



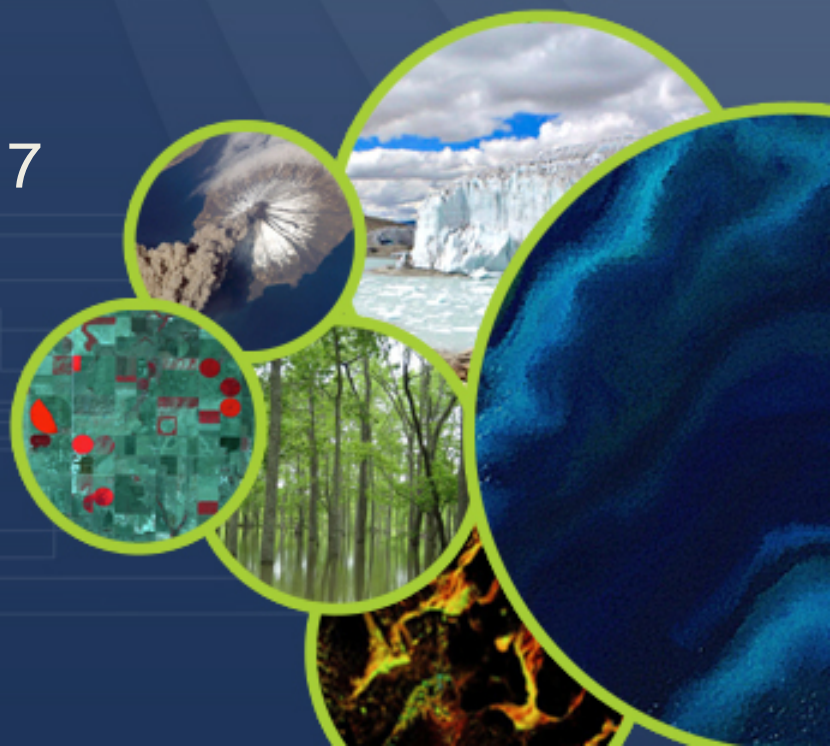
Committee on Earth Observation Satellites

Recovery Observatory (RO)

Haiti Hurricane Matthew RO Status and Next Steps
Report on demonstrator activities

Presentation to WGD, March 16, 2017

Agwilh Collet, Helene de Boissezon
Steven Hosford, CNES
Mare Lo, GFDRR
Andrew Eddy, ROOT Secretary



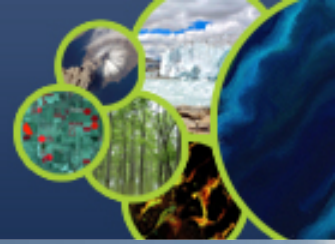


□ Haiti Recovery Observatory

- Status Overview
- First mission to Haiti and feedback
- Acquisition Plan
- Next Steps
- Management

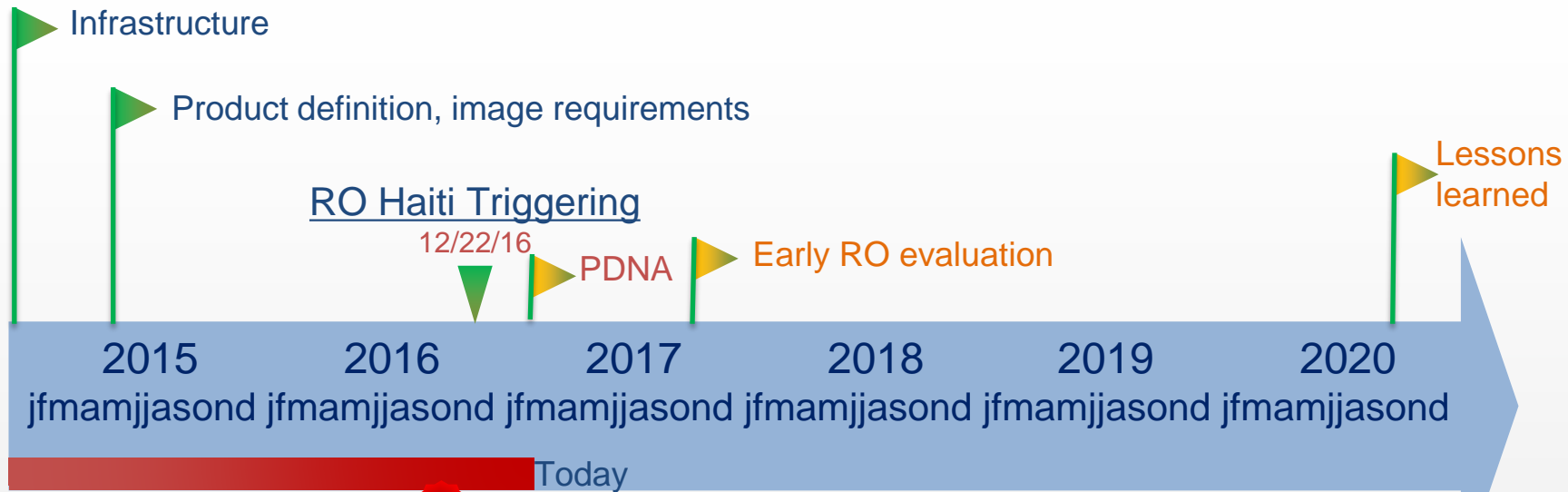
□ Demonstrator activities

- Malawi
- Nepal



House full of seashell

- **Triggering of the RO decided by CEOS Chair in consultation with CEOS Principals, December 22, 2016, after significant impact of Hurricane Matthew in Southwest Haiti (October 2016);**
- **Mission to Haiti 31 Jan - 3 Feb 2017 to establish partnership with Haiti RO users and stakeholders**



Hurricane Matthew
in Haïti
10/04/16



Malawi, Nepal
Demonstrators

Missions to Haiti
(2 to 3 per year)

1st
31 Jan – 3 Feb

Workshop
Week of 29 May





Hurricane Matthew – Haïti 2016

**Evaluation des Besoins Post Désastre
Post Disaster Needs Assessment
PDNA**



RÉPUBLIQUE D'HAÏTI

Haiti RO to cover three departments: Grand'Anse, Sud, and Nippes





National government users :

3 early partners : CNIGS, CIAT, ONEV

Other desired partners : ministries (planning, interior, agriculture, finance...)

Academia: universities and institutes (UEH, UniQ, UNDCayes, ENS...)

CEOS agencies :

Italy (ASI), China (CAS), France (CNES), Europe (ESA), Japan (JAXA), USA (NASA, NOAA, USGS) - Possibly Germany (DLR), Canada (CSA). Open to others...

DRM stakeholders and donor bodies :

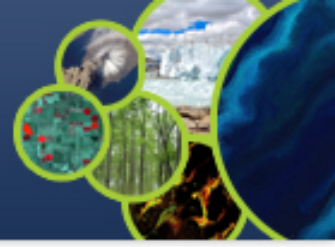
WB, GFDRR, UNDP, EU, UNEP, UNOPS, WHO, UN Habitat, UNOOSA,...

NGO, crowdsourcing and collaborative associations :

Potentiel 3D, OSM,

International scientific community:

CIMH, CIMA, INGV, CIRAD, CESBIO,



31 January to 3 February, 2017

Joint CNES-GFDRR mission on behalf of RO to establish partnership with RO user and stakeholders and develop consensus on user needs for the RO

CNES:

- Helene de Boissezon
- Aurelie Sand

GFDRR:

- Gian Michele Toglia

ROOT Secretary:

- Andrew Eddy



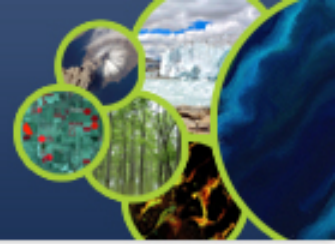
- CNIGS
- CIAT
- ONEV
- Ministere de la planification
- UNDP
- UNEP
- WHO (World Health Organization)
- IOM (International Organization for Migration)
- Delegation of European Union
- Open Street Map/3D Potential
- Univ Notre-Dame des Cayes, UniQ (Quisqueya), UEH, ENS



- Strong support for RO concept
- Desire to link RO to existing tools and platforms for increased synergy: **HaitiData.org**, KAL-Haiti, RASOR, new ONEV environmental information service
- Role of local champions
 - **CNIGS** technical implementation and leadership
 - **CIAT** user needs coordination
 - **Ministry of planning** linkages to national and local recovery efforts
 - **ONEV** linkages to environmental and eco-system monitoring
- Strong interest of universities and research communities



- Area to be extended to the three administrative units
- Main application areas :
 - Agriculture and food security
 - Forests and protected areas
 - Coastal zone monitoring and coastal settlements
 - Population displacement and rural settlements
 - Road networks and accessibility
 - Landslides and water system monitoring (river bed and river discharge monitoring)
- Baseline pre and immediately post event; update every six months over AoI; hotspots with more detailed, more frequent coverage; thematic applications led by theme leaders (e.g. Environment- ONEV); reactive update after future events.

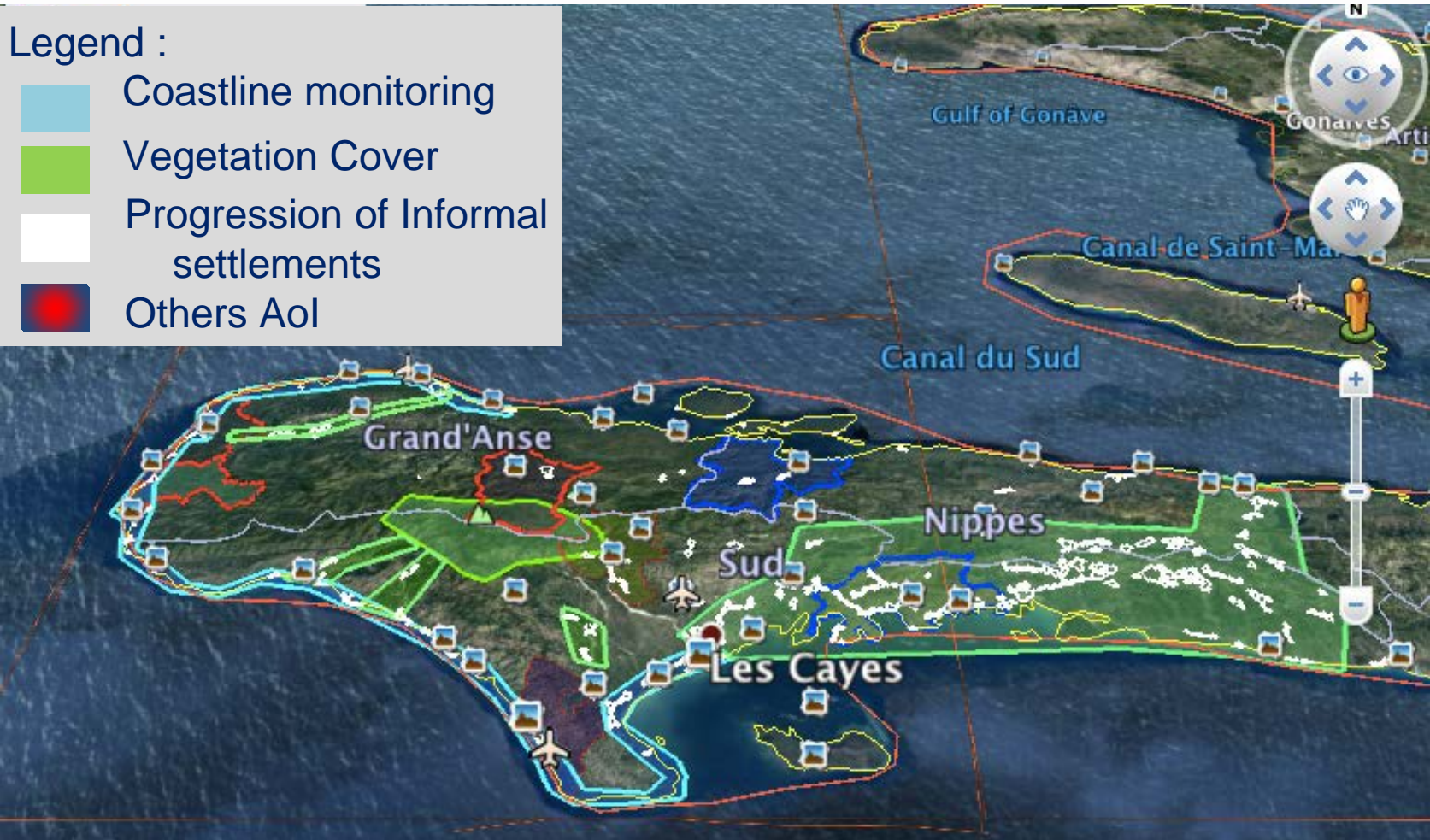


Baseline mapping	Pre-event baseline landcover map of area of interest
	After event baseline map showing categories of damage over Aol Update with schools and health centres and road network
Housing	Progress of housing reconstruction (routine product) 1 or 2 years only?
	Population displacement monitoring product (routine product)
Transport	Status of critical transportation points (input to Rural Access Index) (routine product)
Agriculture	Agricultural change assessment (science product)
Health	Vector-based disease risk product (science product)



Environment	Status of regeneration, deforestation and human impacts (and other parameters?) in protected areas (routine product)
	Coastal zone monitoring with focus on reefs (reef health) and coastline (sedimentation, river discharge, coastline change) – (science product)
	Integrated watershed monitoring (science product)
	Ground movements: landslide (base map and update after major met events or seismic event) and fault mapping (science product)
	Evolving hazards – change detection map of high risk vulnerable areas ; flooding after new met events (science product)

CIAT input on priority monitoring

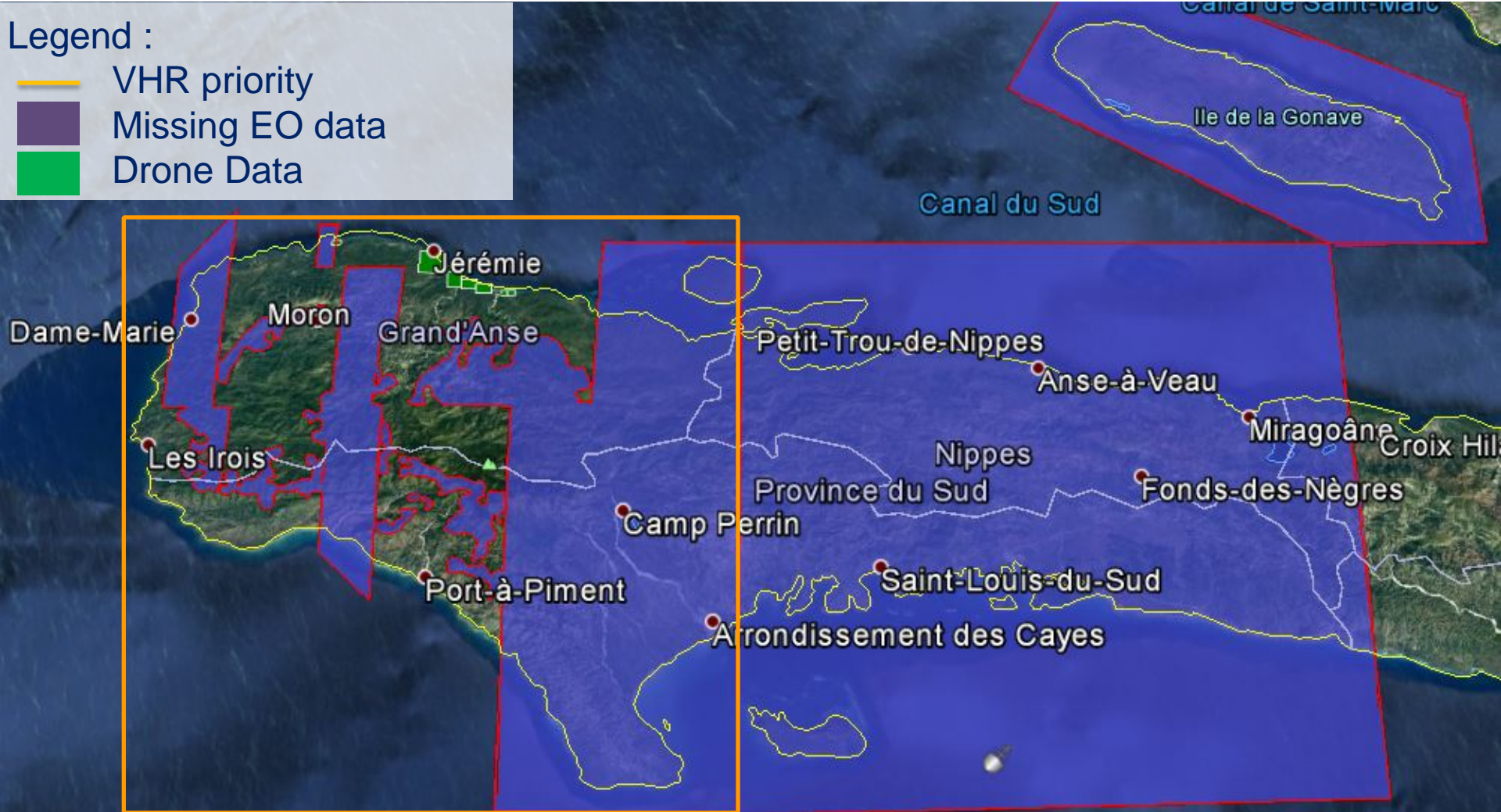




IOM input on priority monitoring (International Organization for Migration)

Legend :

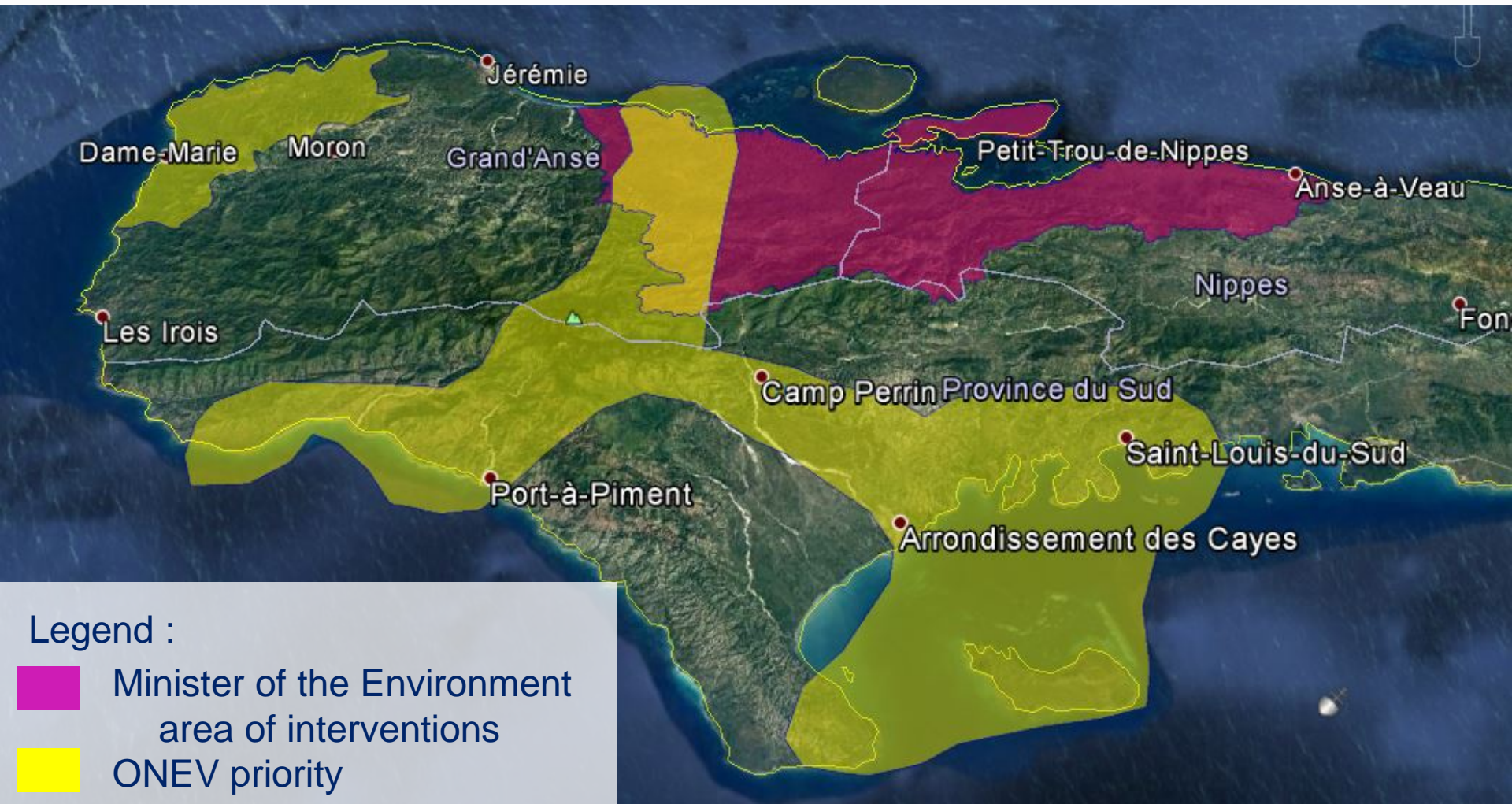
- VHR priority
- Missing EO data
- Drone Data



RO monitoring needs being mapped out by CIAT, ONEV and others :



**ONEV input on priority monitoring
(National Observatory of the Environment and Vulnerability)**





Overview
AOI



Free and open collection of images and maps at several scales

Field data for validation

Strong capacity building component

**An HR cover of the entire AOI, few VHR on zoom before and after Matthew
(Optical and SAR) for reconstruction planning**

Regular programming for reconstruction monitoring

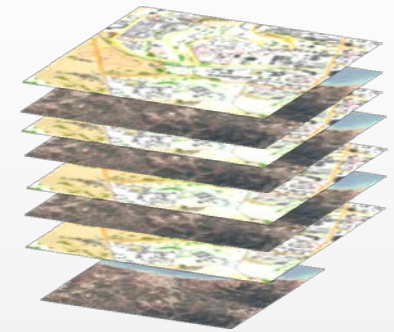


An HR cover of the entire AOI, few VHR on zoom before and after Matthew
(Optical and SAR)

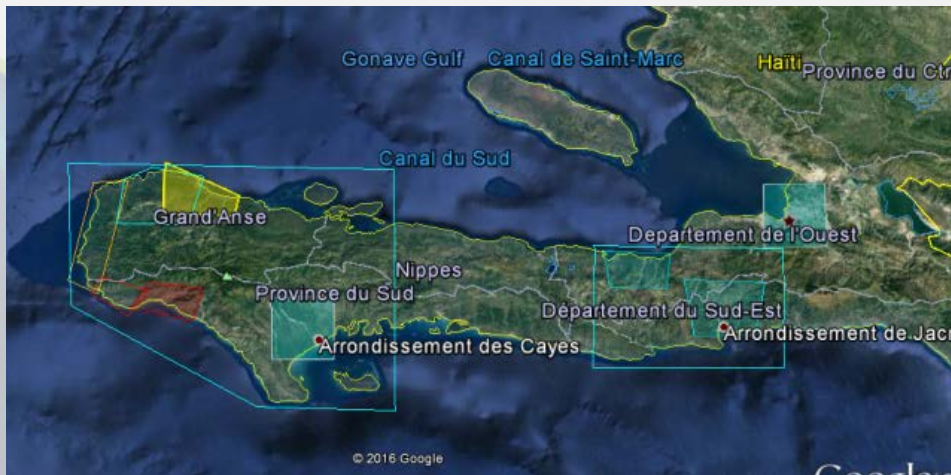
Archive Existing data :

TerraSAR-X, Spot, Landsat, WV, ALOS-2,
Radarsat-2, Pléiades, Drones images

**Action : Discuss Archive Data quota
with CEOS RO partners**

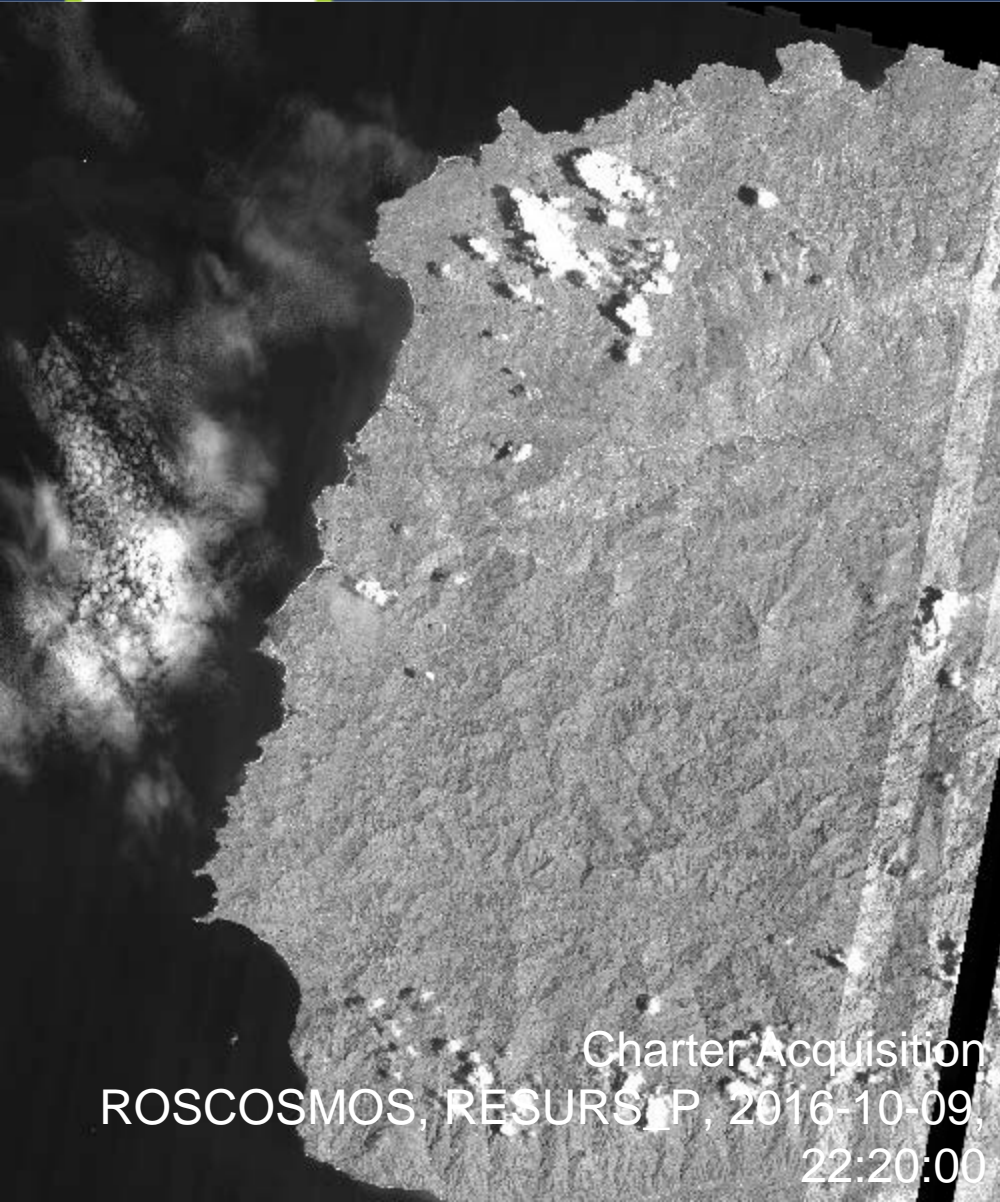
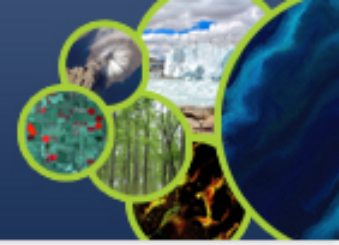


Charter activation for Matthew in Haiti



**ROSCOSMOS- Resurs p
ROSCOSMOS- Kanopus v
CNES - Pléiades
CSA – Radarsat-2**

**Action : Charter- CEOS
agreement**



Charter Acquisition
ROSCOSMOS, RESURS-P, 2016-10-09,
22:20:00

Overview area

Mid-scale products : overview AOI

- Change in landcover, open spaces
- Vegetation loss or re-growth
- Agriculture
- Coastal apps

HR Optical : SPOT, Landsat-8, Sentinel-2

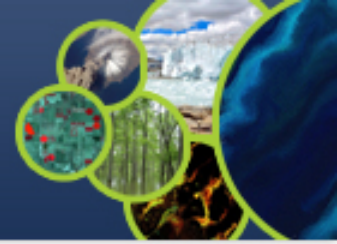
Medium/Low Resolution Optical :
MODIS, Sentinel-3

HR SAR: CSK, TSX, ALOS-2, Radarsat-2
DEM

Update frequency:

every 10 days to 6 months

(Agriculture, landcover, landslides,
environmental monitoring, Coastal apps,
Flood and landslide hazard products)



Pre event :

05/06/2016 T16:48:40

24/04/2016 T16:48:40

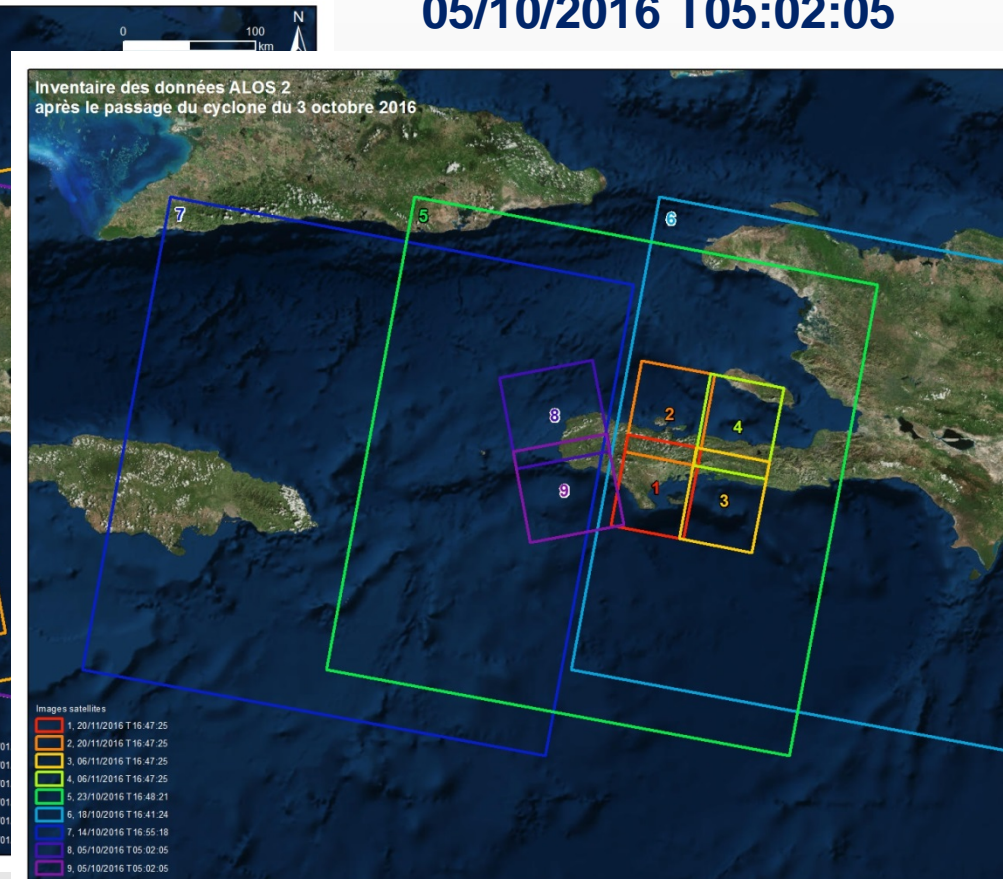
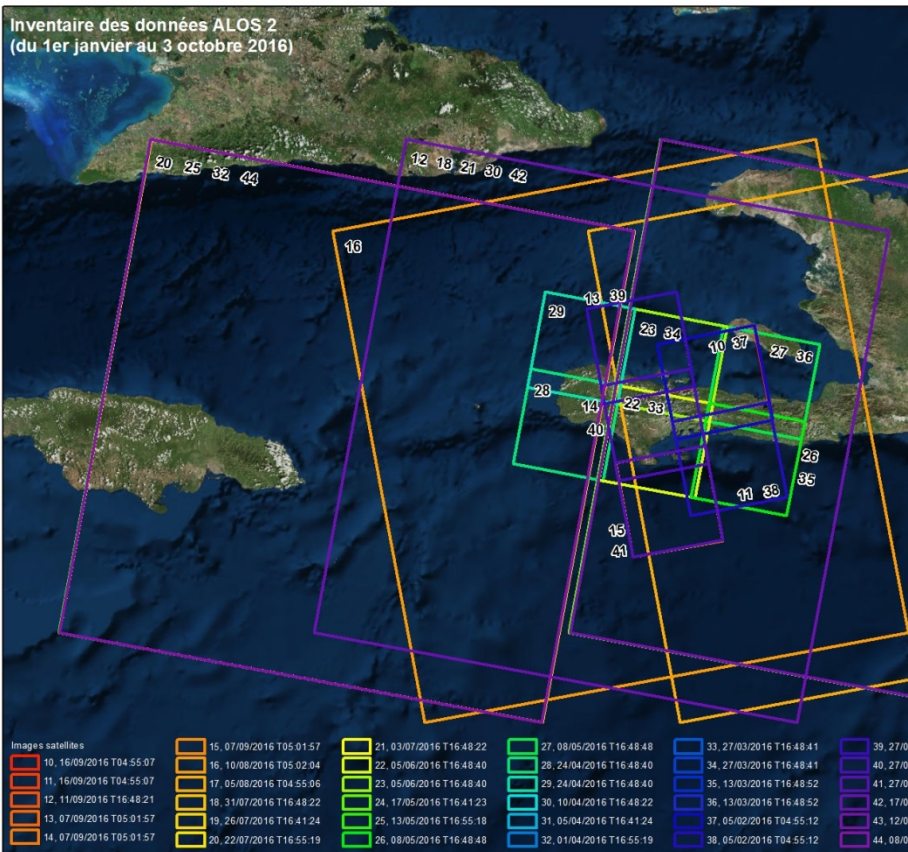
08/05/2016 T16:48:48

Post event :

20/11/2016 T16:47:25

06/11/2016 T16:47:25

05/10/2016 T05:02:05

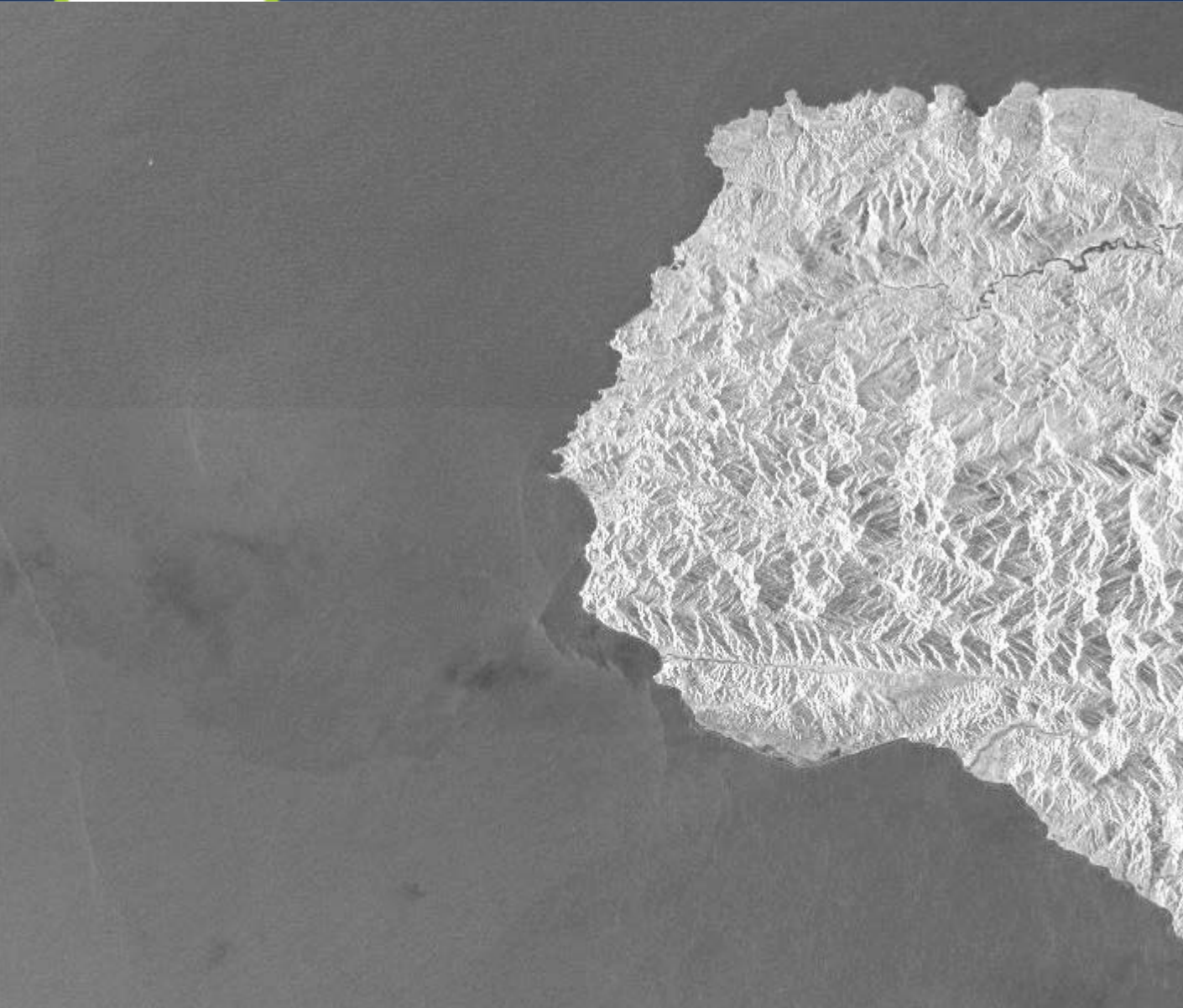




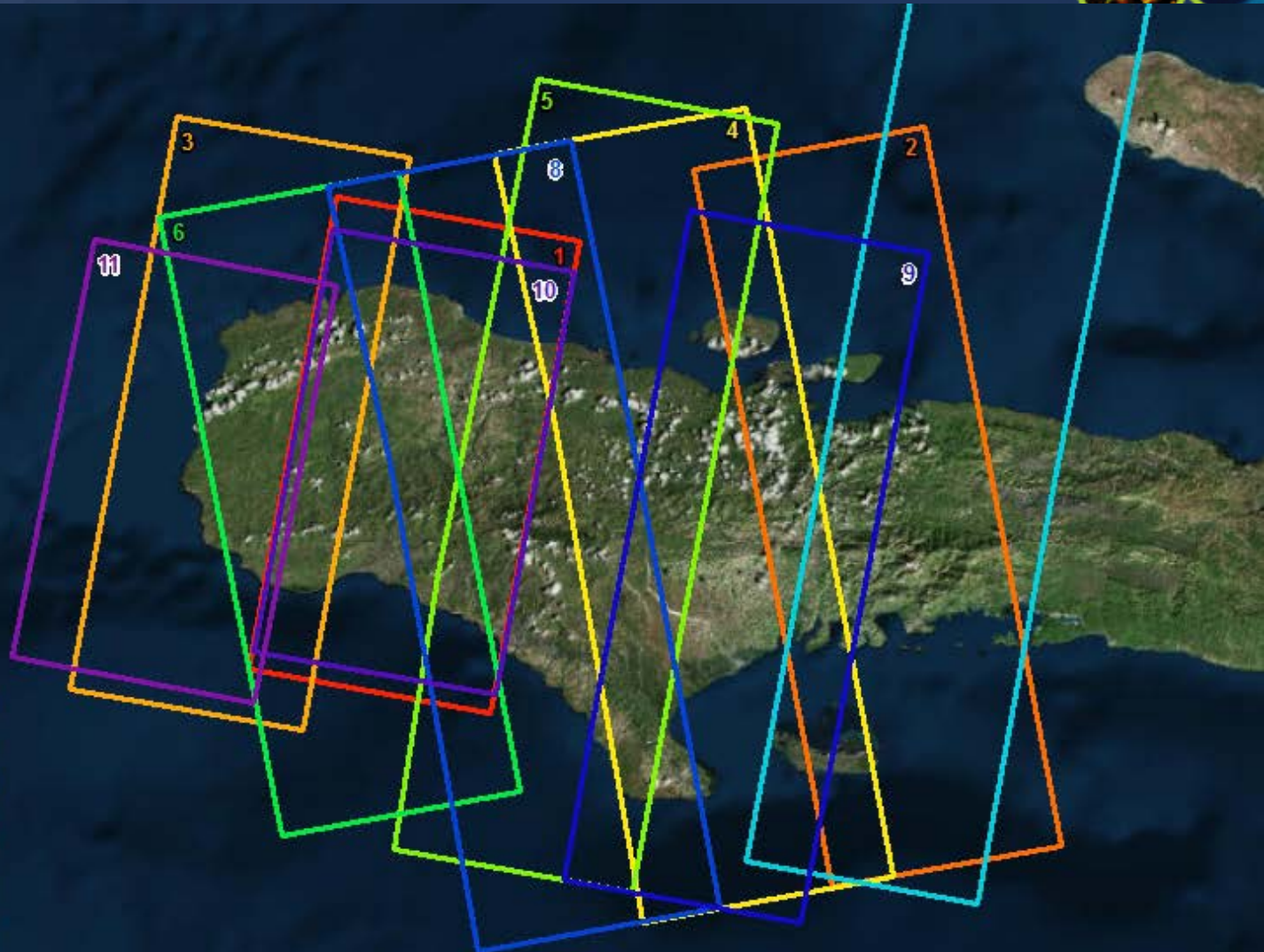
**Alos-2
Post Event**

**JAPAN-JAXA-
ALOS2-EICS
05/10/2016
T05:02:05**

**155218
155153**

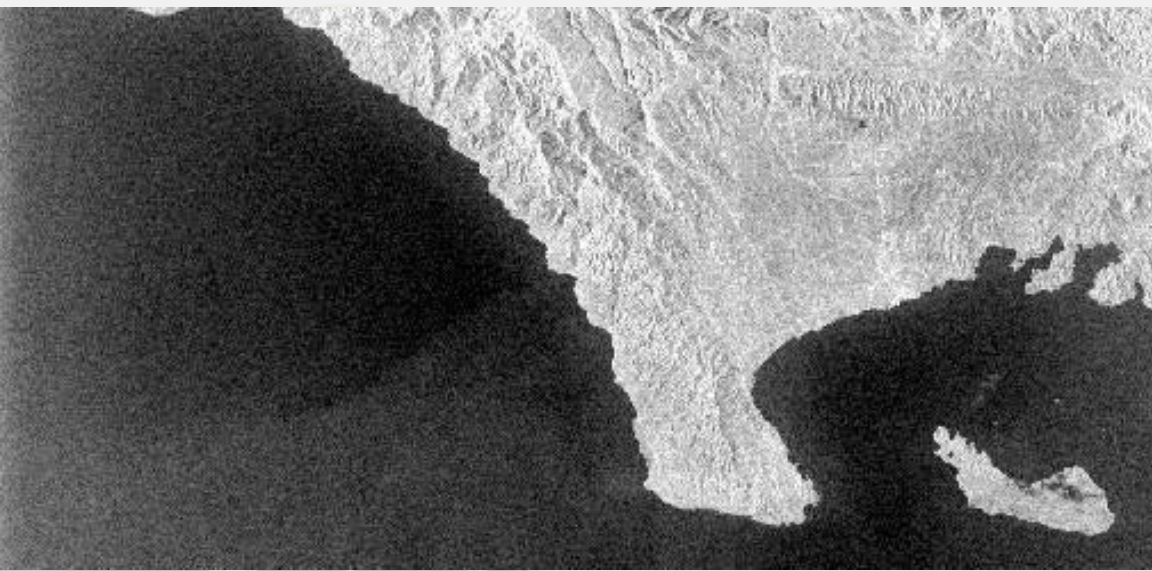
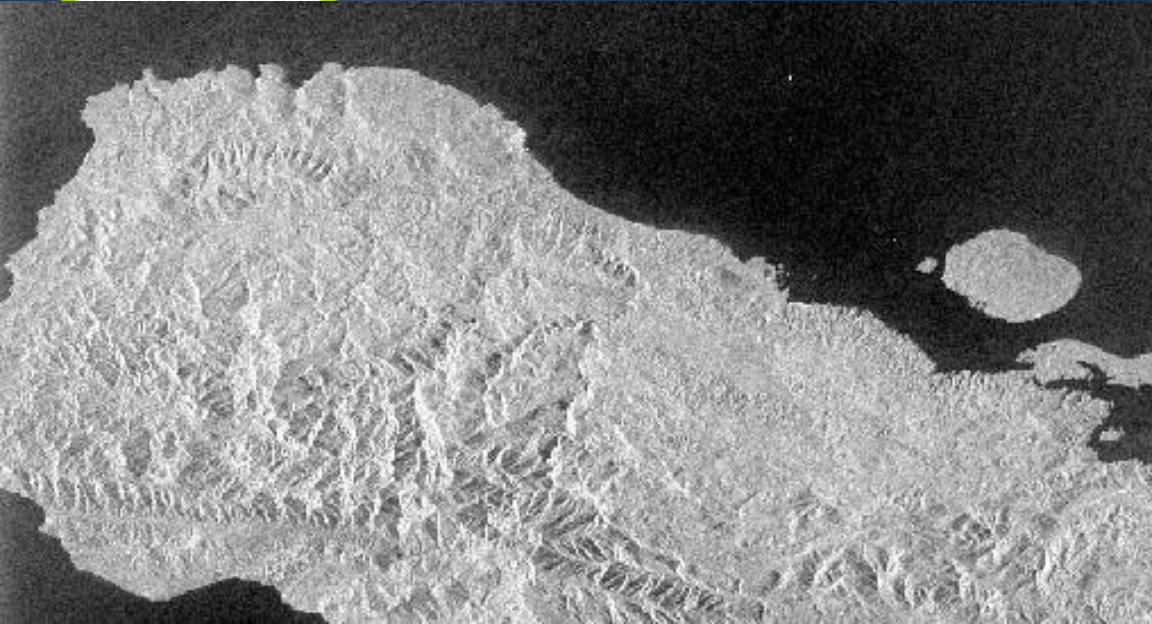


Existing Data : TerraSAR-X TanDEM-X



Images satellites

- 1, TerraSAR-X, 2017-01-20T10:53:57.136Z
- 2, TanDEM-X, 2017-01-09T22:54:49.346Z
- 3, TerraSAR-X, 2017-01-09T10:53:56.296Z
- 4, TanDEM-X, 2016-12-18T22:54:51.551Z
- 5, TerraSAR-X, 2016-12-18T10:53:56.671Z
- 6, TanDEM-X, 2016-11-26T22:54:54.972Z
- 7, TerraSAR-X, 2016-11-26T10:53:52.939Z
- 8, TanDEM-X, 2016-11-15T22:54:52.186Z
- 9, TerraSAR-X, 2016-11-15T10:53:59.115Z
- 10, TerraSAR-X, 2016-10-13T10:54:00.312Z
- 11, TerraSAR-X, 2016-10-07T11:02:33.034Z



Two areas

Pre event :

11/02/2016 23:12

06/03/2016 23:12

30/03/2016 23:12

23/04/2016 23:12

17/05/2016 23:12

10/06/2016 23:12

04/07/2016 23:12

21/08/2016 23:12

Post event :

07/10/2016 10:56:04

08/10/2016 23:12:13

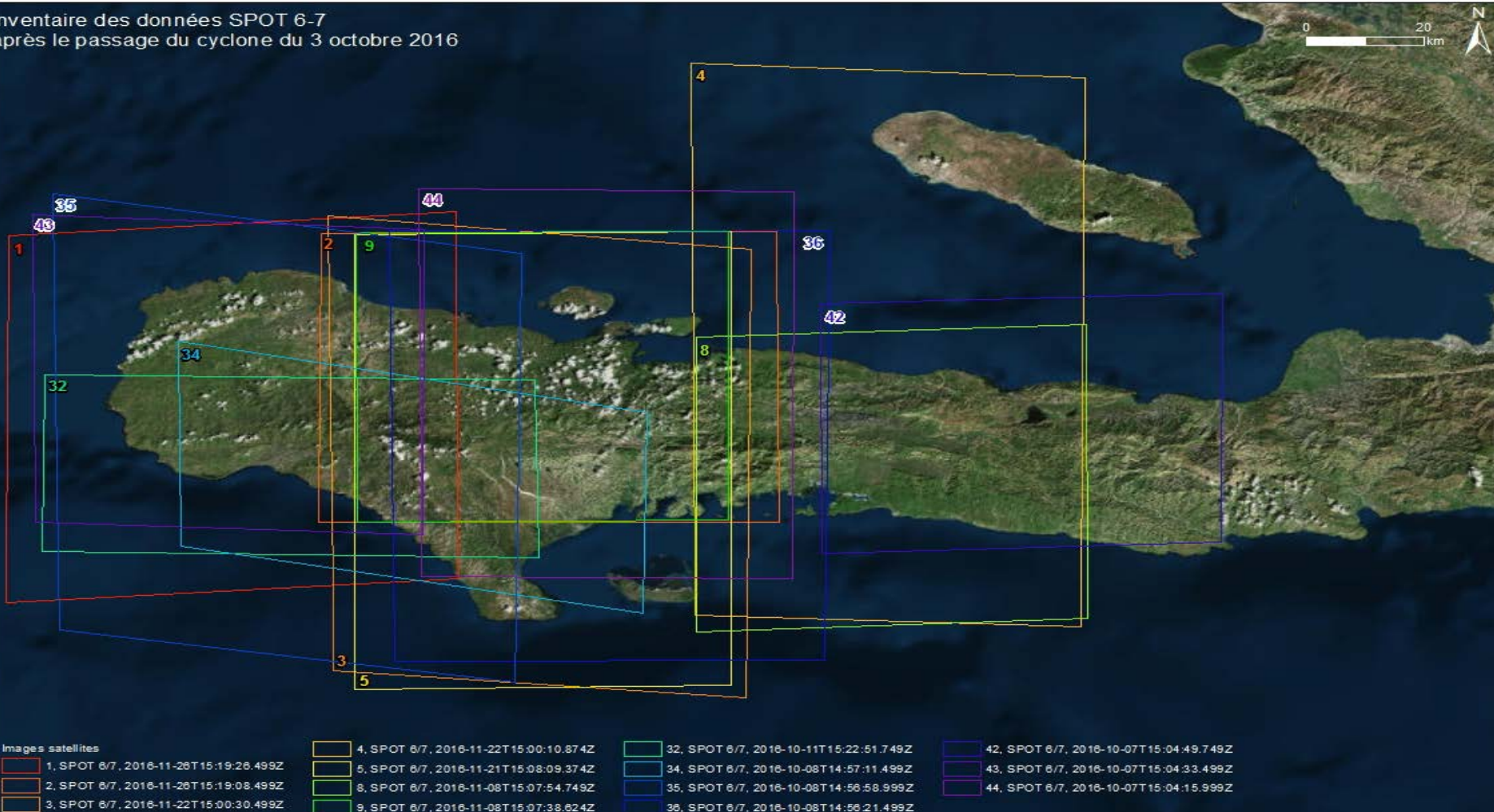
01/11/2016 23:12:12

25/11/2016 23:12:10



The entire AOI has been covered on February 1st and 14, 3 images cloud free
 Pre Event : 25/06/2016 – 26/01/2016
 Post Event : 08/10/2016

Inventaire des données SPOT 6-7
 après le passage du cyclone du 3 octobre 2016





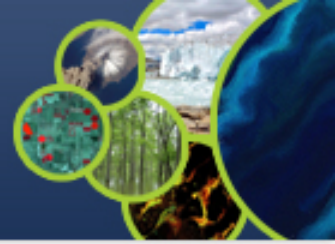


Rebecca Blackwell/Associated Press

Environment / Agriculture monitoring : a key to success

Macaya National Park : a biosphere reserve by UNESCO (2016)





Several target already defined :

Macaya National Park

Urban Area (Port salut, Les Cayes..)

Infrastructures monitoring (Hospital..)

Population movement

(Dame-Marie Corridor Jérémie)

Coastline monitoring

(zone Les Cayes - Jérémie)

Erosion of mountain area to the sea

Pine forests, Situation of the cocoa, coffee

and the cashew nut culture,

Landslide Area, Watershed ...

Users input still being received

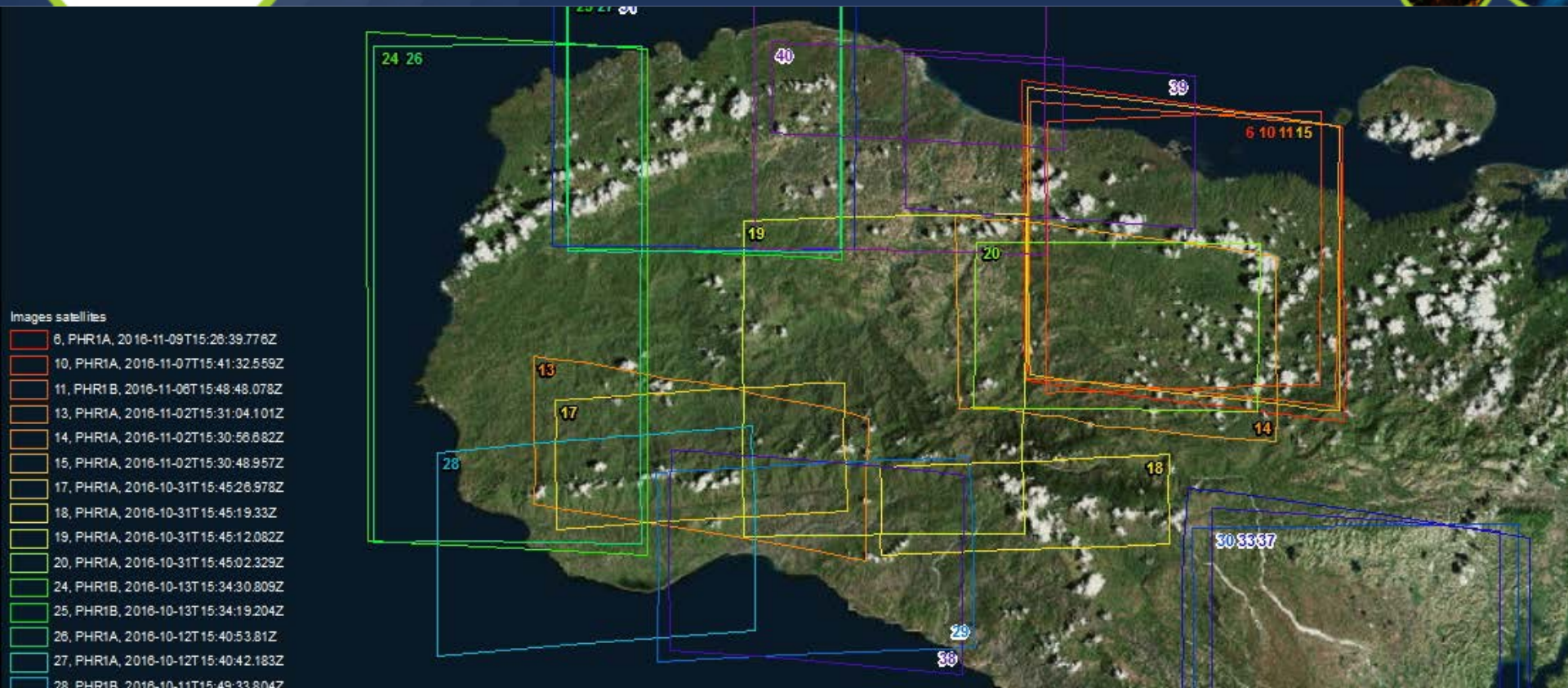
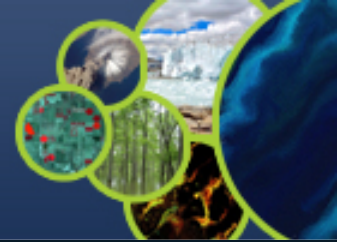
analysis in ROOP late March

VHR Optical : Pléiades, (GeoEye, Woldview 1/2/3)

VHR SAR : Alos-2, CSK, TSX, Radarsat-2 Spotlight

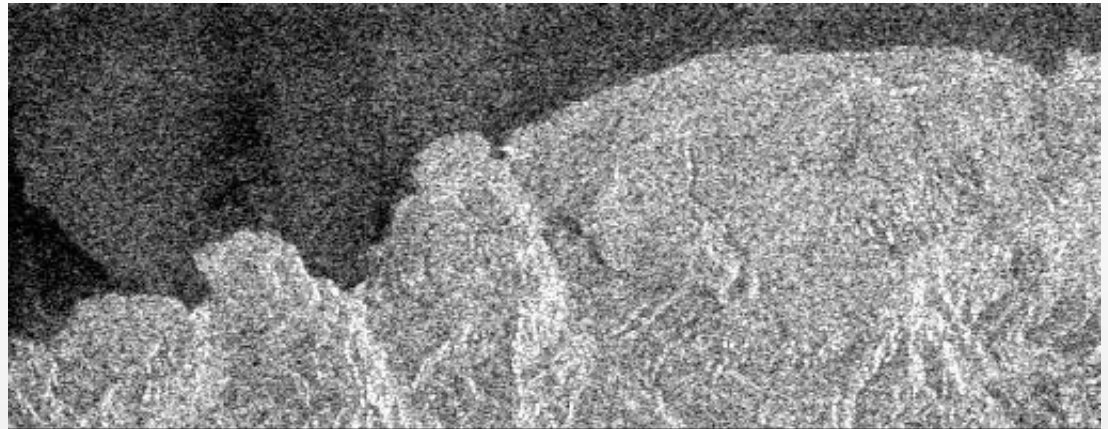
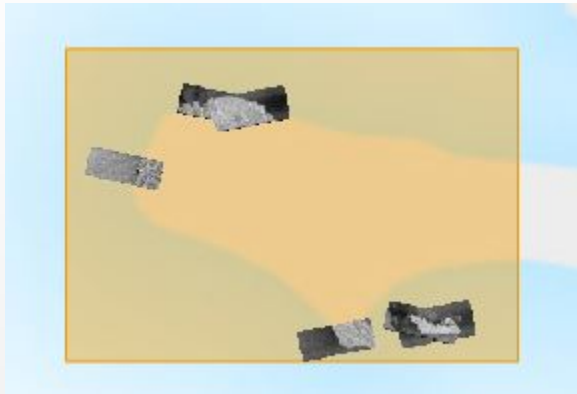
Possible Update frequency:

Every 6 months; tuned to applications

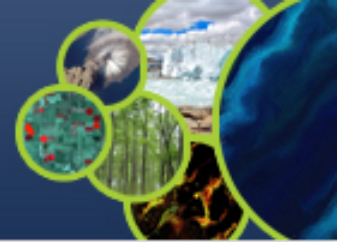




Spotlights Post Event



15/10/2016 23:08
15/10/2016 23:08
24/10/2016 11:00
29/10/2016 22:59
31/10/2016 10:56
31/10/2016 10:56



Pre event :

WV02 28/09/2016
WV02 29/08/2016
WV02 13/08/2016
WV01 07/08/2016
WV02 27/07/2016
WV02 17/07/2016
WV02 06/07/2016
WV02 07/06/2016
WV01 12/06/2016
GEO1 07/06/2016
WV01 28/03/2016
WV01 23/02/2016

Post event :

From 09/10/2016 To 17/10/2016

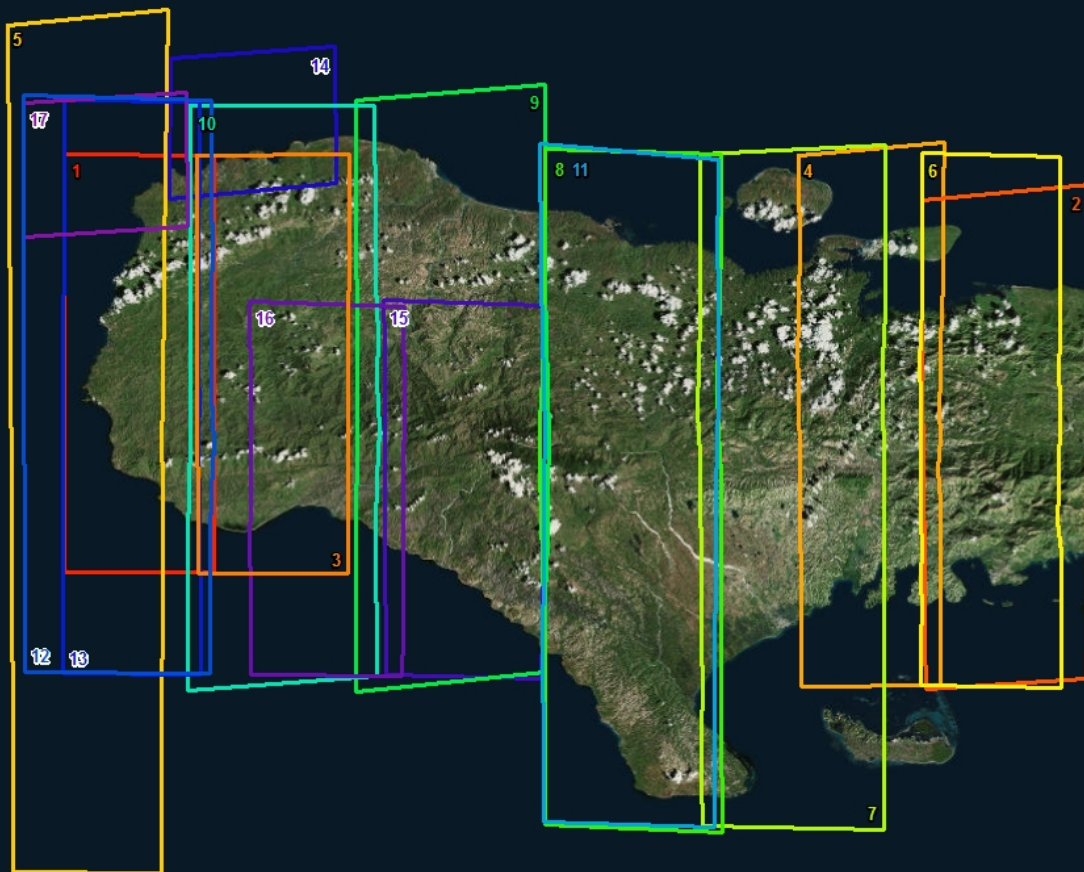
Inventaire des données américaines
après le passage du cyclone du 3 octobre 2016

0 10 km

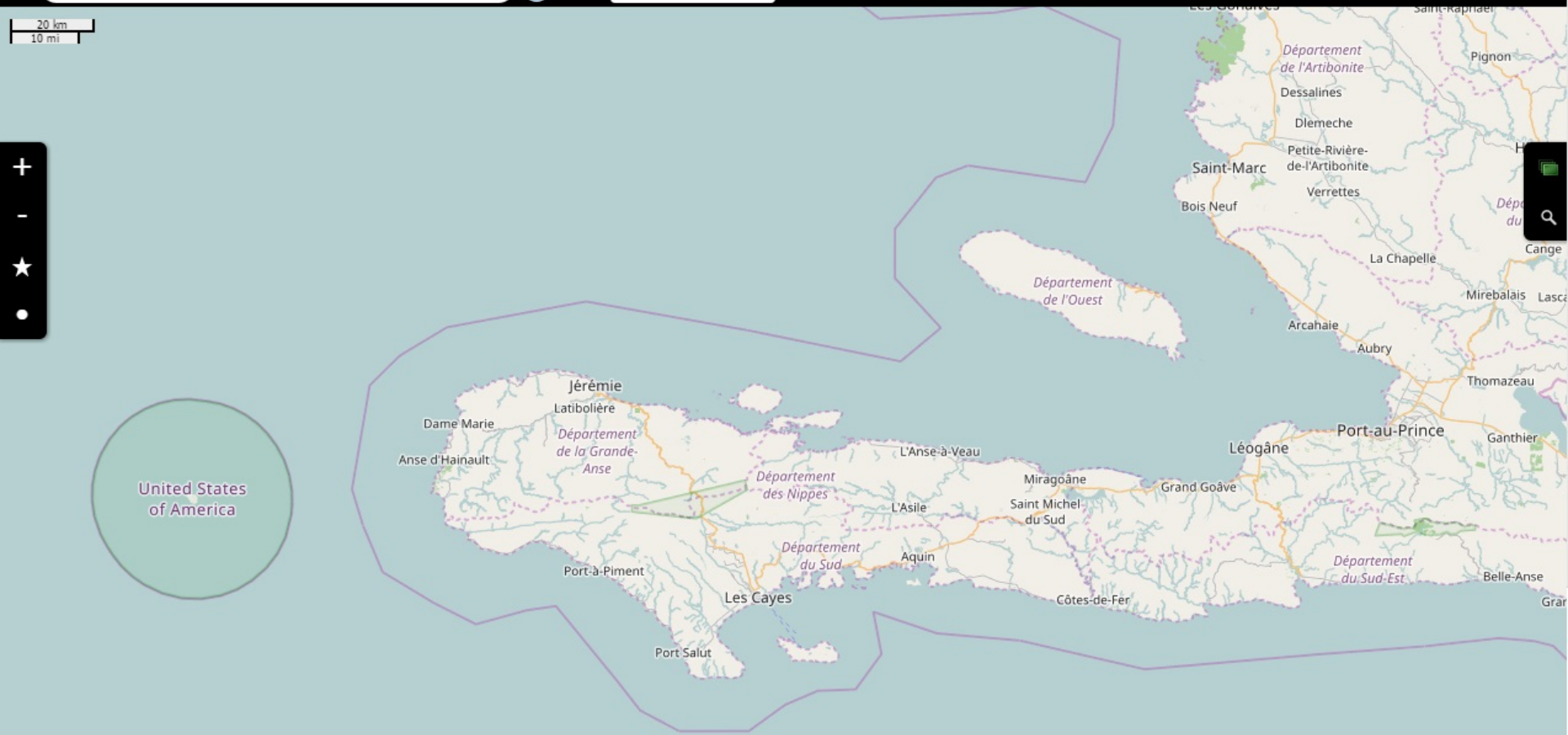


Images satellites

- 1. WV02, 17/10/2016
- 2. WV02, 17/10/2016
- 3. WV02, 17/10/2016
- 4. WV03, 18/10/2016
- 5. GEO1, 18/10/2016
- 6. WV03, 18/10/2016
- 7. WV02, 14/10/2016
- 8. WV02, 14/10/2016
- 9. WV01, 11/10/2016
- 10. WV01, 11/10/2016
- 11. WV01, 11/10/2016
- 12. WV01, 11/10/2016
- 13. WV03, 10/10/2016
- 14. WV02, 09/10/2016
- 15. WV02, 09/10/2016
- 16. WV02, 09/10/2016
- 17. WV02, 09/10/2016



RO Dotcloud Platform creation on-going – first version late April 2017

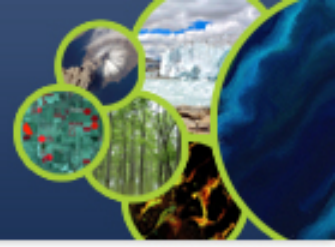




- Update of Operations Plan (ROOP) to be developed in cooperation with Haitian partners and international DRM community in March 2017
- Development of pilot applications based on identified requirements for presentation at May workshop
- Solicitation of new funding and new partners to augment monitoring applications to be offered
- “Table Verte” contacts and Haiti presentation by RO Team (CNIGS, 29 and 30 March) in Port-Salut
- May User Workshop – proposed for 29 and 30 May or 30 and 31 May in Port-au-Prince



- Bring together local, national and international RO users to present recovery plans of government and NGOs in affected areas;
- Showcase preliminary RO platform, with pilot applications for review and improvement proposals by users;
- Discuss capacity building plan and specific initiatives to ensure increased capacity at national and local levels;
- Discuss improvements and ideal ‘steady-state’ RO;
- Discuss functionalities required (database, archive search, platform, portal, product generation, etc) for integrated EO-based information systems in Haiti; review role of different projects;
- Discuss dissemination strategies to ensure full RO access for users with different levels of capacity.



To June 2017 – RO Establishment

- Discussion of MOUs with Haitian users and partners,
- Solicitation of new partnerships (especially for value-adding)
- Establishment of IT infrastructure with charter images, baseline pre/post-event
- Development of capacity building plan
- **First User workshop** in Haiti to provide further input to the ROOP and finalise the RO baseline.

June to fall 2017 – RO Commissioning

- Incorporating the first products into the RO and ensuring easy access;
- Animating the user forum;
- Encouraging and promoting RO use.
- First “early evaluation”, with a report to RO Steering Committee

To end 2021 (est.) – RO Steady-state Operations

- Ensure IT updates, engage in capacity building activities, generate regular products, report on RO annually to stakeholders and partners
- Preparation of closure, including evaluation and legacy strategies.



- Haiti RO will set up a **Project Team**, made up of local stakeholders, international DRM community, value adders, academia, and CEOS satellite community. All RO contributors and users are de facto members of Project Team. All ROOT members invited to join.
- Haiti RO **Steering Committee (SC)** to be made up of Haiti champions CNIGS, CIAT and ONEV, together with GFDRR/WB, and UNDP as representatives of the international community, and two or three volunteers ROOT CEOS agencies.
- Haiti SC to meet via teleconference once every three months to oversee RO development and address issues that arise, and face to face as required.
- Day-to-day management of RO to be undertaken by project team on a decentralized basis (project leadership by CNIGS; technical project management support by CNES).



World Reconstruction Conference 3

Promoting Resilience Through Post-Crisis Recovery
Brussels, Belgium | June 6-8, 2017

The third edition of the World Reconstruction Conference will be held in conjunction with the European Development Days 2017. It will bring over 500 practitioners from governments, civil society, development partners, academia, and the private sector to share best practices and lessons learned on a range of topics.

The conference will focus on:

- Promoting inclusive recovery and building back better for achieving resilience
- Building capacities for implementing resilient recovery
- Leveraging political consensus on strengthening recovery systems

To support the implementation of **Priority 4 of the Sendai Framework for Disaster Risk Reduction 2015 – 2030**

Organized by:



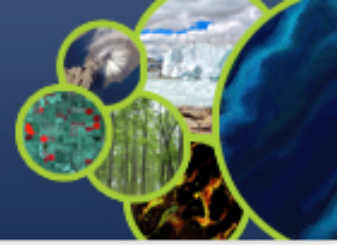
GFDRR
Global Facility for Disaster Reduction and Recovery



WORLD BANK GROUP



For more information:
wrc3@worldbank.org



- **Structure:**
- **3 days of Conference and Tour&Taxi (at The Square)**
- **5 plenaries**
- **21 technical sessions**

❑ **WRC3 website: <https://www.gfdrr.org/wrc3>**

❑ **Registration: To be launched by the end of Feb. 2017**