

# Hurricane Matthew

## Preliminary Satellite Based Damage Assessment Report:

### Grand'Anse Département, Haiti

Prepared By  
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## Overview

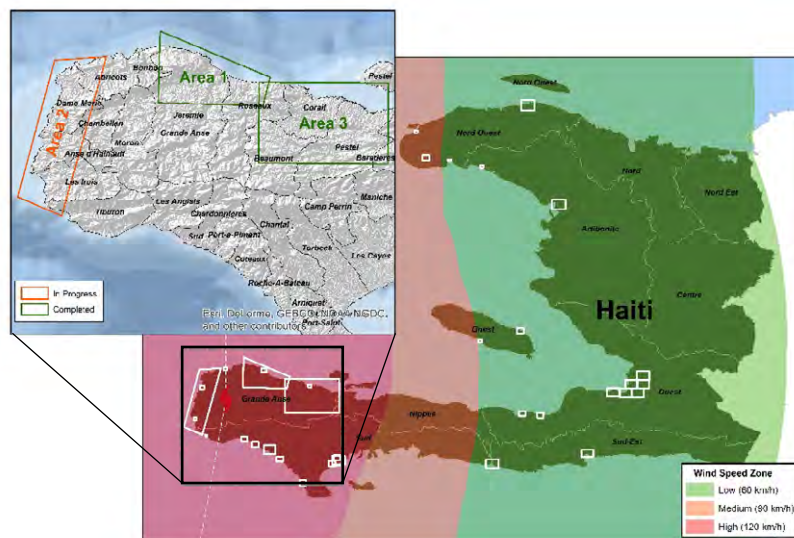
The first Category 5 Atlantic Hurricane since 2007, Hurricane Matthew caused widespread destruction along its wake in several countries including Lesser Antilles, Jamaica, Haiti, Cuba, the Bahamas and the United States. Formed near the Windward Islands on 28 September 2016, the hurricane continued over the Caribbean resulting in catastrophic damages including loss of human lives and an estimated overall damage of over 5 Billion USD.

On 4 October 2016, Matthew made a landfall on the Tiburon Peninsula of Haiti. With over 1000 people dead, Haiti has been one of the most impacted countries with an estimated loss of over a billion USD. Preliminary assessment has showed devastating damages to houses, roads and bridges disrupting aid movement in several departments in the Tiburon Peninsula. It has been reported that 2,128,700 people, or 12% of Haiti's population, have been affected and ~1.5 million people are in need of humanitarian aid ([OCHA Haiti Flash Appeal](#)). This report provides a summary of satellite analysis with a focus on one of the most affected areas in Haiti, Grand'Anse Département with over 80% of population identified to be in need of humanitarian aid.

## UNOSAT's Satellite Support Analysis

UNITAR-UNOSAT on behalf of UN OCHA activated the [International Charter on Space and Major Disasters](#) on 05 October 2016 to support planning and coordination of emergency response operations with satellite analysis covering areas affected by Hurricane Matthew. Project Manager (PM) nominated for this Charter Call is Pacific Disaster Center while UNOSAT along with other satellite mapping groups (Copernicus EMS, USGS) are supporting the Charter Call by providing (satellite-derived) value-added analysis & mapping products.

Priority Areas of Interest (AOIs) for satellite imagery acquisition submitted by UNOSAT have been requested by UN OCHA and UNCT based on operational requirements to assist most affected communities living in rural and urban areas in Grand'Anse Département. Prior to the activation, UNOSAT released a report with the [preliminary population exposure analysis](#) based on spatial demographic, cyclone track & wind speed data available. UNOSAT is also supporting UNOCHA, UNCT and UNDAC team deployed to hurricane affected areas in Haiti with the overall coordination of satellite analysis. All completed, current and planned analysis areas covered by UNOSAT as well as by other mapping groups can be viewed through [GDACS' Satellite Mapping and Coordination System \(SMCS\)](#).



Overview Map showing areas covered with satellite analysis by all organizations along with Hurricane wind speed; Inset map shows the Areas of Interest (AOIs) completed and in-progress by UNOSAT.

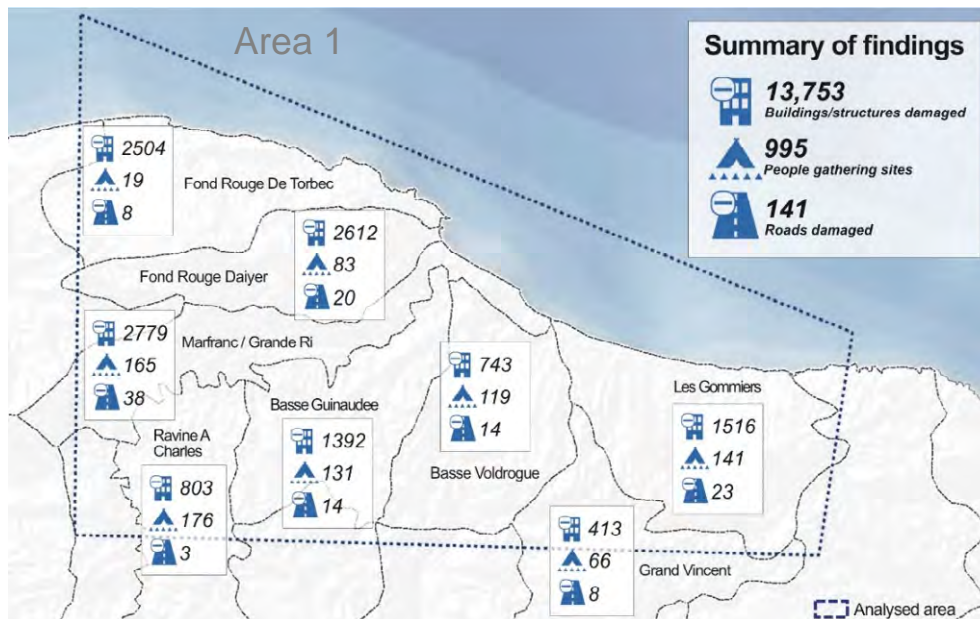
Note that for AOI 3 covering Corail and Pestel communes, UNOSAT has undertaken flood analysis only:  
Map produced (Area 3) can be accessed [here](#)

All the maps and products from UNOSAT are available at: <https://www.unitar.org/unosat/maps/HTI> and from Copernicus are available at: <http://emergency.copernicus.eu/mapping/list-of-components/EMSR185>. Combined satellite based damaged assessment is also available through a [LIVE WEB MAP](#).

# UNOSAT's Satellite Derived Analysis: Area 1

This report highlights the preliminary building damage analysis including a rapid assessment of transportation network conditions and locations of spontaneous people gathering sites covering Jérémie Commune and surrounding areas within Area 1 as shown in the map above. The analysis was conducted by comparing the post-disaster satellite images (Pleiades acquired on 7/10/2016) with available pre-disaster images (WorldView-1 on 01/05/2015 and 08/12/2014).

Area 1 approximately covers 290 Sq Km in Jérémie Commune, falling under nine different sections communales as shown in the map below along with Carrefour Charles/Ja, Les Gommiers and Grand Vincent in Roseaux and Desormeau (Bonbon). The preliminary analysis shows a total of **13,753 buildings/structures** with visible damages and **141 roads** with obstructions. There are **995 temporary people gathering sites** that have been identified within the analyzed area. A detailed summary can be found below.



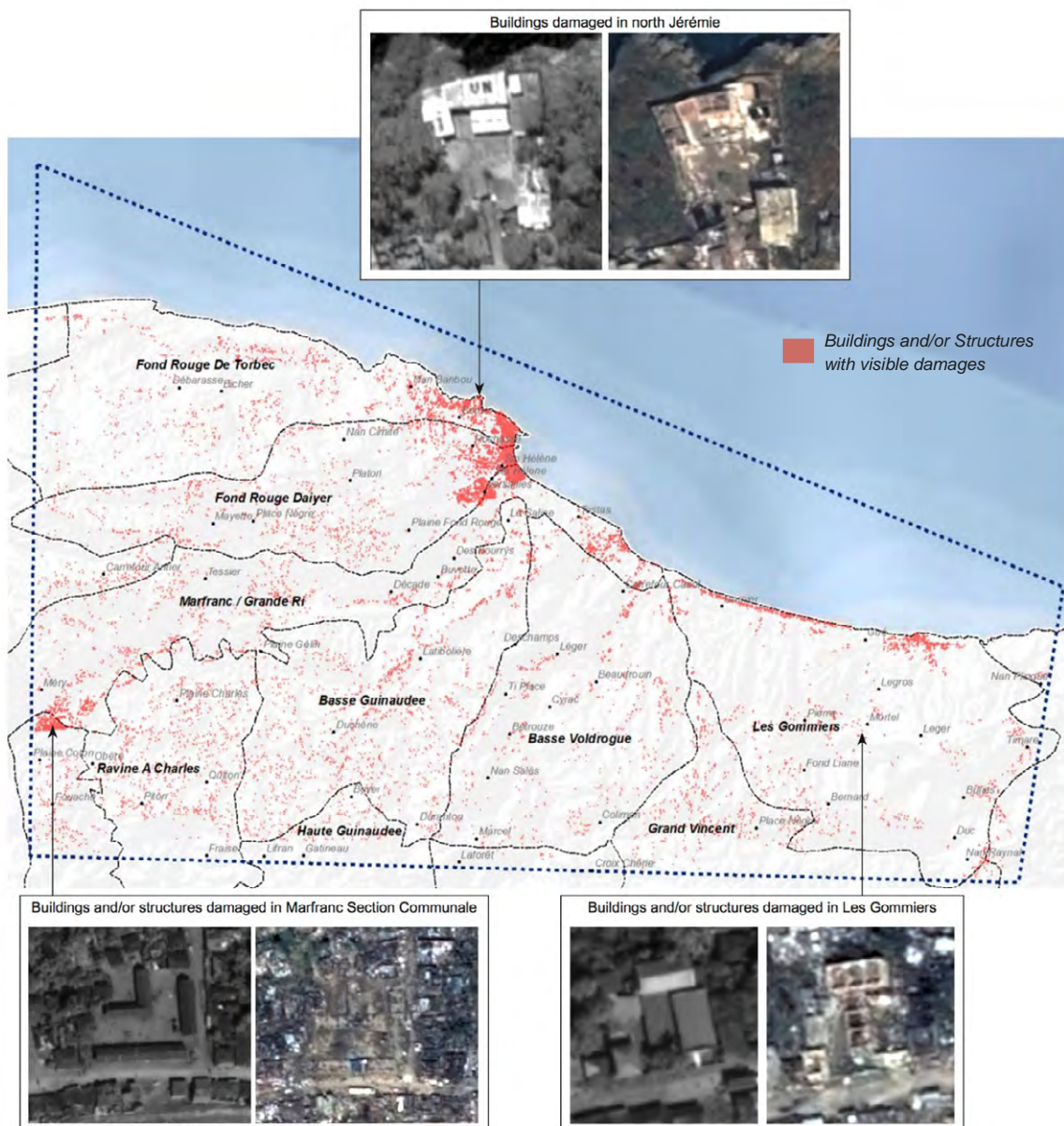
| Département  | Commune              | Sections Communale   | Damaged Buildings | Damaged Roads | People Gathering Sites |
|--------------|----------------------|----------------------|-------------------|---------------|------------------------|
| Grand'Anse   | Bonbon               | Desormeau            | 190               | 5             | 34                     |
|              |                      | Jérémie              | Basse Guinaudee   | 1,392         | 14                     |
|              | Basse Voldroque      | 743                  | 14                | 119           |                        |
|              | Fond Rouge Daiyer    | 2,612                | 20                | 83            |                        |
|              | Fond Rouge De Torbec | 2,504                | 8                 | 19            |                        |
|              | Haute Guinaudee      | 98                   | 4                 | 7             |                        |
|              | Haute Voldroque      | 15                   | 2                 | -             |                        |
|              | Iles Blanches        | 617                  | 2                 | 47            |                        |
|              | Marfranc / Grande Ri | 2,779                | 38                | 165           |                        |
|              | Ravine A Charles     | 803                  | 3                 | 176           |                        |
|              | Roseaux              | Carrefour Charles/Ja | 71                | -             | 7                      |
|              | Grand Vincent        | 413                  | 8                 | 66            |                        |
|              | Les Gommiers         | 1,516                | 23                | 141           |                        |
| <b>TOTAL</b> |                      |                      | <b>13,753</b>     | <b>141</b>    | <b>995</b>             |

Map and table showing summary findings within the analysed areas by commune. There are a total of 13,753 affected buildings, 141 affected roads and 995 people gathering sites.



# Building/Structure Damage Assessment

Preliminary damage assessment of settlements was conducted through visual interpretation by UNITAR-UNOSAT utilizing before and after very high resolution satellite imageries. The post-disaster satellite images were acquired from Pleiades on 7/10/2016 with available pre-disaster images from WorldView-1 on 01/05/2015). A total of **13,753** buildings were identified to have suffered prominent visual damages within the analyzed areas. Marfranc section communale has been identified to have the most impact with over 2,700 damaged buildings.

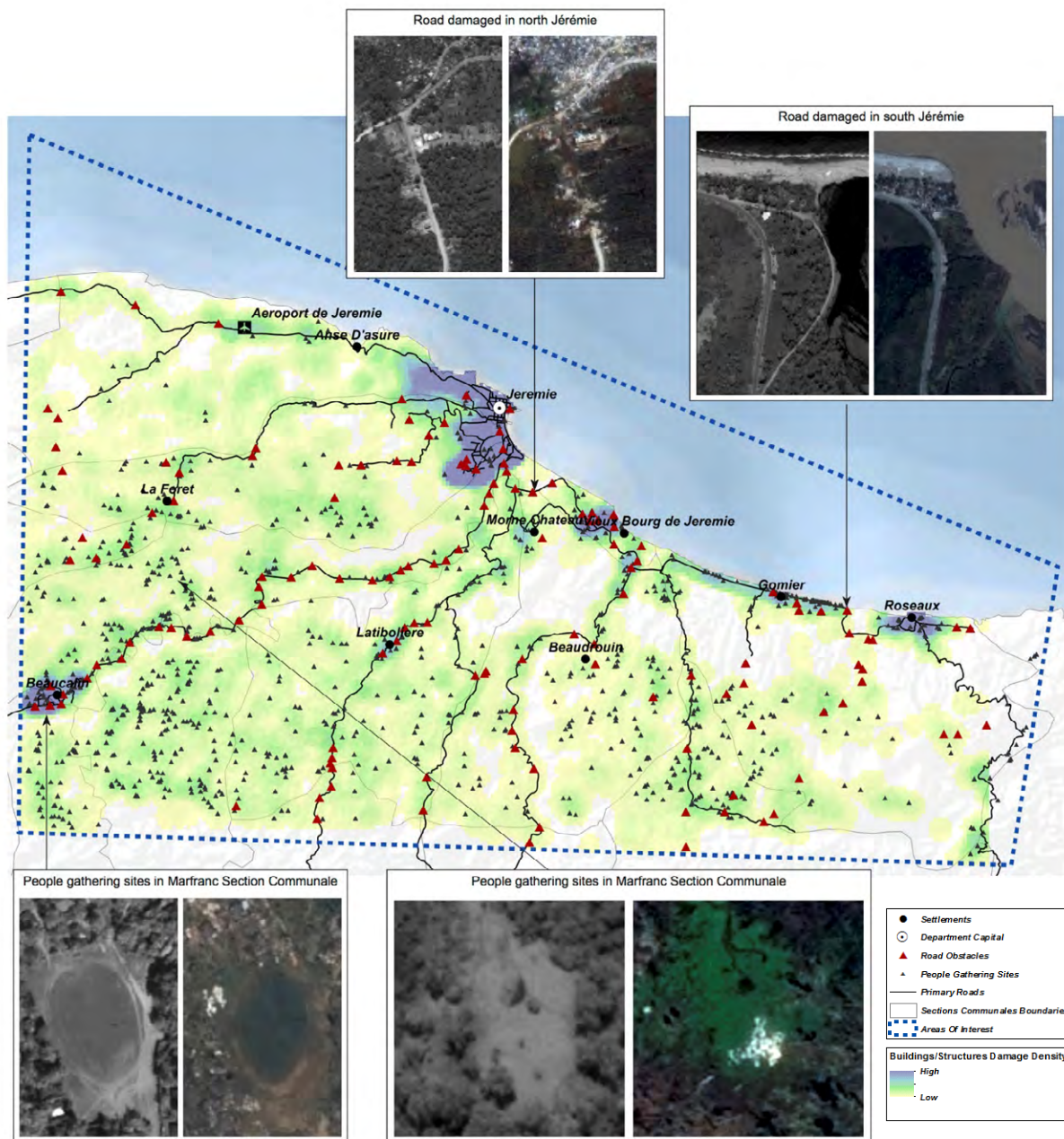


Map showing the buildings/structures identified (red dots) with visual damage using pre- and post- satellite imageries

# Rapid Assessment of Transport Networks and People Gathering Sites

Preliminary damage assessment of transport network with main focus on primary roads and bridges was conducted throughout the study area. Conditions of roads are crucial in terms of access to humanitarian aid and rescue teams. Within the AOI, a total of **141** roads have been assessed as damaged with most affected Section Communale being Ravine A Charles in Jérémie Commune.

According to a recent UN OCHA report (12/10/2016), at least 175,500 have been evacuated or displaced and housed in 224 temporary shelters across Haiti. Within the analyzed extent in the Communes of Jérémie, Bonbon and Roseaux, UNOSAT has identified a total of **995** temporary people gathering sites.



Map depicts the location of road blocks and people gathering sites overlaid on building damage density within the analysed area. Note the increase in the number of temporary people gathering sites where the level of damage is high.

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*The analysis has not been verified in the field yet; please send your comments and feedback to [unosat@unitar.org](mailto:unosat@unitar.org).*

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