Recovery Observatory (RO) Pilot

Haiti Hurricane Matthew RO Status and Next Steps

Presentation to WGD mtg#14
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Haiti Recovery Observatory Pilot

- Progress since last WGD meeting
- Capacity building
- Legacy planning and wrap-up
- Conclusion
• Triggering of the RO by CEOS Chair - December 22, 2016
• Mission #1 to Haiti - end January 2017 Definition of activities in Haiti
• ...
• Mission #6 to Haiti - May 2019 3th User Workshop (PàP + Jérémie)
• Sept 2019 – Dec 2019 : troubled period but some work progress however
• March 2020 : COVID
Key elements since Last WGD mtg

- Focus on **Capacity Building in 2020** (Internships, Trainings)
  - Training to be performed in Italy (*delayed for now, due to COVID*)
  - Training end 2020 **to be performed remotely**

- Continued **engagement of Copernicus EMS RRM** for value adding products

- Continued **engagement of space agencies** (ASI, CNES, DLR, ESA, NASA, NOAA) for data provision and value adding products:
  - NOAA available for health products elaboration
  - NASA for air quality topic

- Links with **WB on resilient agriculture** post Matthew projects: Nippes (ongoing)
- Links with **IADB projects on environment**: Parc Macaya /Ground Movement (*delayed for now, due to COVID*)
- Links with **UNEP / ONEV - Environmental Information System**: several layers related to RO (ongoing)
## Progress in 2020

<table>
<thead>
<tr>
<th>Product</th>
<th>Key user</th>
<th>CEOS</th>
<th>Sat. Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings Mapping</td>
<td>CIAT / Planning Ministry</td>
<td>CNES/SERTIT, Copernicus EMS R&amp;R</td>
<td>Pléiades, WorldView-3</td>
</tr>
<tr>
<td>Terrain Motion</td>
<td>BME / URGeo</td>
<td>ASI, CNES/EOST</td>
<td>COSMO-SkyMed, Pléiades, Spot 6/7, TerraSAR-X</td>
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<td>Change Detection</td>
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<td>Watershed / Flood</td>
<td>ONEV / Agriculture Ministry</td>
<td>ASI/CIMA Foundation</td>
<td>Pléiades, COSMO-SkyMed</td>
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<td>Agriculture</td>
<td>Agriculture Ministry</td>
<td>Copernicus EMS R&amp;R</td>
<td>Sentinel-2, Spot 6/7, GeoEye-1, WorldView-2</td>
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<tr>
<td>Macaya Park Monitoring</td>
<td>ANAP / ONEV / Environment Ministry</td>
<td>Copernicus EMS R&amp;R, CNES/SERTIT</td>
<td>Spot 6/7</td>
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<tr>
<td>Environmental Impact</td>
<td>ONEV / Environment Ministry</td>
<td>Copernicus EMS R&amp;R</td>
<td>Sentinel-2, Spot 6/7, Pléiades, WorldView-2</td>
</tr>
<tr>
<td>Land Use</td>
<td>All</td>
<td>CNIGS, CNES</td>
<td>Sentinel-2</td>
</tr>
</tbody>
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### Vector-borne Disease risk
- Health Ministry / OMS
- NOAA
- L8, Images NOAA + statistic needs

### Air pollution
- CIAT / Health Min./ ONEV
- NASA
- S5P Tropomi
**RO Timeline**

- **01** Opening
  - RO Haiti agreed by CEOS
  - 22/12/2016

- **02** ROOP
  - Du RO Haiti par le CEOS
  - Q3 2017

- **03** G-RO
  - First meeting
  - Q3 2018

- **04** Evaluation
  - RO Haiti
  - Q4 2019

- **05** REX
  - Feedback
  - Q1 2021

**Disaster**
- Ouragan Mathieu Haiti
  - 04/10/2016

**M1**
- First contacts
  - 31 Jan - 3 Feb

**M2**
- Workshop 1 (PâP)
  - 29 Mai - 2 Juin

**M3**
- Technical Review
  - 5-8 Dec

**M4**
- Workshop 2 (PâP, Cayes)
  - 8 - 11 Mai

**M5**
- Training and Revue
  - 10-14 Dec

**M6**
- Workshop 3 (PâP, Jérémie)
  - 26 Avr - 4 Mai

**M7**
- Landuse Training
  - Q4 Online

**M8**
- Closing workshop
  - Q4 Remotely

**Q1 2017**
- RO post Matthew
  - Definition and Implementation

**Q1 2018**
- RO post Matthew
  - Commissionning

**Q4 2019**
- RO post Matthew Operations
  - Lessons learnt for G-RO

**Q4 2020**
- RO legs
  - G-RO concept
• Links with **WB Haiti post Matthew project**: Agricultural resilience in Nippes
  - January Training of **two Haitian partners** (CNIGS) in Montpellier (France) at CIRAD on Land Use mapping

• January – Sept : **3 Internships** ongoing in Haiti at CNIGS (led by CNES/SERTIT)
  - Urbanization of agricultural areas: issues and challenges in Jérémie
  - Analysis of the mutation of agricultural areas: Dame Marie and Jérémie
  - Analysis of the dynamics of woodland cover and coastal erosion: Dame Marie

• March – August 1 **Internship** by a Haitian student in France on Land-Use :
  - "Characterization of land use in an agricultural environment in the Dame-Marie sector (Haiti) by the application of the Moringa chain".

• Links with **IADB Haiti projects** : Macaya Park / Ground Movement - POSTPONED : Training of **two Haitian partners** (CNIGS) in Italy :
  - @ ASI with IADB & Macaya Park input (cf ASI section), with EOST contribution
  - @ CIMA for hydrometeo applications with RASOR
- **EMSN 051 “Environment” (2018)**
  Area: Macaya Park, Port Salut, Les Cayes, Jérémie, Pointe Abacou and Costal line.
  - Agricultural activities
  - Coastal Line evolution
  - Macaya Park classification and monitoring forest damage
  - Mangrove monitoring

- **CNIGS/CIAT/ONEV** have asked for two other RRM activations mid 2019 on two products, through EU Delegation: **Activation EMSN 063** launched in January 2020
  - **Result April 2020:**
    - Agricultural monitoring
    - Macaya Park land use map and wooden areas monitoring
Dame-Marie - HAITI
Agricultural Status - 2017
Change Map Pre- to Post-Matthew - Overview
Dame-Marie - HAITI
Agricultural Status - 2019
Change Map Post-Matthew to 2019 - Overview
**ASI’s scientific goal**  ➔ To develop experimental scientific products tailored to obtain useful information on ground stability and motions for target areas of the RO

**Satellite data analysis and ground truth activities**

- COSMO-SkyMed acquisition campaign with VHR SAR over 3 hotspots (Jeremie, Camp-Perrin, Carriere Arniquet), [started in Dec 2017 and ongoing](#)
- X-band SAR change detection using COSMO-SkyMed and TerraSAR-X
- Sentinel-1 data processing with ESA GEP hosted services, to create interferograms, amplitude change and coherence maps
- Technical mission in Haïti in Apr-May 2019 (field checks, data validation, discussion with stakeholders)

**Capacity building**

- Apr-May 2019: scientific seminars on SAR data and applications held at LNBTP- Haïti during field mission
- Visit of 2 CNIGS staff members in ASI in Rome, to learn how to process Sentinel-1 data in GEP ([on hold due to COVID-19](#))
ASI – Terrain motion products

Dissemination via ESA GEP Blog

“Observing surface deformation in Haiti after Hurricane Matthew with Sentinel-1 in GEP”


Upcoming dissemination

• Sept 2020: video presentation at IGARSS 2020
  + peer-reviewed conference paper
The training on hold due to covid will cover 3 main components:

1. **Hazard:**
   Uploading and generating new hazard layer

2. **Exposure and vulnerability:**
   Uploading different exposure shapefile and associating specific RASOR attributions and different vulnerability curves

3. **Impact evaluation:**
   Generating impact reports and extrapolating the most relevant results
• Training at ASI and CIMA for 2 CNIGS experts
  • + Link with EOST using ALADIM on GEP and discuss methodologies to be rescheduled

• LandUse LandCover Training Session at CNIGS: probably ONLINE
  • => Following previous training made in WB resilient agriculture project (CIRAD)
  • Operating IOTA2 tool for producing LULC maps from S2 data
    • After this training CNIGS should be able to produce annual LULC maps on Haiti
  • Extra: Charter PM training

• Final workshop: Virtual meeting end 2020 (date TBD with Haitian partners)
  • RO Pilot closure with high-level and decision makers outreach
  • RO products analysis and last delivery; Lessons learned; RO Legacy
• Troubled and lasting period (Riots .. now Covid) in Haiti delayed the Capacity Building roadmap. However due to our strong links with WB projects and Haitian community, the link is constant with our Haitians partners. The final planning is being defined, with remote events.

• The last thematic products through Copernicus EMS063 respond to the last requests from 2019 user workshop (from several mayors). Feedback awaited from Haitian partners.

• The last mission, on hold for now, should be focused on high-level and decision makers final workshops, as well as outreach linked to the cyclonic season opening: how to hold it?
Thank you

Merci

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