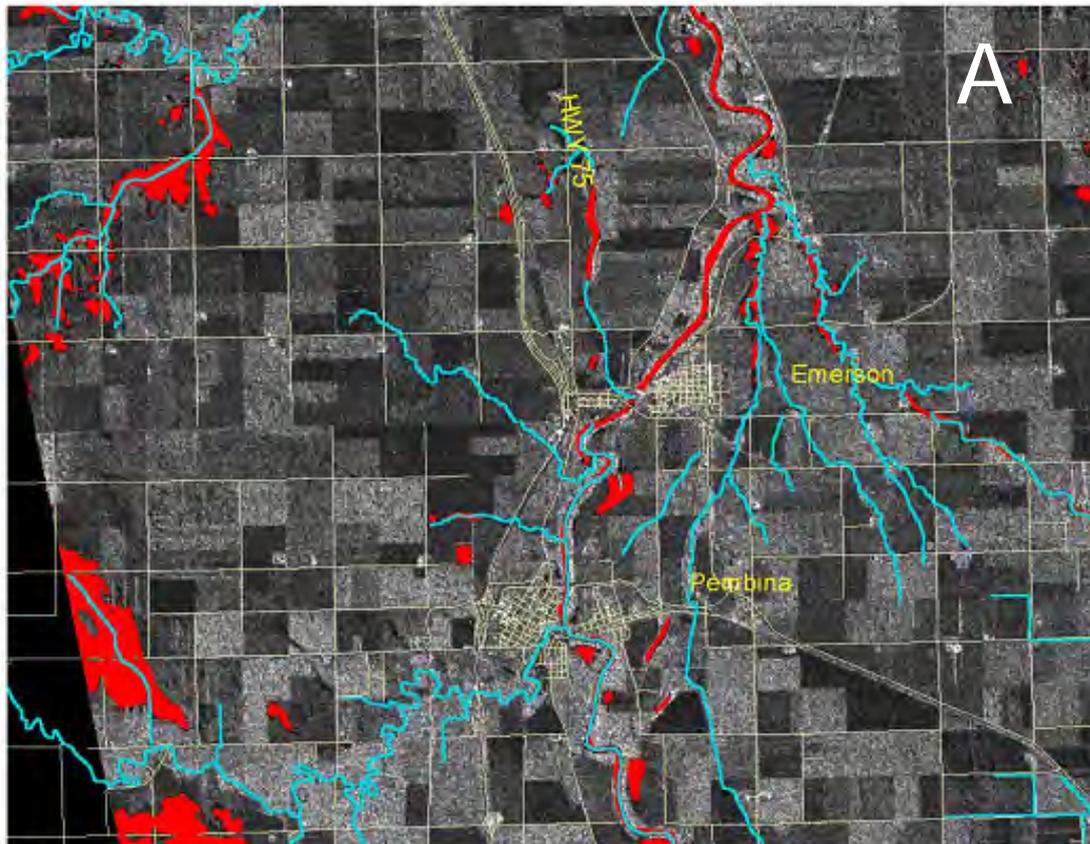
Activation 16

- ⊕ Authorized User: **OCIPEP Canada**
- ⊕ Date of activation: **June 13, 2002**
- ⊕ Emergency On-Call Officer of that week: **ESA**
- ⊕ Project Manager: **CSA**
- ⊕ Value-Added Reseller: **Vantage Point International, Canada**
- ⊕ End User: **Manitoba Conservation, Canada**
- ⊕ Data Used: **RADARSAT-1**: 2 archives (W2, W1), 3 new (S5, S6, W1)
SPOT-2: 4 new (XS)



Manitoba flood, Canada

Flood mapping



Rivers
Flood Waters
Roads



2 0 2 4 6 Kilometers

Scene Information:
RadarSat Standard 6
June 15, 2002
7:22:55 PM Local

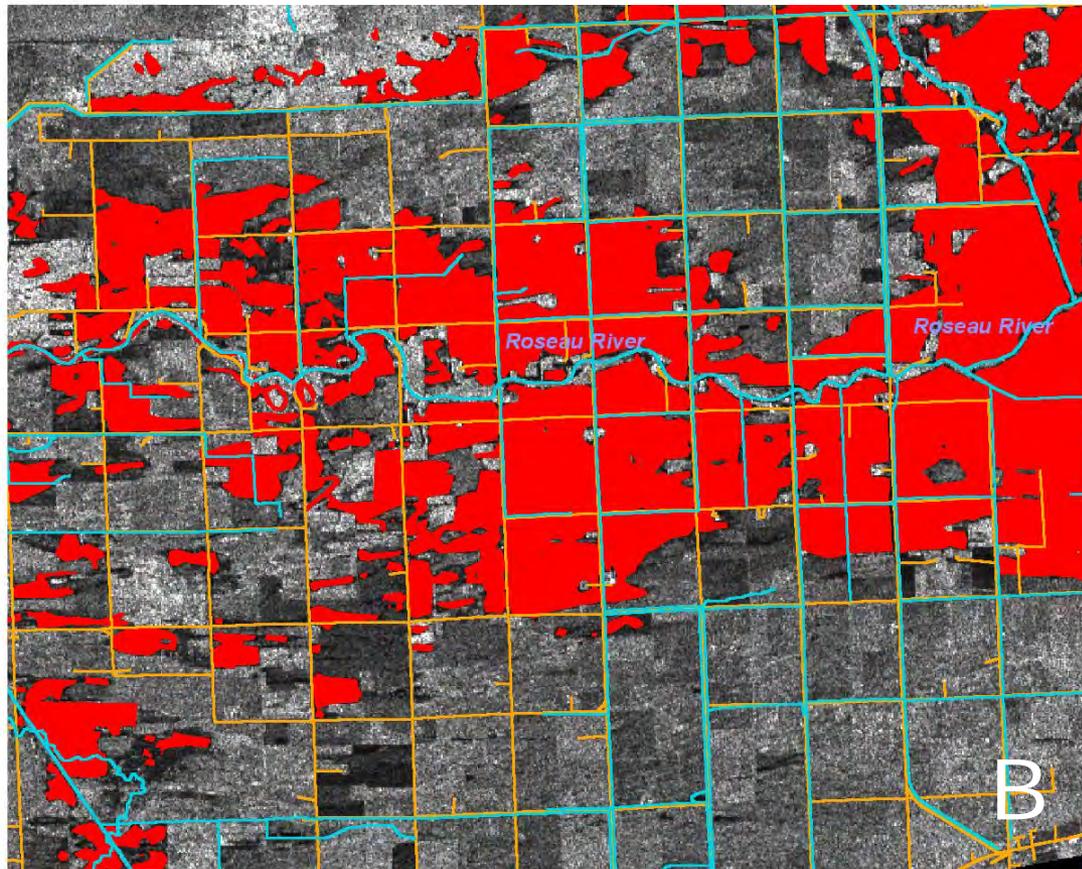


Manitoba flood, Canada

Flood mapping



June 15, 2002



Rivers
Roads
Flood Waters

Scene Information:
RadarSat S6
15 June 2002
7:23 PM Local





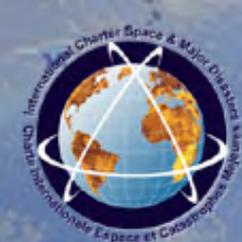
Southern France flood, France

Flood maps of Gard Department

Map of the impacted area near Aramon

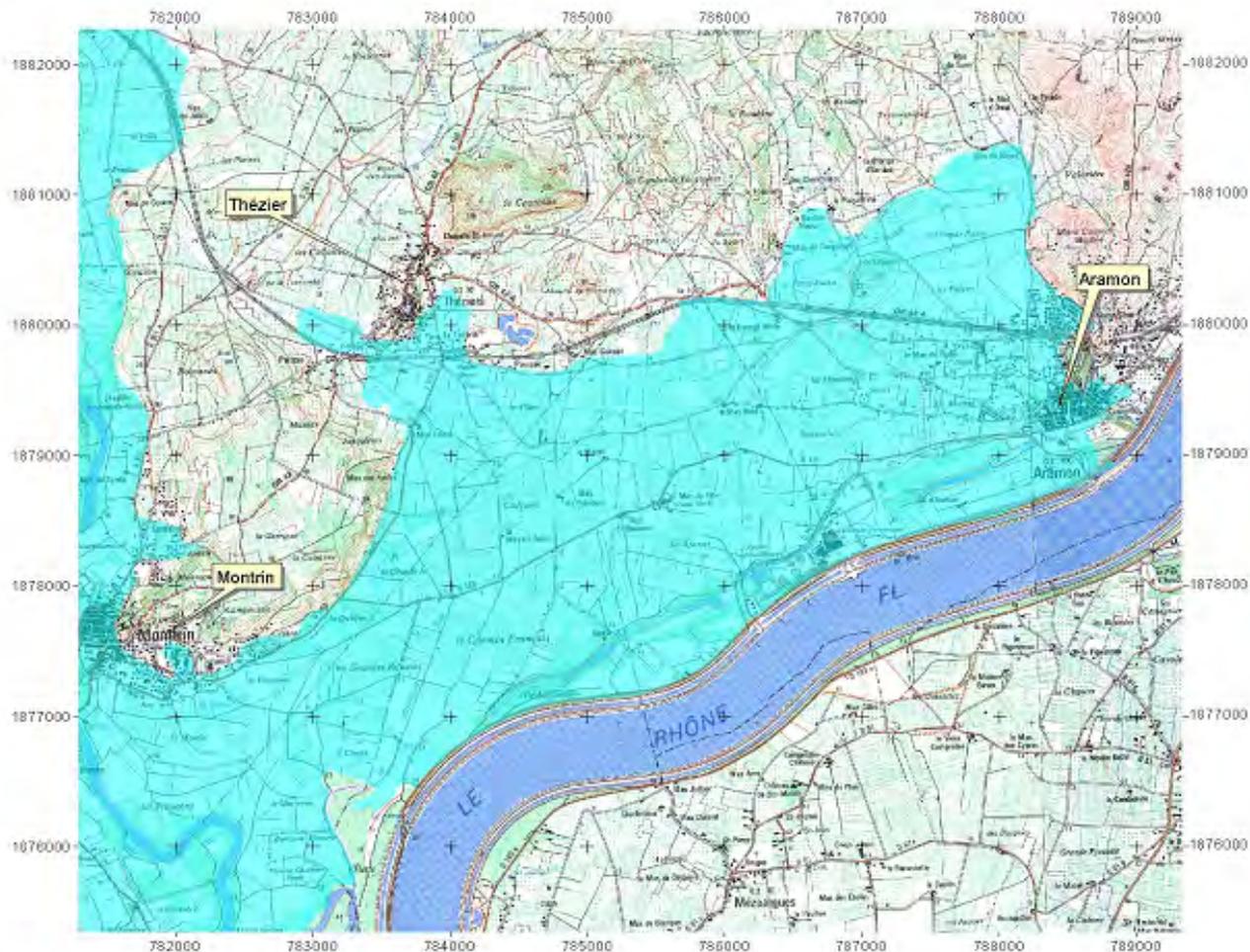
Produced using stamp of flooded area (in dark green) extracted from SPOT-4 data superimposed on accurate SPOT-5 image (2.5 m resolution)





Southern France flood, France

Flooded area near Aramon on a topographic map



Données sources :

Champ d'inondation
image SPOT 2 du
11 septembre 2002 12 h 58.

Fond de référence
SCAN 25 IGN



extension de la crue



0.5 0 0.5 1km

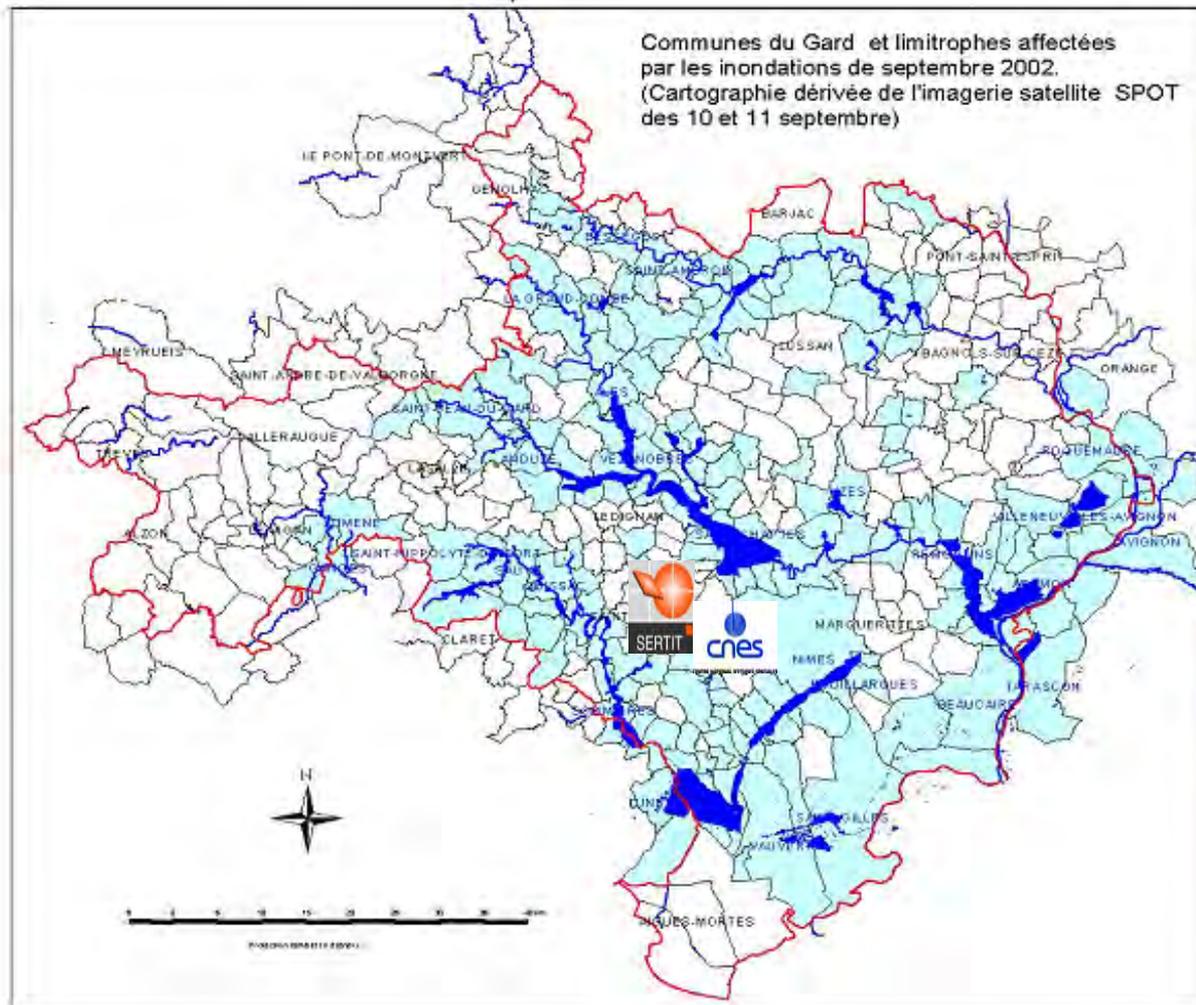
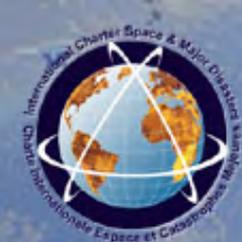
Projection Lambert II étendu

Source Imagerie SPOT

© CNES 2002
Distribution SPOT Image
Réalisation Sertit 2002

Southern France flood, France

Flooded surfaces on top of town boundaries



Données sources

- 2 Images SPOT 4 du 10 septembre
- 1 Image SPOT 4 du 11 septembre
- 1 Image SPOT 2 du 11 septembre

Données acquises dans le cadre de la Charte Internationale Espace et Catastrophes Majeures.

Fond cartographique : BD carto

- Département du Gard
- Surfaces inondées
- Cours d'eau principaux
- Surface affectée < 1%
- Surface affectée 1 à 5%
- Surface affectée 5 à 10%
- Surface affectée 10 à 30%
- Surface affectée > 30 %
- Pas d'inondation visible sur l'image satellite



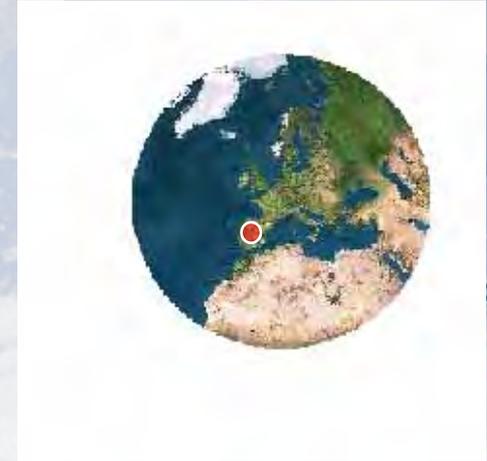
Galicia oil spill, France

Activation information



Activation 26

- ✦ Authorized User: **European Commission (DG-ENV)**
- ✦ Date of activation: **November 14, 2002**
- ✦ Emergency On-Call Officer of that week: **ESA-ESRIN**
- ✦ Project Manager: **CNES**
- ✦ Value-Added Reseller:
- ✦ End User: **Delegacion Gobierno, Spain**
- ✦ Data Used: **RADARSAT-1**: 2 new (ScanSAR Narrow)
SPOT-2: 1 new (XS)
SPOT-4: 2 new (XS)
SPOT-5: 1 new (XS)
ERS-2: 4 new



esa





Galicia oil spill, France

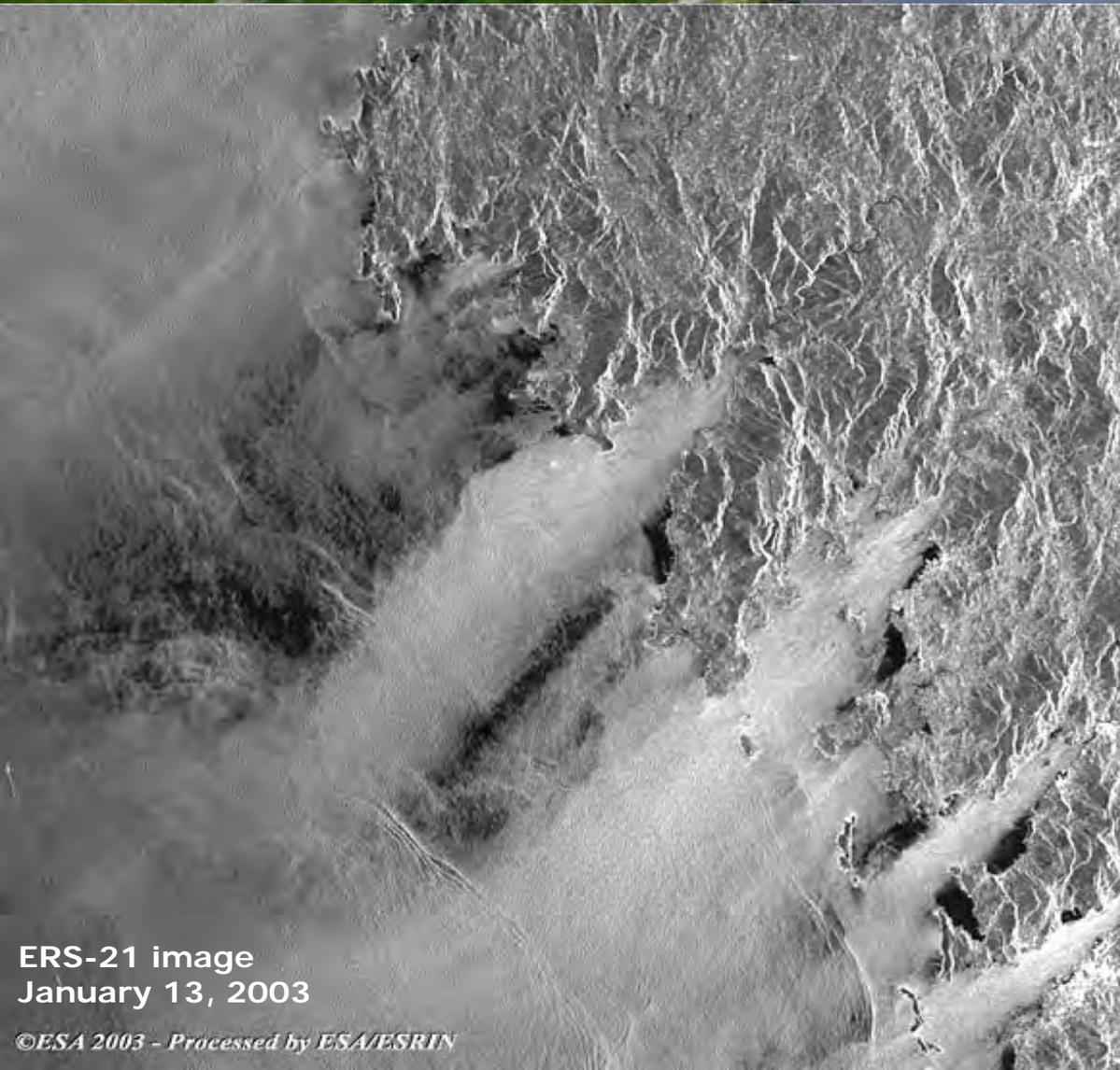
Oil spill detection

Wide Swath Vertical Pol ENVISAT image
November 07, 2002



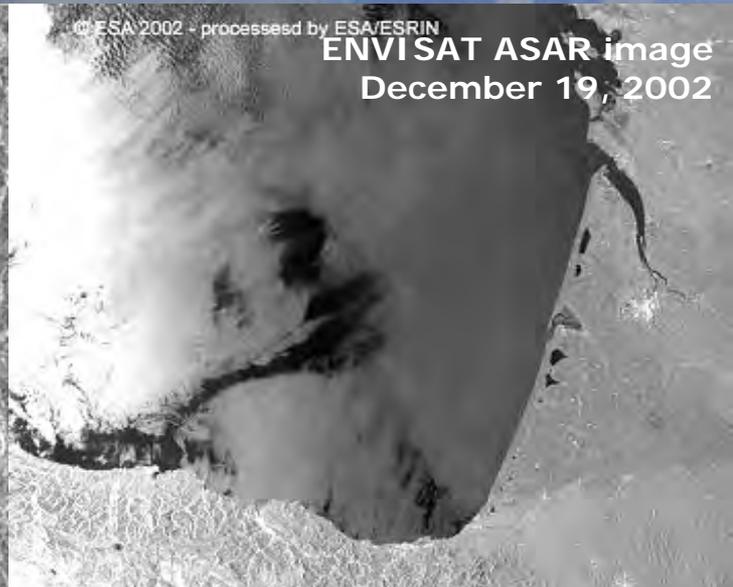
Galicia oil spill, France

Oil spill detection



ERS-21 image
January 13, 2003

©ESA 2003 - Processed by ESA/ESRIN



©ESA 2002 - processed by ESA/ESRIN

ENVISAT ASAR image
December 19, 2002



ENVISAT ASAR image
December 26, 2002

©ESA 2003 - Processed by ESA/ESRIN

Algiers earthquake, Algeria

Activation information



Activation 32

✦ Authorized User: **COGIC** – Direction de la Défense et de la Sécurité Civiles

✦ Date of activation: **May 22, 2003**

✦ Emergency On-Call Officer of that week: **CNES**

✦ Project Manager: **CNES**

✦ End User: **COGIC** – Direction de la Défense et de la Sécurité Civiles

✦ Data Used: **SPOT-4**: 1 new (P+XI)

SPOT-5: 3 archive, 1 new (P,XI)

ENVISAT: 1 archive, 1 new

ERS-2: 1 archive, 1 new



esa



Tsunami, India

Activation information



Activation 64

- ✦ Authorized User: **ISRO**
- ✦ Date of activation: **December 26, 2004**
- ✦ Emergency On-Call Officer of that week: **ISRO**
- ✦ Project Manager: **ISRO**
- ✦ Value-Added Reseller:
- ✦ End User: **ISRO – Director DMS**
- ✦ Data Used: **IRS-1D:** 2 archive, 2 new **ENVISAT:** 2 new
IRS-1C: 1 new **RADARSAT-1:** 4 archive, 4 new
IRS-P6: 4 archive, 12 new **SPOT-5:** 3 new
IRS-P4: 1 new

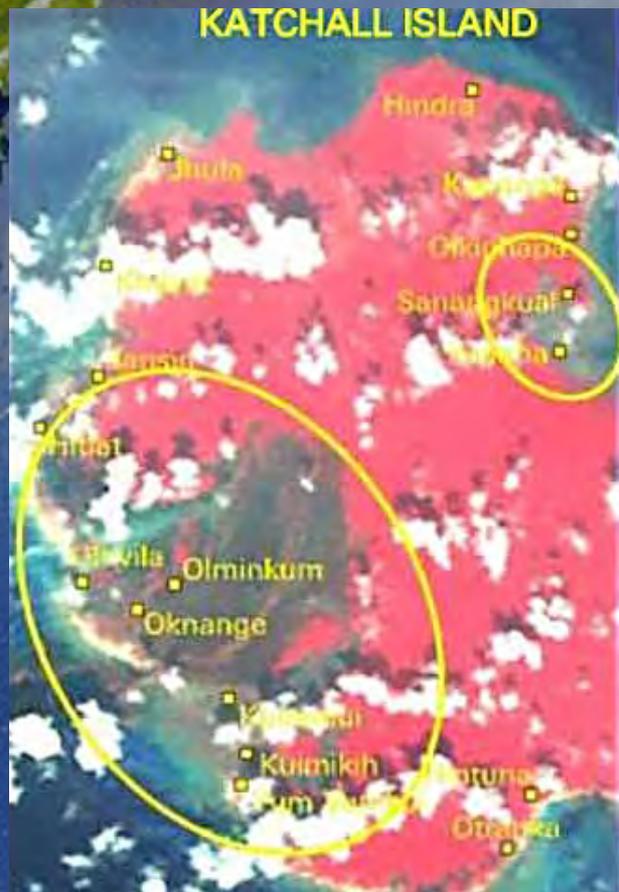


eesa



Tsunami, India

A Close View of Katchall Island



IRS-P6 AWiFS
 December 21, 2004

IRS-P6 AWiFS
 December 26, 2004

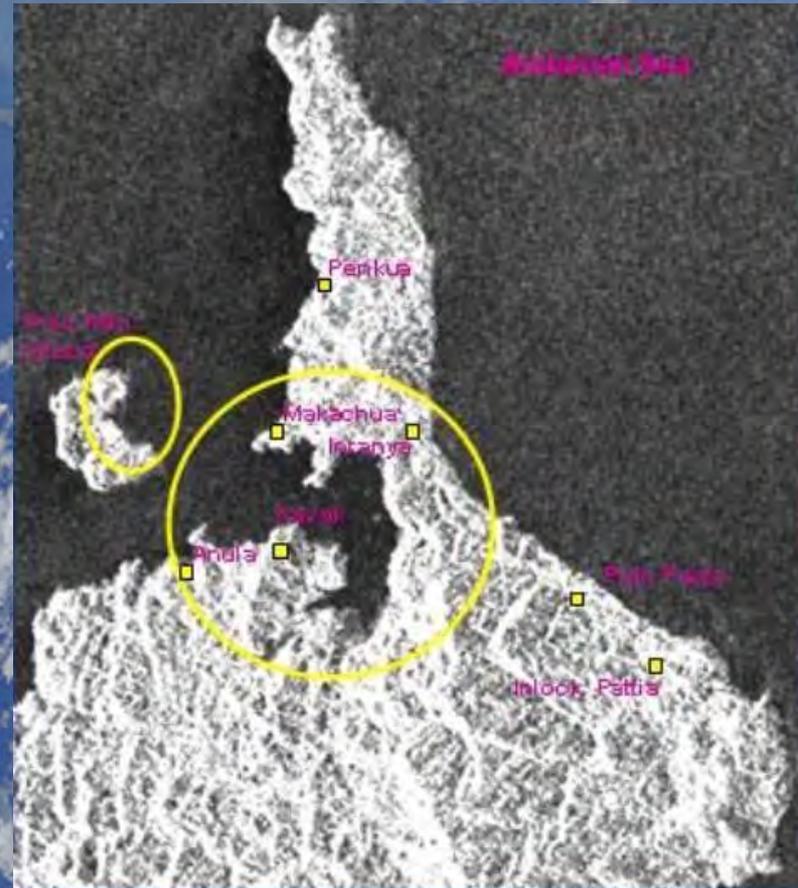
IRS-P6 LISS-III
 January 04, 2005

Tsunami, India

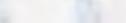
A Close View of Little Nicobar Island



IRS-P6 AWiFS
December 21, 2004

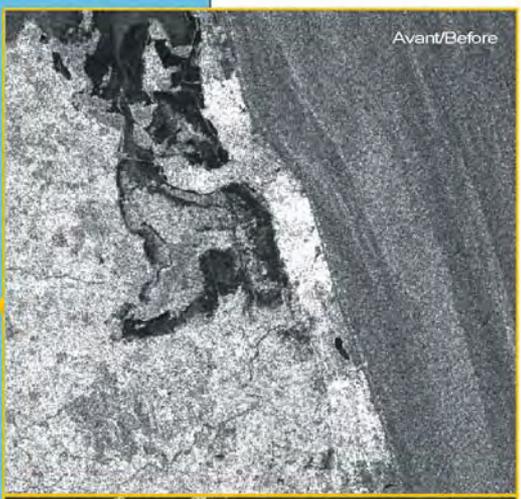
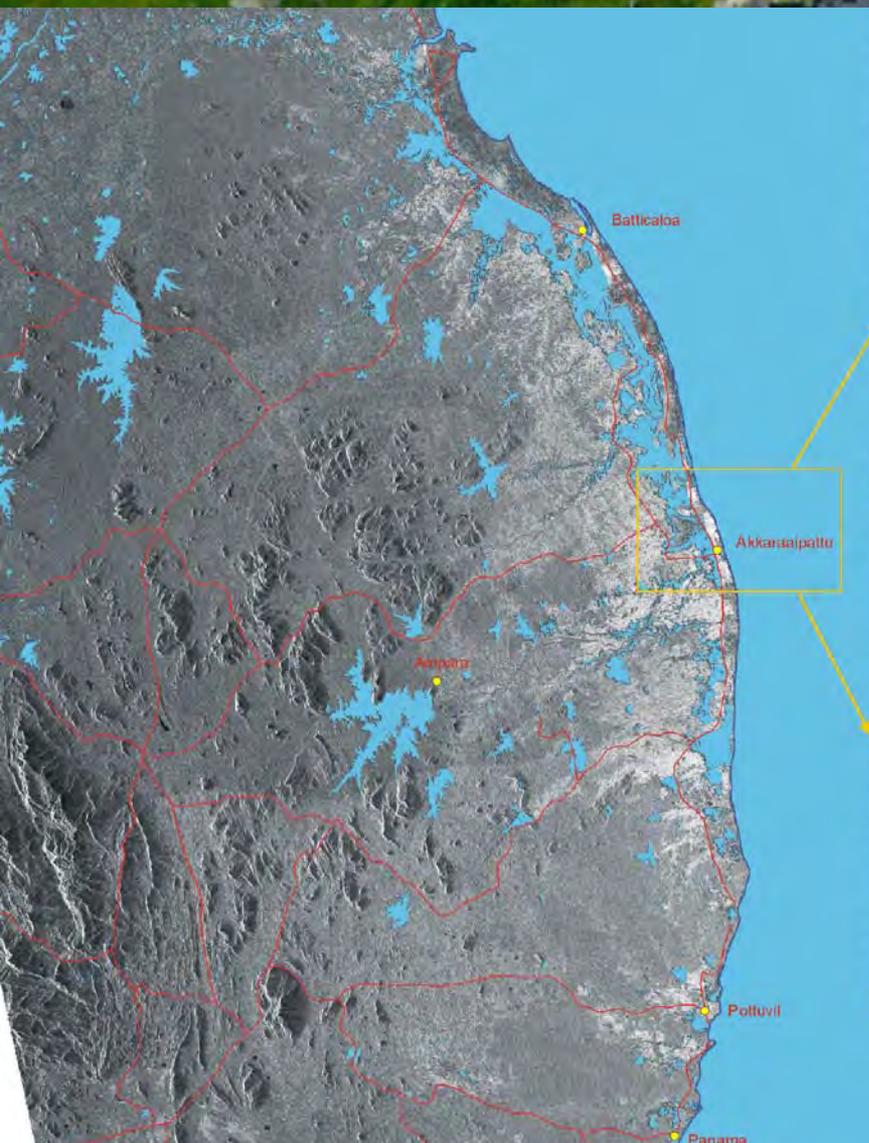
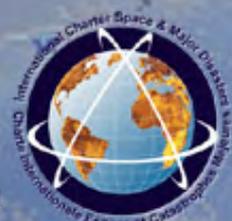


RADARSAT-1
December 31, 2004



Tsunami, Sri Lanka

Effects of Tsunami on the East Coast of Sri Lanka



RADARSAT-1
December 27, 2002

RADARSAT-1
January 5, 2005



Legend/Légende

- Eau/Water
- Zone urbaine/Urban
- Chemins/Roads
- Ligne de côte de 2002/2002 Coastline

Produced by Dendron Resource Surveys Inc.



Tsunami, Sri Lanka

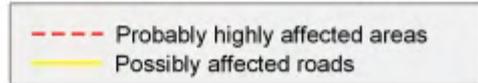
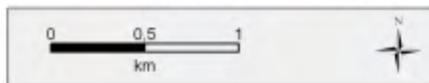
Effects on the South East Coast



SPOT 2, February 8, 2002



Spot 4, January 13, 2005

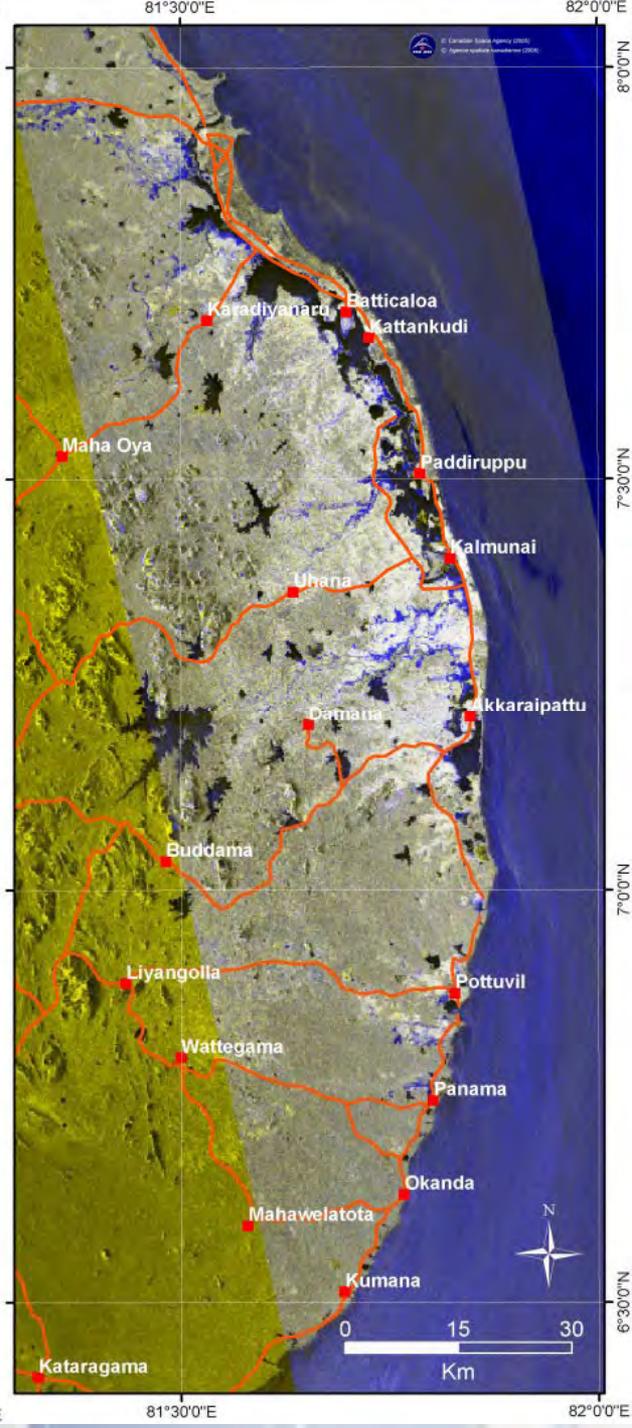


Tsunami Sri Lanka

Effects of Tsunami on the East Coast

Reference image:
RADARSAT-1
December 27, 2002

Post-disaster crisis
image: RADARSAT-1
January 2, 2005



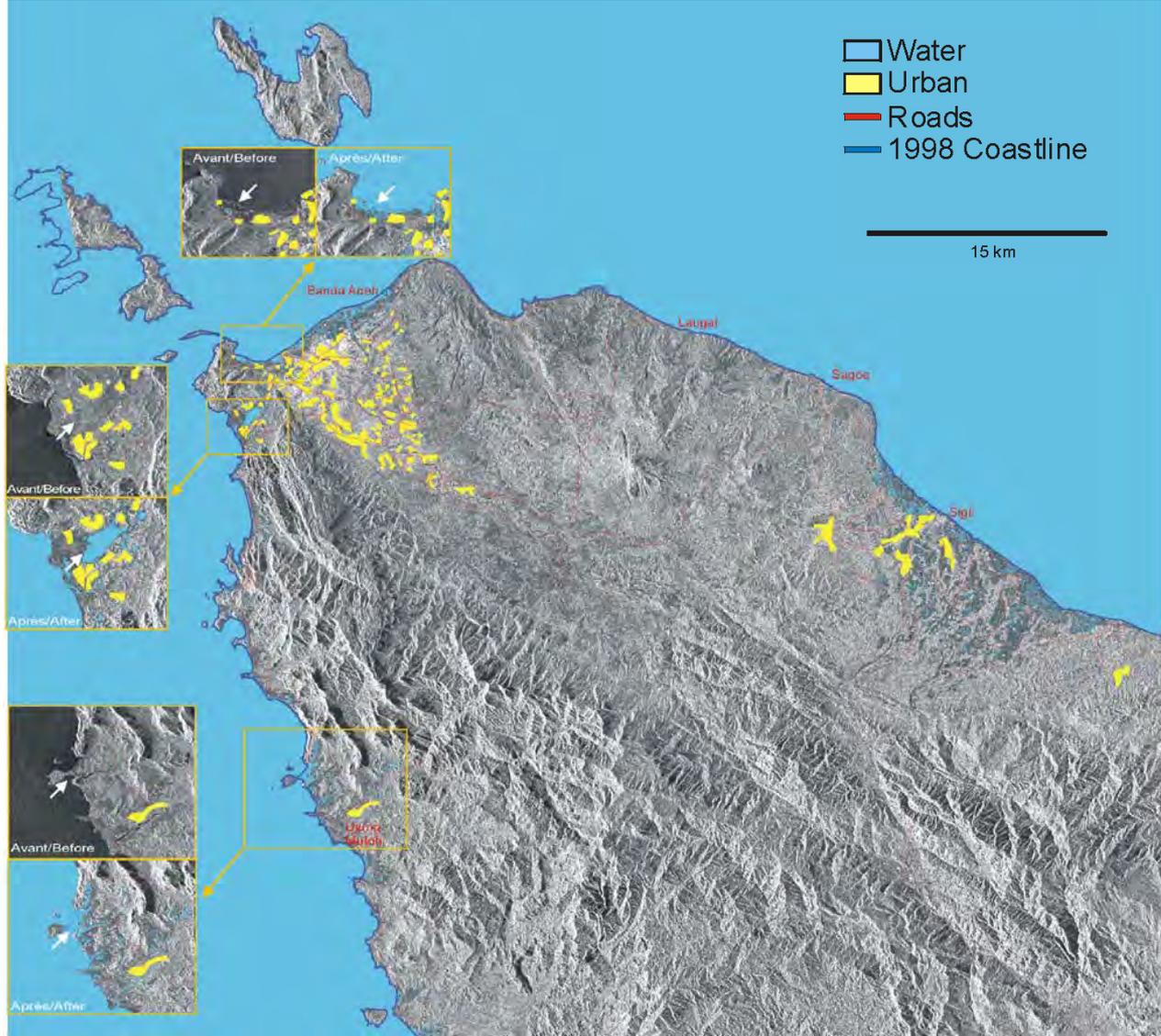


Tsunami, Indonesia

Effects of the Tsunami in Northern Sumatra, Indonesia

Before image:
RADARSAT-1
April 9, 1998

After image:
RADARSAT-1
December 31, 2004



Tsunami, Indonesia

Banda Aceh, West area

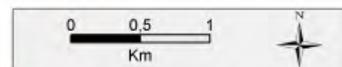


Indonesia - Sumatra Banda Aceh - West area

Damage map
30 December 2004



- Damage within urban area**
- Devastated urban area
 - Highly affected urban area
 - Affected urban area
 - Not/Slightly affected
- Damage within rural/natural area**
- Completely destroyed shoreline
 - Devastated rural area
 - Water

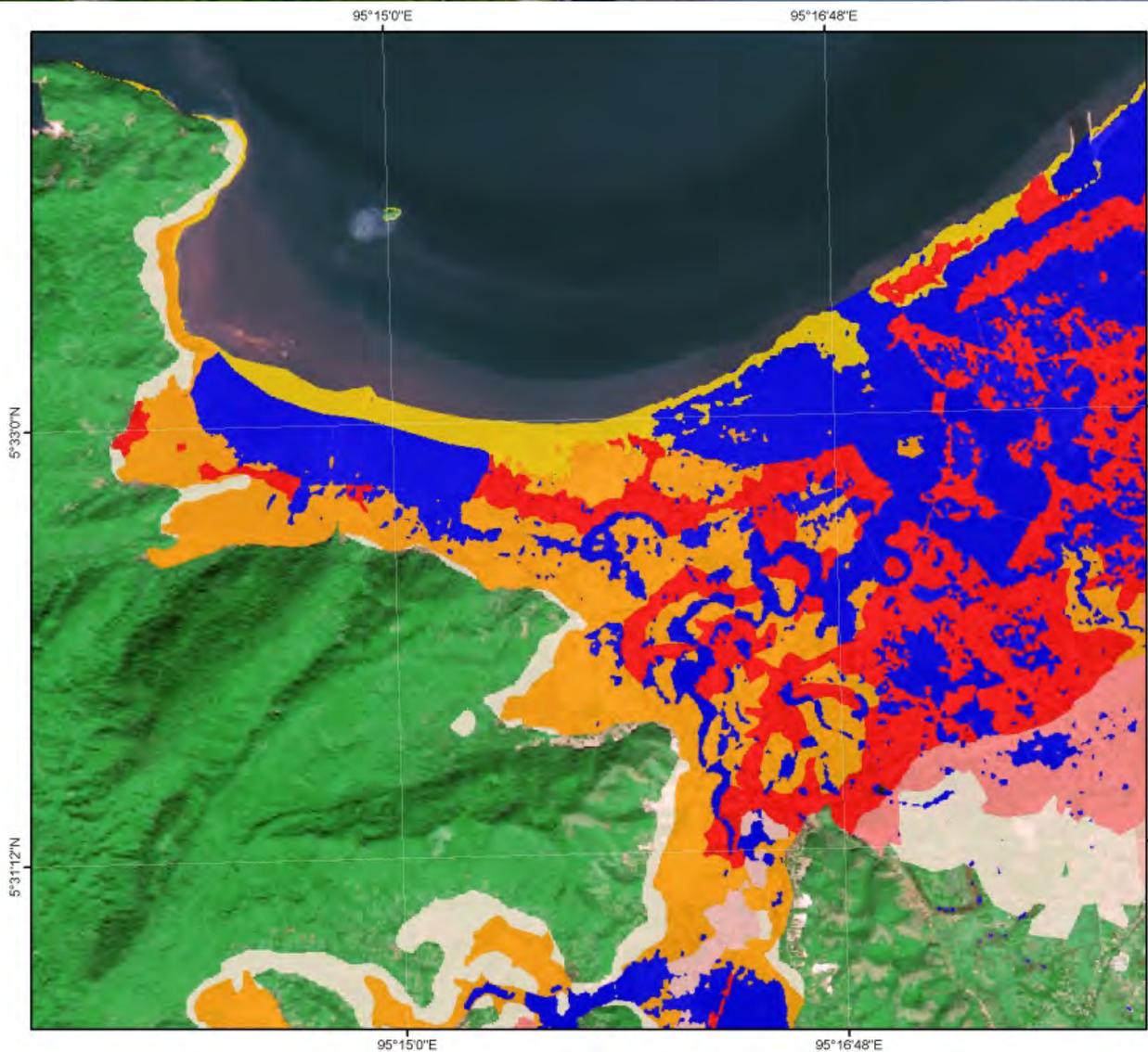


Disaster type : Tsunami
Disaster date : 26 December 2004
Data source : SPOT 5 colour (2,5 m)
Acquisition date : 30 December 2004
© CNES 2004 : distribution SPOT Image

Datum : WGS 84
Projection : UTM 46

Scale : 1/30 000 for A3 prints

Map created 05 January 2005 by SERTIT.
© SERTIT 2005
sertit@sertit.u-strasbg.fr
<http://sertit.u-strasbg.fr/>



Tsunami, Indonesia

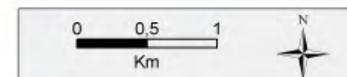
Banda Aceh, West area



Indonesia - Sumatra Banda Aceh - West area

Post-disaster map

30 December 2004



Disaster type : Tsunami
Disaster date : 26 December 2004

Data source : SPOT 5 colour (2,5 m)
Acquisition date : 30 December 2004

Datum : WGS 84
Projection : UTM 46

Scale : 1/30 000 for A3 prints
Map created 04 January 2005 by SERTIT.

sertit@sertit.u-strasbg.fr
<http://sertit.u-strasbg.fr/>



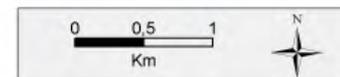
Tsunami, Indonesia

Banda Aceh, City center



Indonesia - Sumatra Banda Aceh City center Post-disaster map

30 December 2004



Disaster type : Tsunami
Disaster date : 26 December 2004

Data source : SPOT 5 colour (2,5 m)
Acquisition date : 30 December 2004

Datum : WGS 84
Projection : UTM 46

Scale : 1/30 000 for A3 prints

Map created 04 January 2005 by SERTIT.

sertit@sertit.u-strasbg.fr
<http://sertit.u-strasbg.fr/>



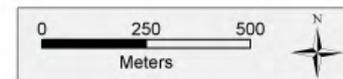
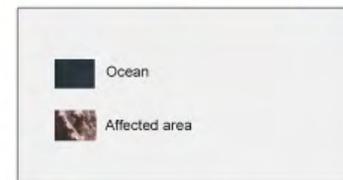
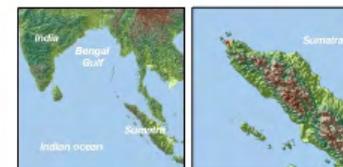
Tsunami, Indonesia

Banda Aceh, West coast area



Indonesia - Sumatra Banda Aceh West coast area Post-disaster map

30 December 2004



Disaster type : Tsunami
Disaster date : 26 December 2004
Data source : SPOT 5 colour (2,5 m)
Acquisition date : 30 December 2004
Datum : WGS 84
Projection : UTM 46
Scale : 1/10 000 for A3 prints
Map created 04 January 2005 by SERTIT.
sertit@sertit.u-strasbg.fr
<http://sertit.u-strasbg.fr/>



Tsunami, Sri Lanka

Banda Aceh



Quickbird, June 23, 2004

Quickbird, December 28, 2004



Hurricane Katrina, USA

Activation information

Activation 83¹, 85² & 86³



- ✦ Authorized User: **USGS¹, USGS², DDSC/COGIC³**
- ✦ Date of activation: **August 26¹, August 31², September 2³, 2005**
- ✦ Emergency On-Call Officer of that week: **CSA¹, ISRO^{2&3}**
- ✦ Project Manager: **USGS^{1&2}, CNES³**
- ✦ Value-Added Reseller: **SERTIT³**
- ✦ End User: **State of Florida-Division of Emergency Management¹
Federal Emergency Management Agency²
DDSC/COGIC³**
- ✦ Data Used:

DMC: 2 new	Landsat: 22 archive, 53 new
Enivsat: 5 archive, 7 new	Nigeriasat: 1 new
ERA: 2 new	RADARSAT-1: 7 archive, 8 new
IRA: 5 new	SPOT: 16 archive, 51 new



Hurricane Katrina, USA

Damage assessment with RADARSAT-1



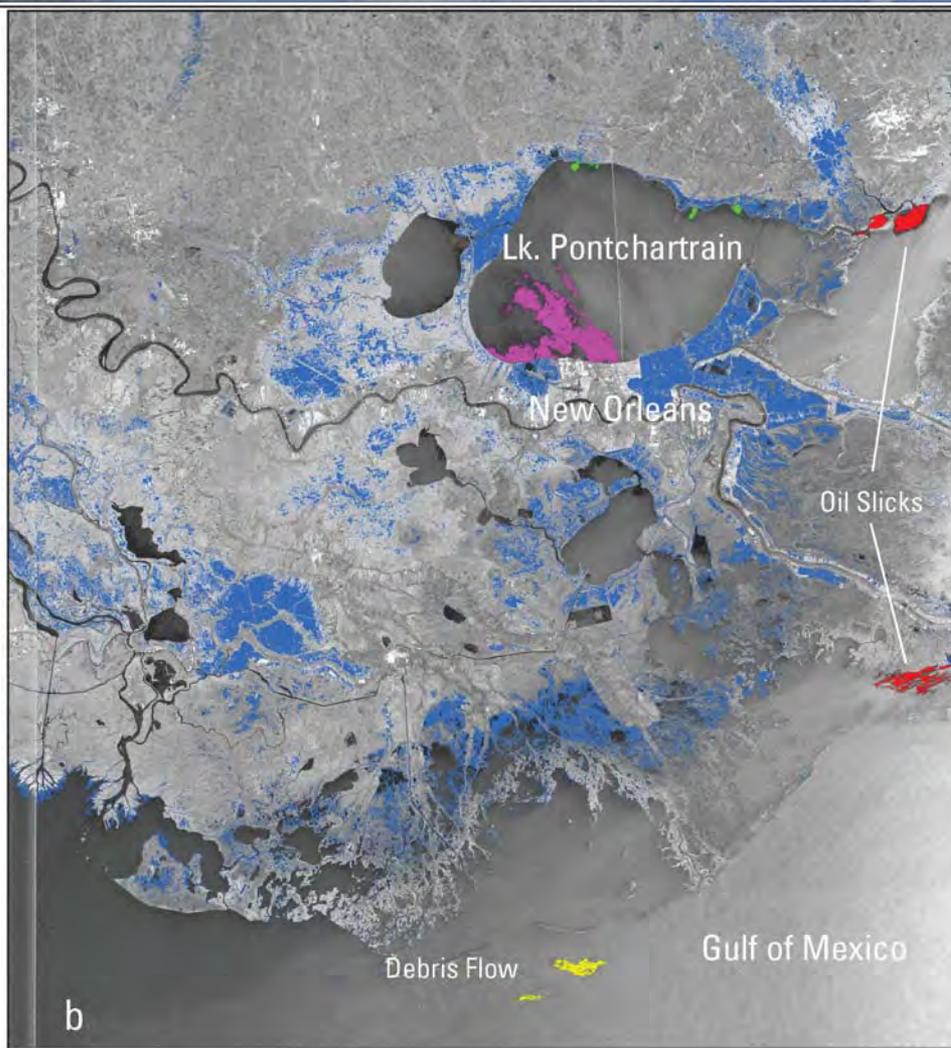
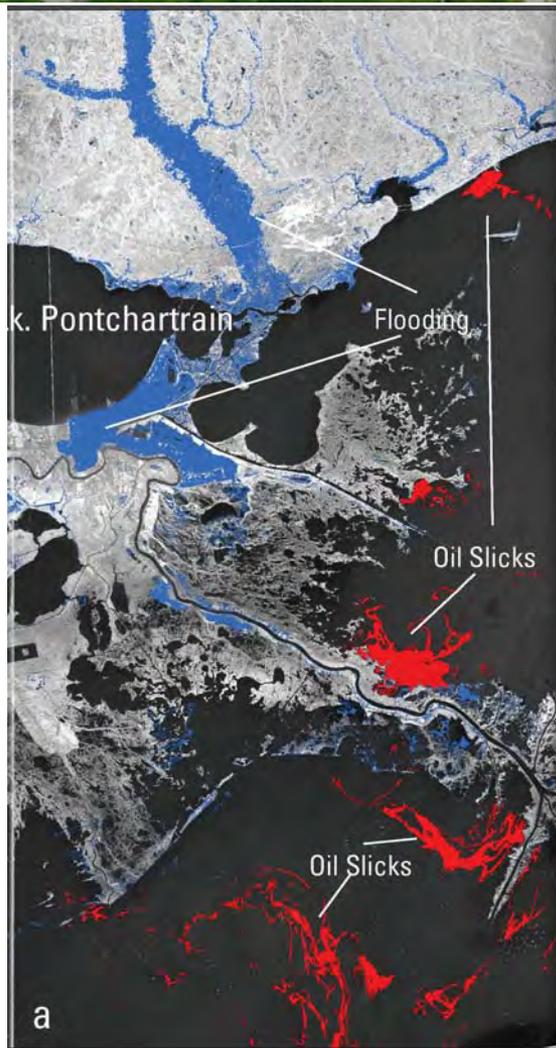
Reference Image
RADARSAT-1
June 14, 2001



Crisis Image
RADARSAT-1
September 09, 2005

Hurricane Katrina, USA

Damage assessment with RADARSAT-1



0 25 50 100 Kilometers

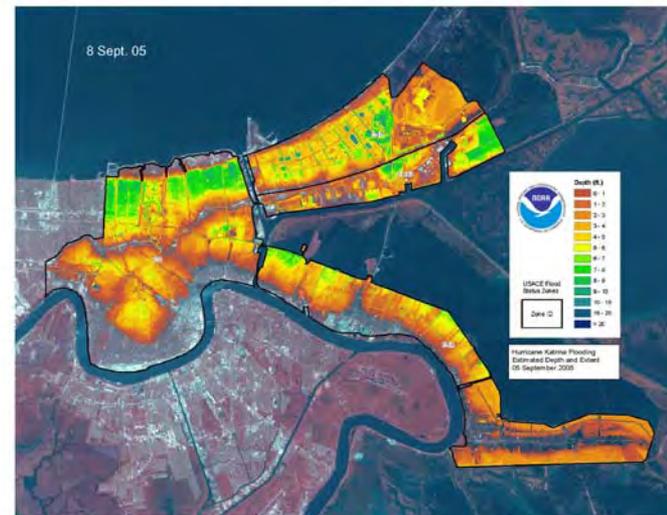
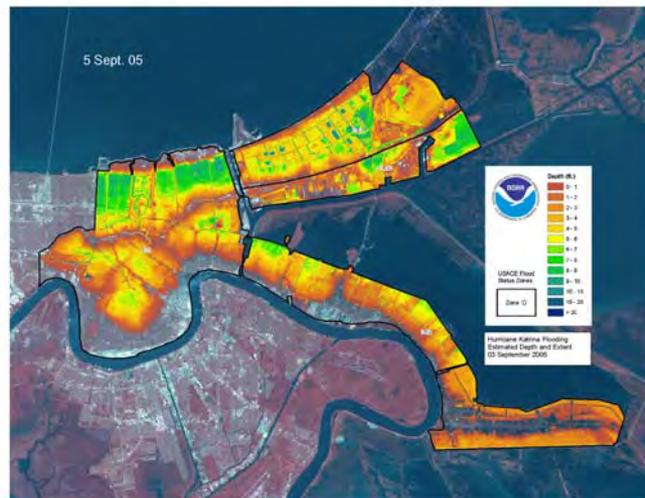
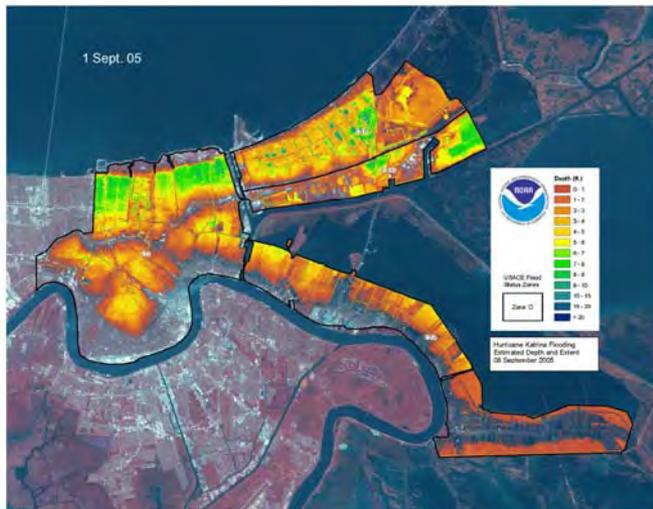


Hurricane Katrina, USA

Water depths with RADARSAT-1



New Orleans Flood Depths



Hurricane Nargis

Activation information



Activation 174

- Authorized User: **OCHA**
- Date of activation: **May 3, 2008**
- Emergency On-Call Officer of that week: **CNSA**
- Project Manager: **UNOSAT**
- Value-Added Reseller: **UNOSAT**
- End User: **UN OCHA**



- Data Used: **ASAR:** 7 archive, 7 new
- MERIS:** 1 archive, 1 new
- DMC:** 2 archive, 5 new
- Landsat:** 11 archive, 1 new
- Alos:** 2 archive, 2 new

- Radarsat:** 3 archive, 2 new
- CNSA:** 3 archive
- SPOT:** 1 Archive, 6 new
- Formosat:** 2 Archive, 2 new



Hurricane Nargis

Myanmar - damage assessment with ENVISAT



Charter Call 203 - SERTIT Product No 01
Myanmar "Nargis Typhoon"
South-West Yangon region
 Scale: 1:400,000
 Flooding observed the 15th of May 2008

Legend

- Observed flooded areas after Nargis
- Observed flooded areas after Nargis and frequently under water during the monsoon
- Areas frequently under water during the monsoon season
- Permanent water during dry season
- Settlements/villages
- Urban areas
- Airport
- Roads
- Vegetation
- Bare soils

Interpretation
 Hydrological situation after the passage of the Nargis Typhoon over the coastal areas to the South of Yangon City the 15th of May 2008, analysed with ENVISAT WSM HH ASAR images, compared with 10 dry and wet season images acquired by the ENVISAT ASAR sensor in 2007-2008.

Projection & Grid Information

Projection:	UTM Zone 47 North	Geographic Grid	Geographic (DMS)
Spheroid:	WGS 84	WGS 84	WGS 84
Datum:	WGS 84	WGS 84	WGS 84

Crisis Satellite Metadata

Satellite:	ENVISAT
Pixel Size:	75m
Acquisition Date:	15th May 2008
Geometric processing:	Georeferencing and orthorectification

Credits & Copyright

ENVISAT ASAR data used for impact analysis
 © ESA 2007-2008 © SERTIT 2008
 Background cartographic information:
 © USGS 2000 - SRTM 90m, Landsat 7 ETM+
 © ESRI © NGA - vector layer databases

Date: 16 May 2008
 Edition: 1.0
 Print @ 1:400,000
 ISO A3 size (420 x 297mm)

Respond and its suppliers have attempted to provide mapping that is as accurate as is available with the source material, however all geographic information has limitations due to the scale, resolution, date and interpretation of the original source materials. Accordingly, Respond maps are distributed as is, without any warranty, either expressed or implied, including but not limited to warranties of suitability to a particular purpose or use. The entire risk as to the results of the use of these data is assumed by the user and the supplier accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the mapping.

RESOND
 UNES Response Support Unit
 Emergency Relief, Disaster Reduction & Reconstruction

User coordination: **UNOSAT**
 Data provision: **sertit**



Conclusions

- The PM selection has so far been restricted generally to Charter member-agency nominations, or from the UN OOSA-affiliated bodies.
- As the Charter operations evolve, PM from the disaster affected country with in-depth knowledge of the region and close interaction with the end-user may be encouraged.
- A country furnishing PM services gets associated with the Charter as the PM obtains direct access to the Charter operations.
- Regional networks of PMs functioning under the lead of the PMs of the member states may therefore be foreseen.
- Information sessions, workshops, training opportunities may be organized to maintain the regional networks.



Non-disclosure



NON-DISCLOSURE AGREEMENT

The Recipient (s) of the International Charter 'Space and Major Disasters' data will commit to the following conditions:

- a) The data property rights are reserved solely for the concerned Charter Party/Partner Agency, regardless of the location, or the form of the data.
- b) All data are made available to others on a right to use basis only and on the condition that the Recipient(s) ensure(s) that the data shall not be distributed to any Third Party in any form or manner, or used in ways other than those for which the data were provided, without the written consent of the Charter Party/Partner Agency or its designate.
- c) The data are provided for the purpose of meeting the objectives of the Charter, and as these shall not be copied or saved in any form or medium and shall remain the property of the Charter Party/Partner Agency.
- d) All data and data products shall be clearly marked with the applicable Copyright inscriptions.
- e) The data use by the Recipient(s) is subject to data distributor's licensing agreement that accompanies the data delivery.
- f) The data are made available to the Recipient(s) without any assurance or warranty that the data product and the information derived meet the intended needs of the Recipient(s). Moreover, the Charter Parties/Partner Agencies shall accept no liability of actions, decisions and circumstances resulting from the use of these data products and information.
- g) The Charter Parties/Partner Agencies reserve the right of use and demonstration of all and any of the results and promotional products that are derived from the data.





The International Charter 'Space and Major Disasters' website:

www.disasterscharter.org

