



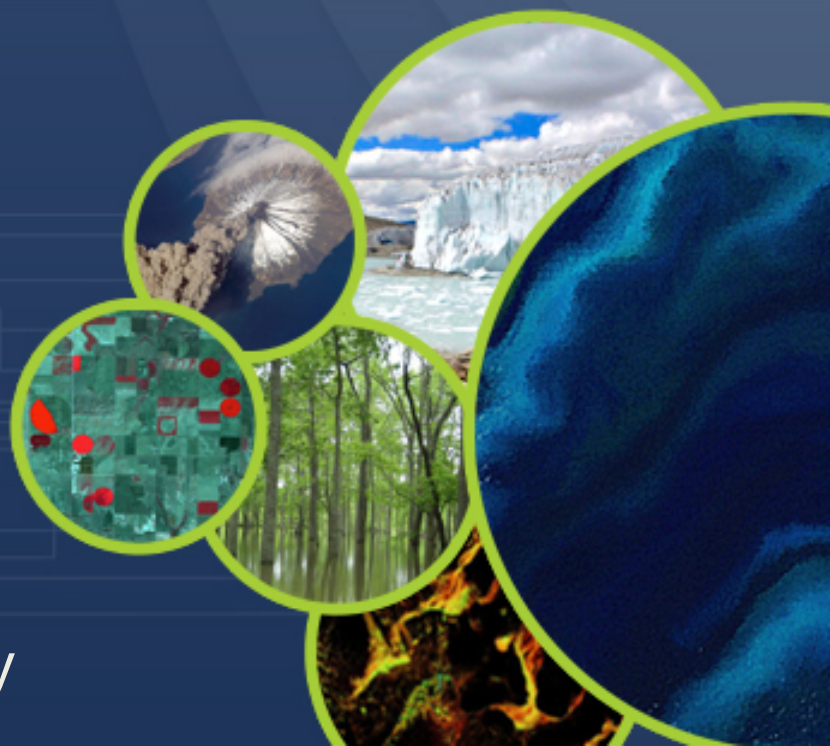
Committee on Earth Observation Satellites

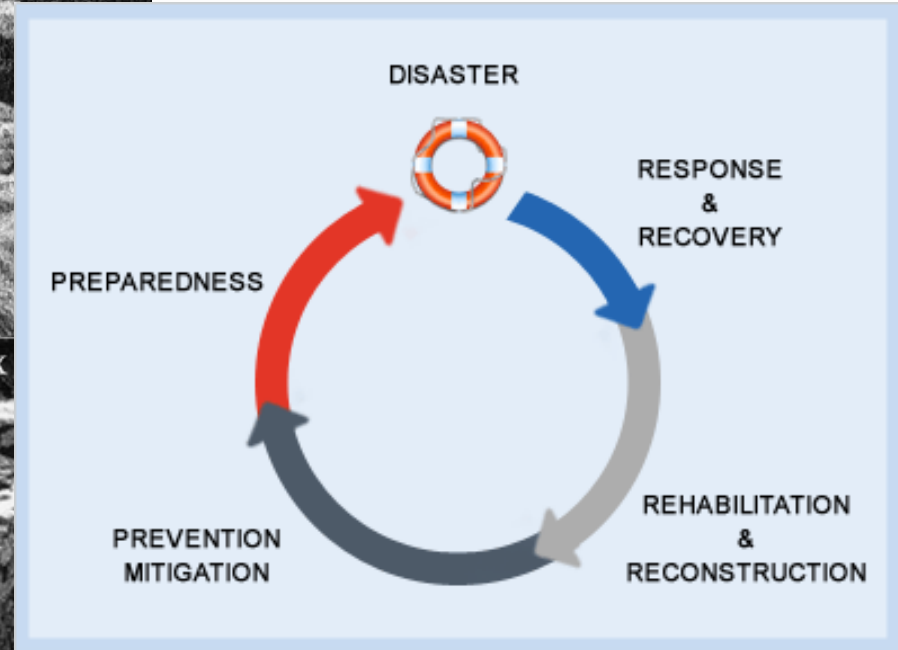
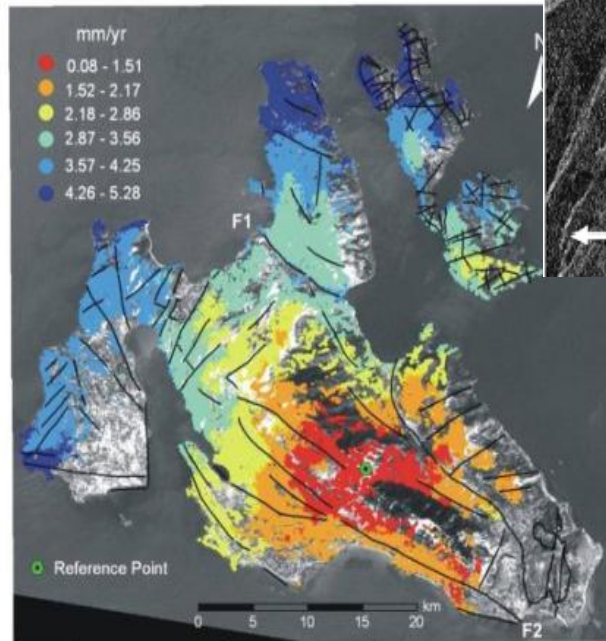
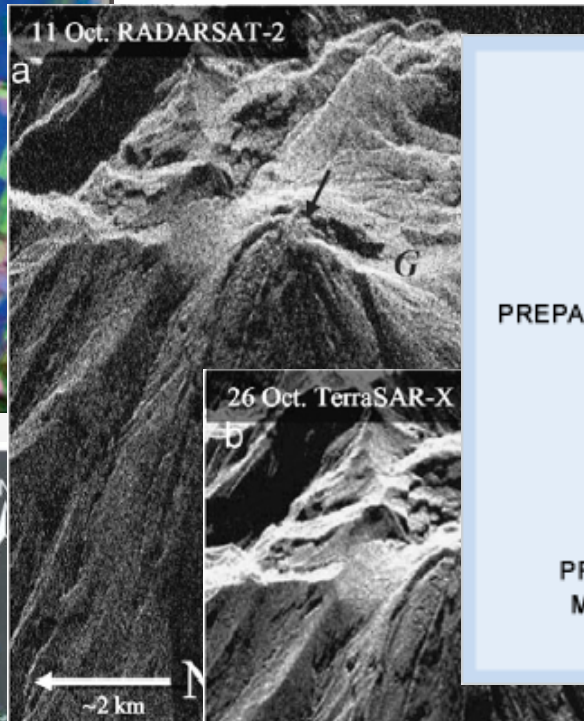
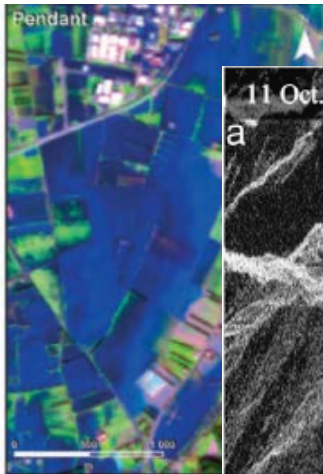
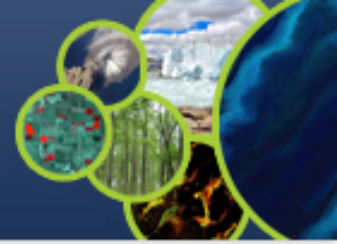
Recovery Observatory (RO)

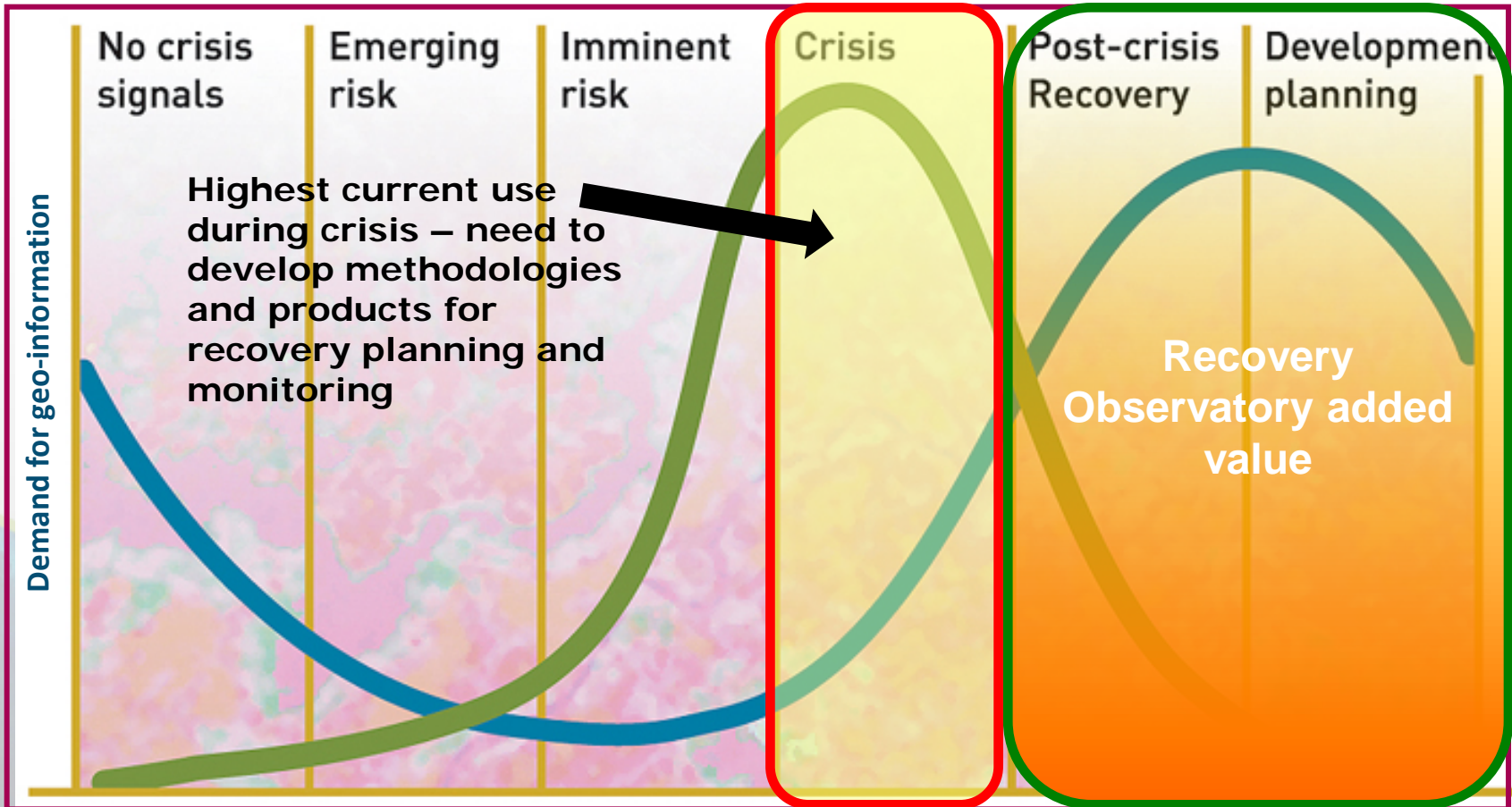
Haiti Hurricane Matthew RO – An Overview

CEOS Pilots Showcase
Buenos Aires September 4th, 2017

Helene de Boissezon, CNES
Agwilh Collet, CNES
Andrew Eddy, AG - ROOT Secretary







Rush demand of basemap



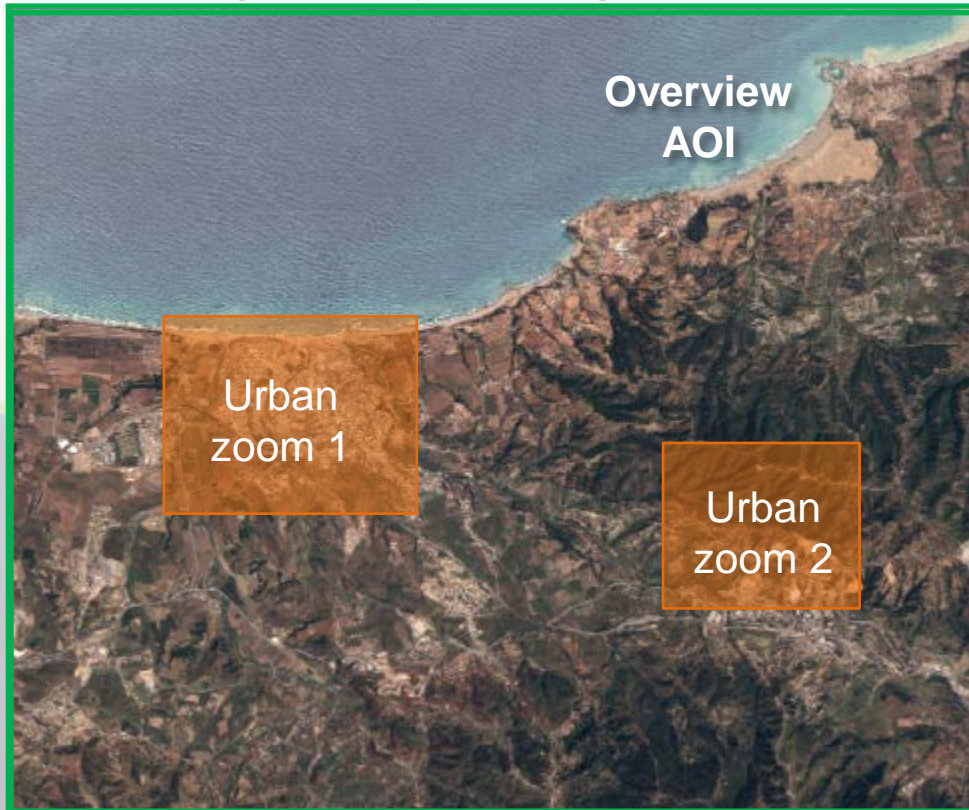
Complex info with added value



Free and open collection of images and maps
at several scales

Field data for validation

Strong capacity building component



Overview area

Mid-scale products from Sentinel
data at 10m resolution

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

Update frequency:

every 10 days to 6 months

Zooms

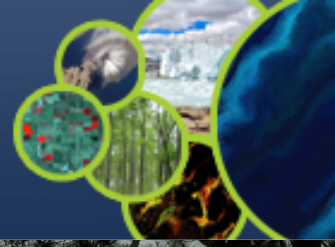
Large scale products from very
high resolution data

- Protected areas,
- Settlements,
- Infrastructures, ...

Update frequency:

Every 6 months; tuned to applications



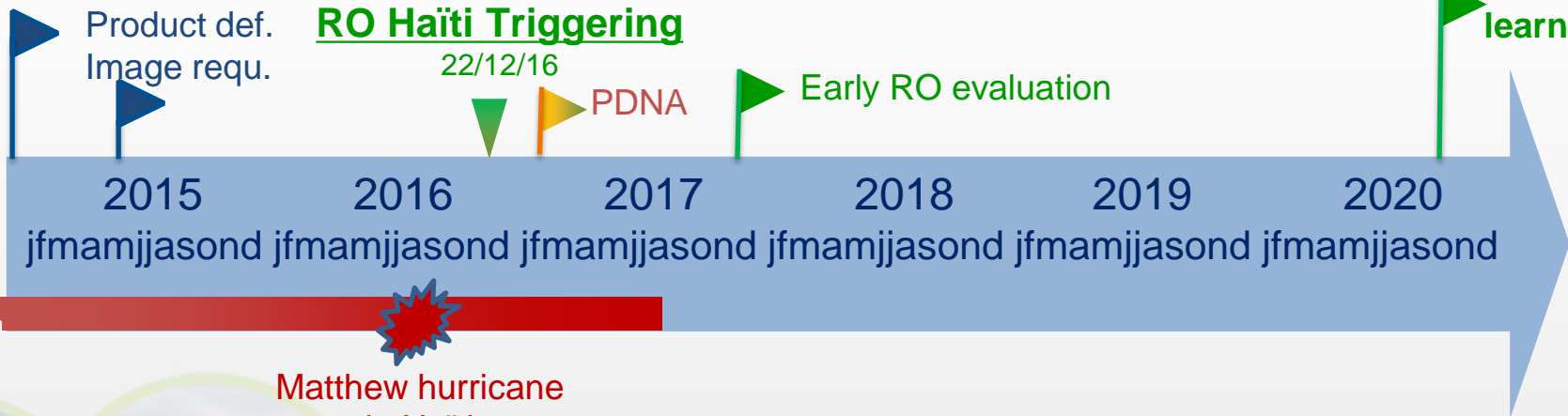


A Reminder of Haiti's diversity

- **Triggering of the RO** decided by CEOS Chair in consultation with CEOS Principals, **December 22, 2016**, after **Hurricane Matthew - October 2016**
- **Mission to Haiti 31 Jan - 3 Feb 2017** to establish partnership with Haiti RO users and stakeholders
- **Mission to Haiti 29 May – 2 June 2017** to establish RO users connection and feedback from first products



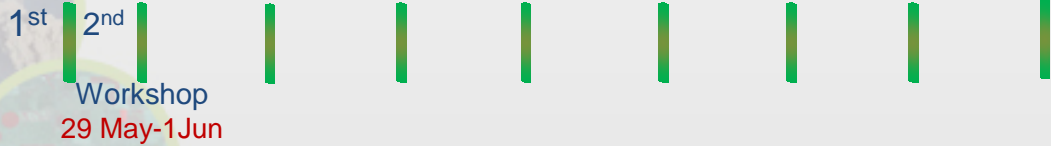
Infra dvt



Matthew hurricane in Haiti
04/10/16

Malawi, Nepal demos

Missions (Haiti, WB/UN)
(2 to 3 per year)



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





Rebecca Blackwell/Associated Press

Environment / Agriculture monitoring : a key to success

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



Workshop users : 29 May to 2 June, 2017

Validation of needs and state of the art with Haitian users, organized by CNIGS/CNES.

Introduced by the Head of the Ministry of Planning cabinet, CNIGS director, UNDP deputy country director, ONEV director.

CNES :

Helene de Boissezon
Frederic Moll
Agwilh Collet

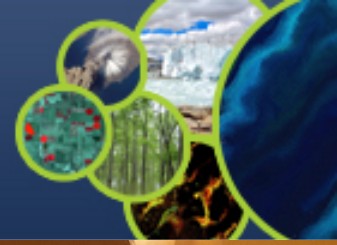
CIMA/ASI :

Giorgio Boni

RO Secretary :

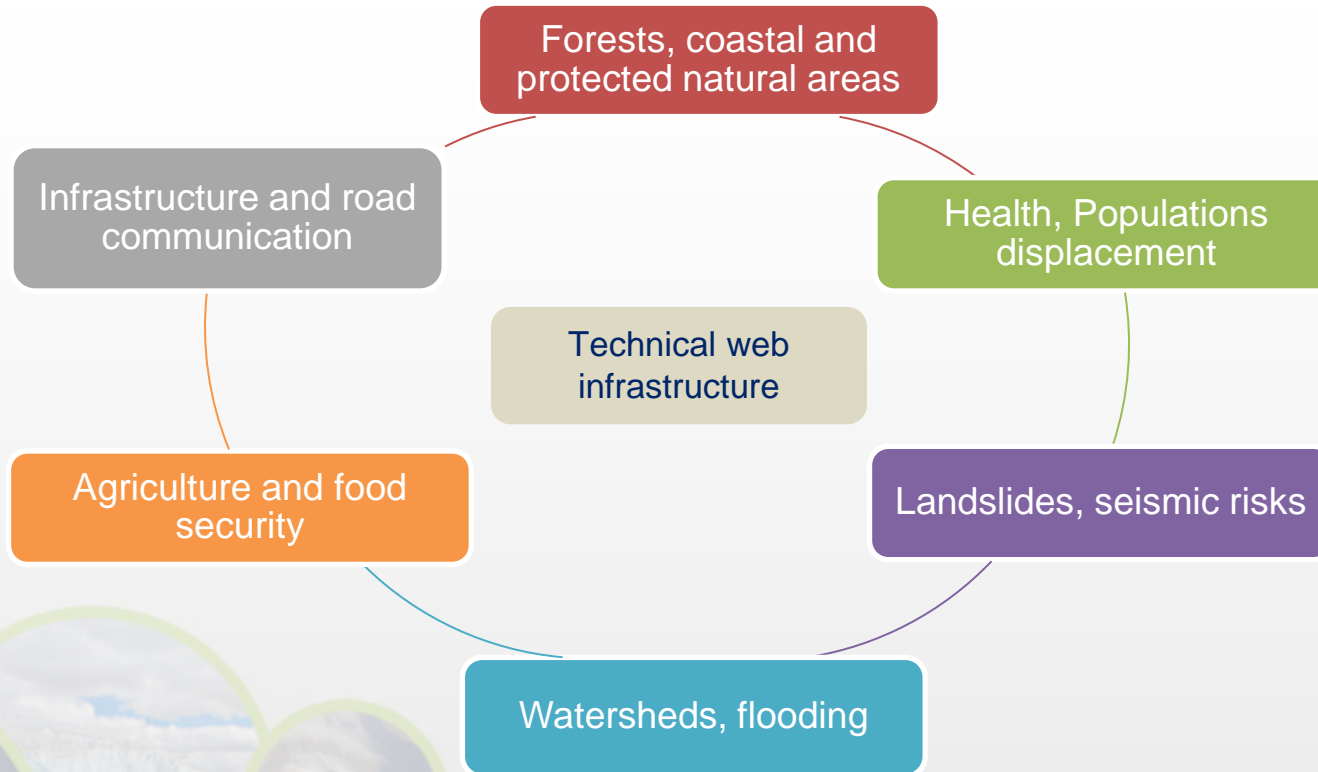
Andrew Eddy





46 participants from

Ministry of Planning, CNIGS, CIAT, ONEV, Mining and Energy department, Ministry of Environment, Ministry of Agriculture, Nature Resources and Rural development, Delegation of European Union, Echo Field, French embassy, CNSA (National Coordination of Food Security) , UNDP, UNEP, SERTIT, CIMA



6 Value-added product themes, 1 technical

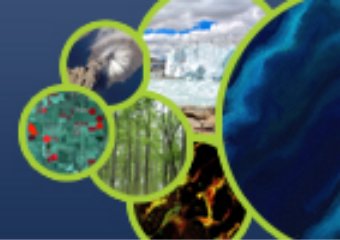
Haitian + CEOS speaker

Haitian concrete examples / showcases

Discussion to define priorities for value added products



- **Strong Haitian presence and support** for RO concept
- Plan to link existing tools & platforms for increased synergy: **Common portal RO, HaitiData.org, RASOR, KAL-Haiti**, future ONEV environmental information service.
- **In each theme:**
 - Definition of key partners and key users
 - Feedback from first products and improvement
 - Choose zoom area(s) to highlight
 - ⇒ **Map of future works**
- **Plan the Copernicus EMS Risk&Recovery requests**
- **Strong need in Capacity Building** (not directly addressed in CEOS WG Disasters framework)



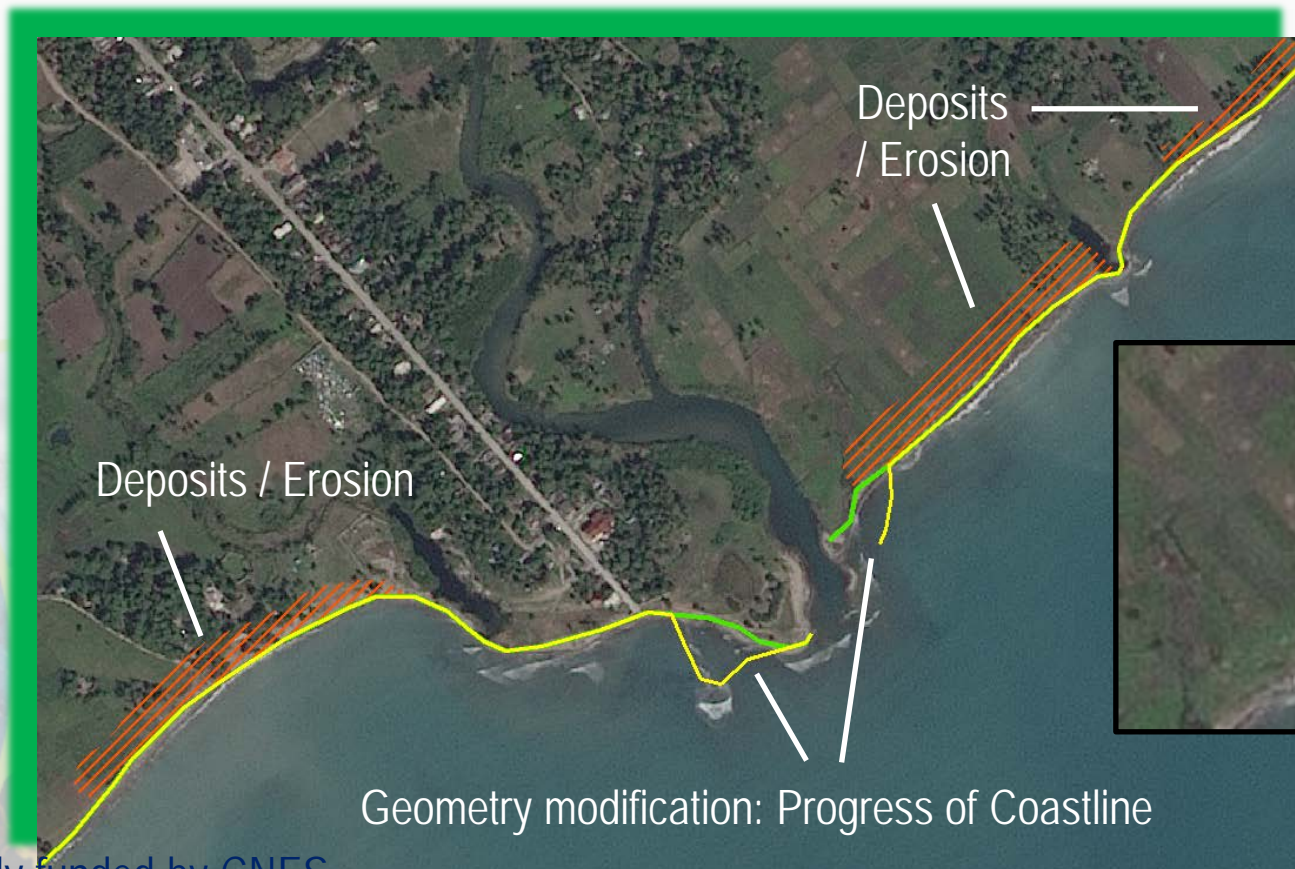
Forests, coastal and protected natural areas

- Secteur 1 : Plaine des Cayes

Torbech

Spot 7 1,5m

Image before
Matthew
08/01/2016

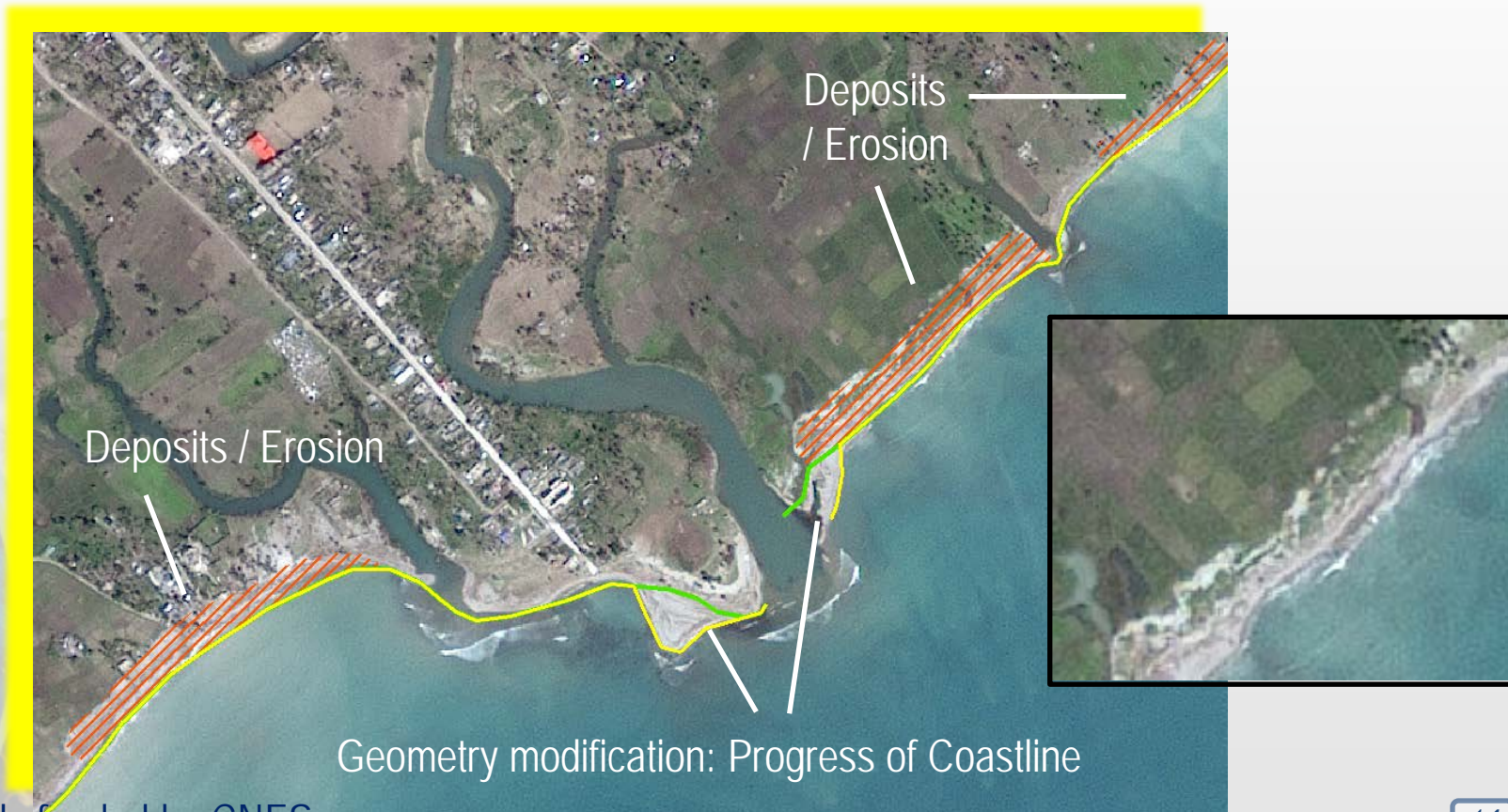




Forests, coastal and protected natural areas

- Secteur 1 : Plaine des Cayes

Torbech
Spot 7 1,5m
Image post
Matthew
14/02/2017

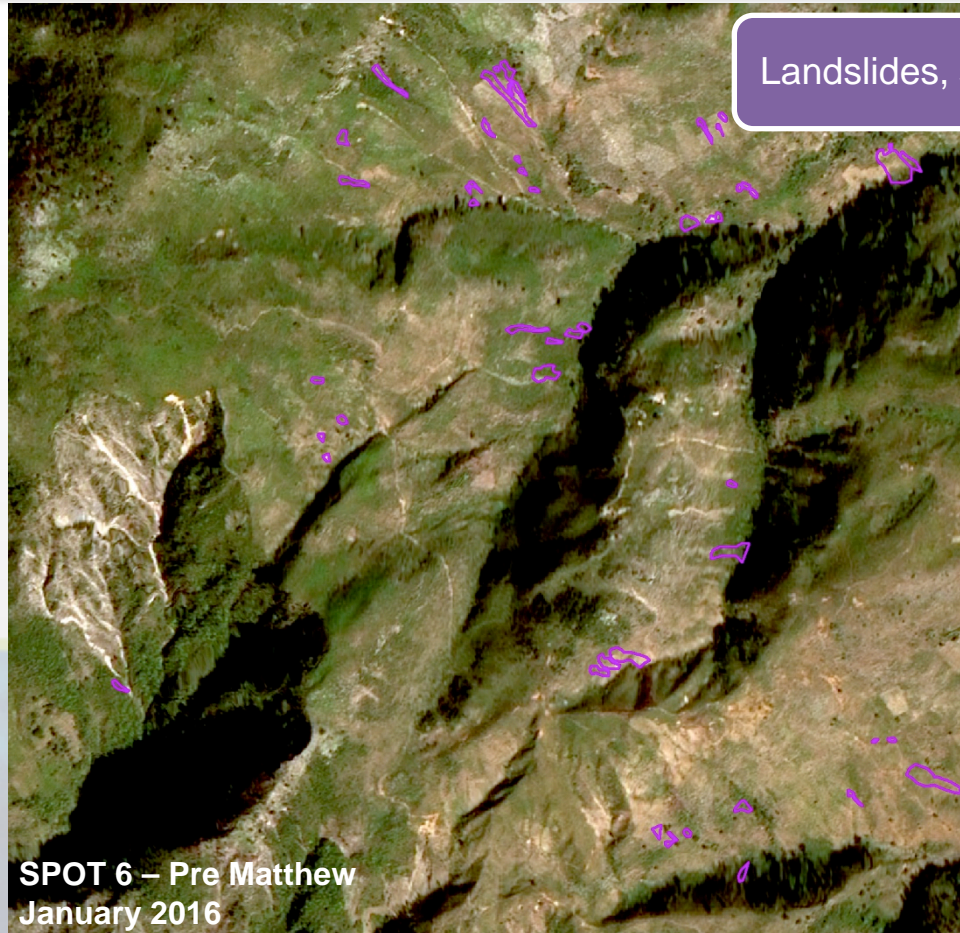


Workshop users #1 :

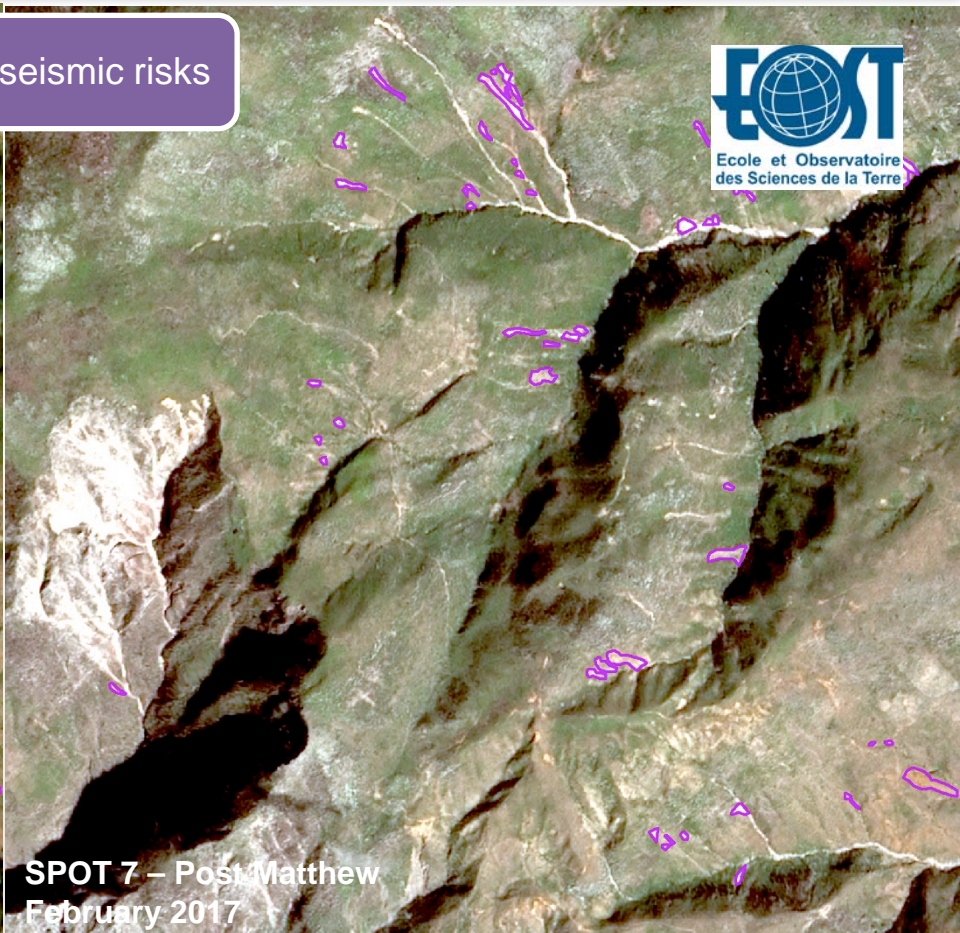
Concrete example



Landslides, seismic risks



SPOT 6 – Pre Matthew
January 2016



SPOT 7 – Post Matthew
February 2017

Application of ALADIM to pre / post-Matthews images (SPOT)

- Deposit channels are difficult to map (+ ~ 30% of affected areas).
- Shadows on the west and north slopes can cause an underestimation of total displacement.
 - Very complex landscape for automated mapping

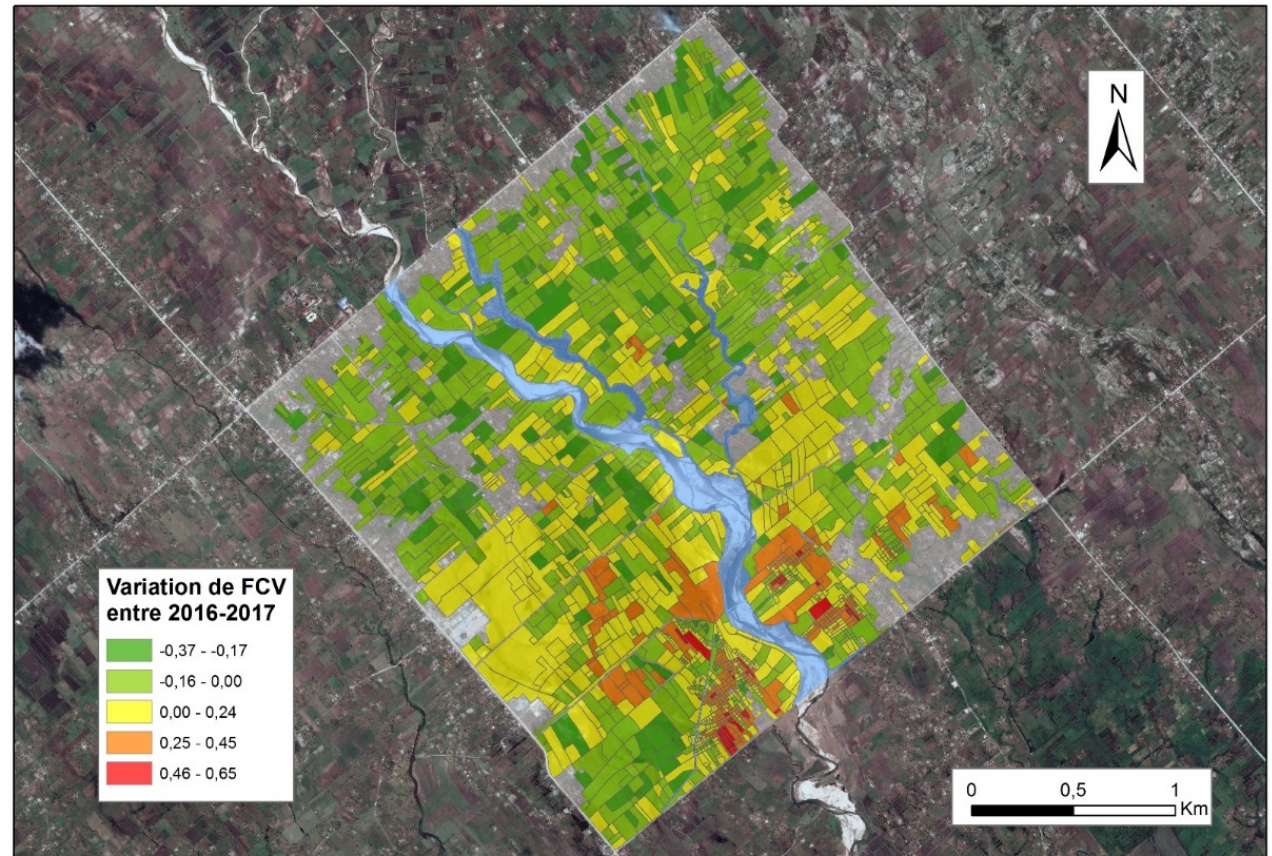


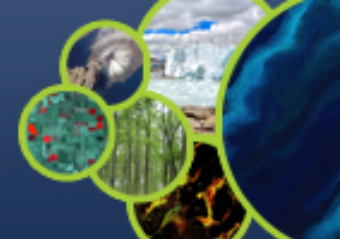
Agriculture

Secteur de la Plaine des Cayes

Evidence of pre/post-event variation

- SPOT6 MS of 08/01/2016 and SPOT 7 MS du 14/02/2017
- Fraction of the Vegetation Cover (calculate from NDVI) Evolution between 2016 and 2017





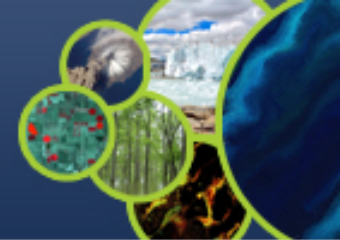
Thematic	Product	Frequency	DATA	Area
Forest and protected natural areas	Status of regeneration in protected areas - Classification and detection of change Monitoring of habitat resettlement (if possible). Map of forest ecosystems Forest Monitoring Follow-up of the Mangrove	Annual	Optical THR and HR	Macaya Park Grand Bois RB la Hotte
Coastal Zone	Monitoring of the coastal zone (zoom on change – scientific product) OCS – Coastal ecosystem	Annual	Optical THR and HR Sentinel 3	West and South coast only
Displacement of population and rural habitats	Removal / Construction of damaged buildings Change in use of urban land Temporary housing (progress and location) Type of reconstruction	2 per years for 2 years	Optical THR	Jérémie Additional Areas TBD ?
Health	Mapping risk of vector-borne diseases	Baseline 2017 then Annual	TBD - Need not confirmed at this stage	

Planned works 2/3



Agriculture and food security

Watersheds, flooding



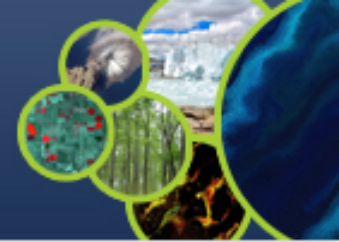
Thematic	Product	Frequency	DATA	Area	Comment
Watersheds Monitoring	Monitoring : RÉNOP (OCS); Ground movement ; loss of soil	Baseline + update after major events	MNT Optical and Radar HR and THR	Priority basins (vulnerability, stake, representativeness)	CIMA Foundation. / RASOR CNIGS Radar ability
	Mapping and assessment of flooded areas	Crisis	SAR Lidar	Entire Area with identification of key points according to the event	CNIGS (+expert in hydraulic modeling) Capacity to activate the Charter
	Early Warning : Hydrometeo monitoring model Flood routing	Real time (Flood period)	Pluviometry (automatic stations) ; weather image (Imerg); Radar; Caribbean Weather services	Priority basins (vulnerability, stake, representativeness)	CNIGS (+expert in hydraulic modeling)
Agriculture	Evaluation of agricultural change	Baseline before/after Then 2 to 3 times / year	HR and THR Optical	Zooms on the plains of Jérémie, Port Salut et Les Cayes Access required to field data (for sample sites and validation)	Nomenclature adapted to the South Basic product over the entire area, dynamically updated with Sentinel flows

Planned works 3/3



Landslides, seismic risks

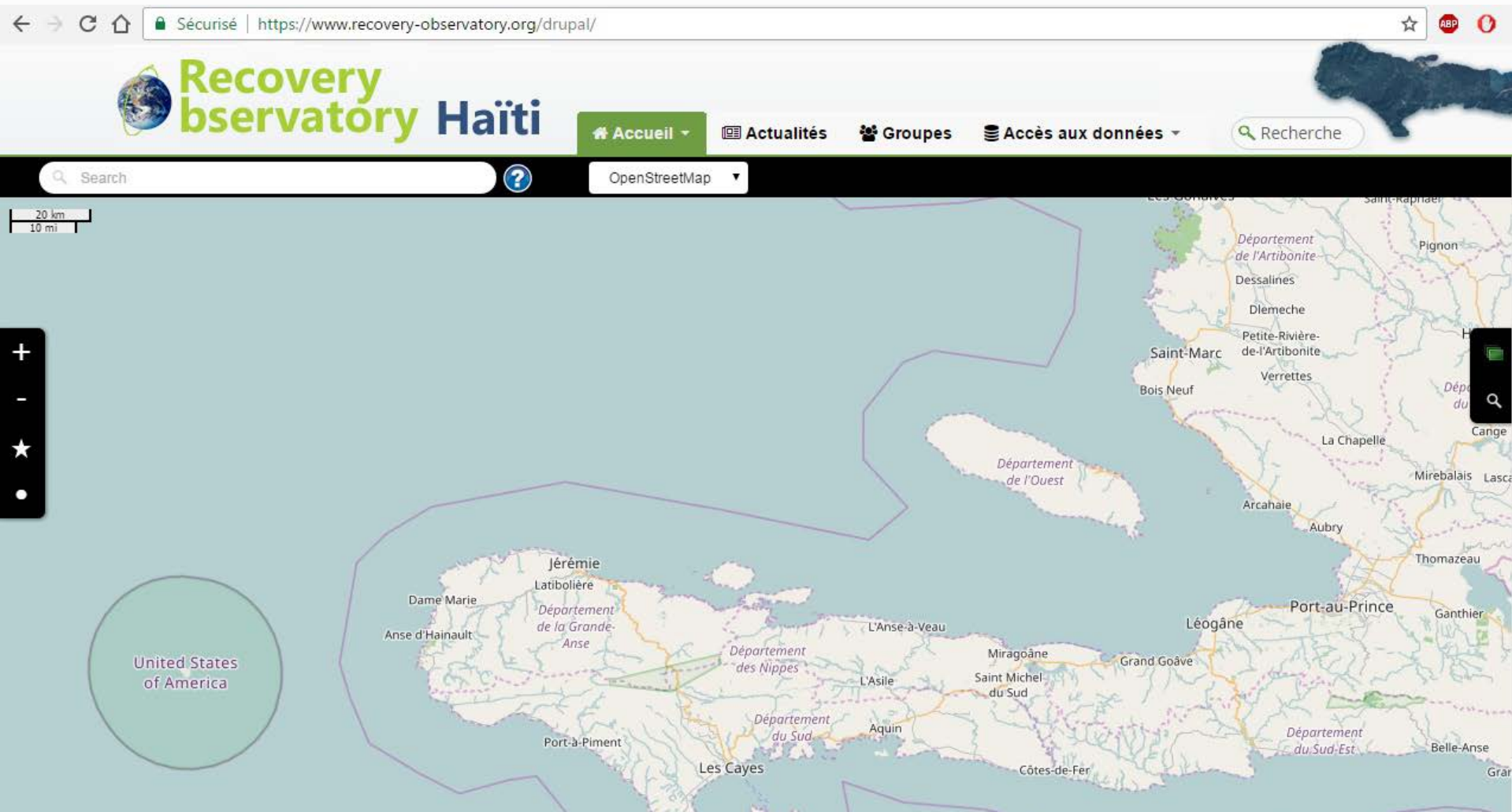
Infrastructure and road network



Product	Frequency	DATA	Area	Comment
Landslide Automated change detection	Pré / Post event	Optical THR HR		Very high resolution required to identify low amplitude movement
Monitoring with quantification of displacements (horizontal deformation fields) By the application of correlation methods of time series images	3 to 6 months TBC	Optical HR, THR Stereo for MNT ?	Zoom on les Cayes – Jérémie Road Jérémie, les abricots	Final product: Maps with displacement fields / speed per period and a map summarizing the sectors and their movements over the period Access to field data essential (for characterization) Catalog displacements on zoom
Quarry Detection and Development	Bi annual	THR	Arniquet quarry	For regulation
Landslide Monitoring by radar amplitude image correlation tests	Bi annual	Radar TerraSAR-X	Idem monitoring	(e.g. offset-tracking) need of HR radar data
Mapping of Road network	Baseline + annual	Optical HR (primary road), THR for secondary VHR or HR SAR (after storms)	RO area	Calculation of RAI Comparison with CNIGS and UNDP network Precise MTN required Secondary dirt road



Translation of key texts. Multilingual by October.

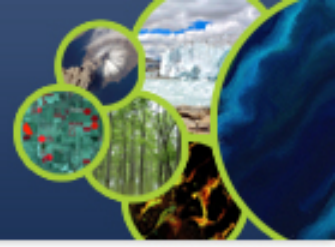
A screenshot of the Recovery Observatory Haiti website. The browser address bar shows the URL 'https://www.recovery-observatory.org/drupal/'. The website header includes the 'Recovery Observatory Haiti' logo, a navigation menu with 'Accueil', 'Actualités', 'Groupes', and 'Accès aux données', and a search bar. Below the header is a map of Haiti with various departments labeled, such as 'Département de l'Artibonite', 'Département de l'Ouest', 'Département des Nippes', 'Département du Sud', and 'Département du Sud-Est'. A scale bar in the top left of the map shows 20 km and 10 mi. A search bar is also visible on the left side of the map area.



- Day-to-day management of the RO – telcon every 3/4 months
- Member of the Haiti RO **Steering Committee (SC)** :
 - Michèle ORIOL (**CIAT**)
 - Boby PIARD (**CNIGS**)
 - Dwinell BELIZAIRE (**ONEV**)
 - Martine THERER and Chiara MELUCCI (**UNDP**)
 - Mare LO and Sergio DELL'ANNA (**WB**)
 - Simona ZOFFOLI and Giorgio BONI (**ASI/ CIMA**)
 - Stéphane CHALIFOUX (**CSA**)
 - Hélène de BOISSEZON (**CNES**)
- First SC meeting planned on 27th September 2017



- Development of first applications based on identified requirements from Users workshop
- Haitian Web Portal for all Spatial Data being established
- Technical mission end 2017, to validate 1st products, plan capacity building and dissemination
- Solicitation of new funding and partners to augment applications offered and to develop Capacity Building capacities
- Reporting to major stakeholders (WB, GFDRR, UN)



To August 2017 – Haiti RO Establishment

- Discussion of MOUs with Haitian users and partners, Establishment of IT infrastructure with charter images, baseline pre/post-event
- **First User workshop** in Haiti to provide further input to the ROOP and finalise the Haiti RO baseline.

Sept 2017 to early 2018 – Haiti RO Commissioning

- Incorporating the first products into the Haiti RO and ensuring easy access
- Definition of capacity building plan
- Solicitation of new partnerships (for value-adding and capacity building)
- Animating the user forum; Encouraging and promoting Haiti RO use. **First “early evaluation”**, with a report to Haiti RO Steering Committee

To end 2020 – Haiti RO Steady-state Operation / Generic RO definition

- Ensure IT updates, engage in capacity building activities, generate regular products, report on Haiti RO annually to stakeholders and partners
- Analysis of Haiti RO operation & results, to derive **Generic RO specifications**
- Preparation of **Haiti RO closure**, including evaluation and legacy strategies.



FOR YOUR ATTENTION

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

