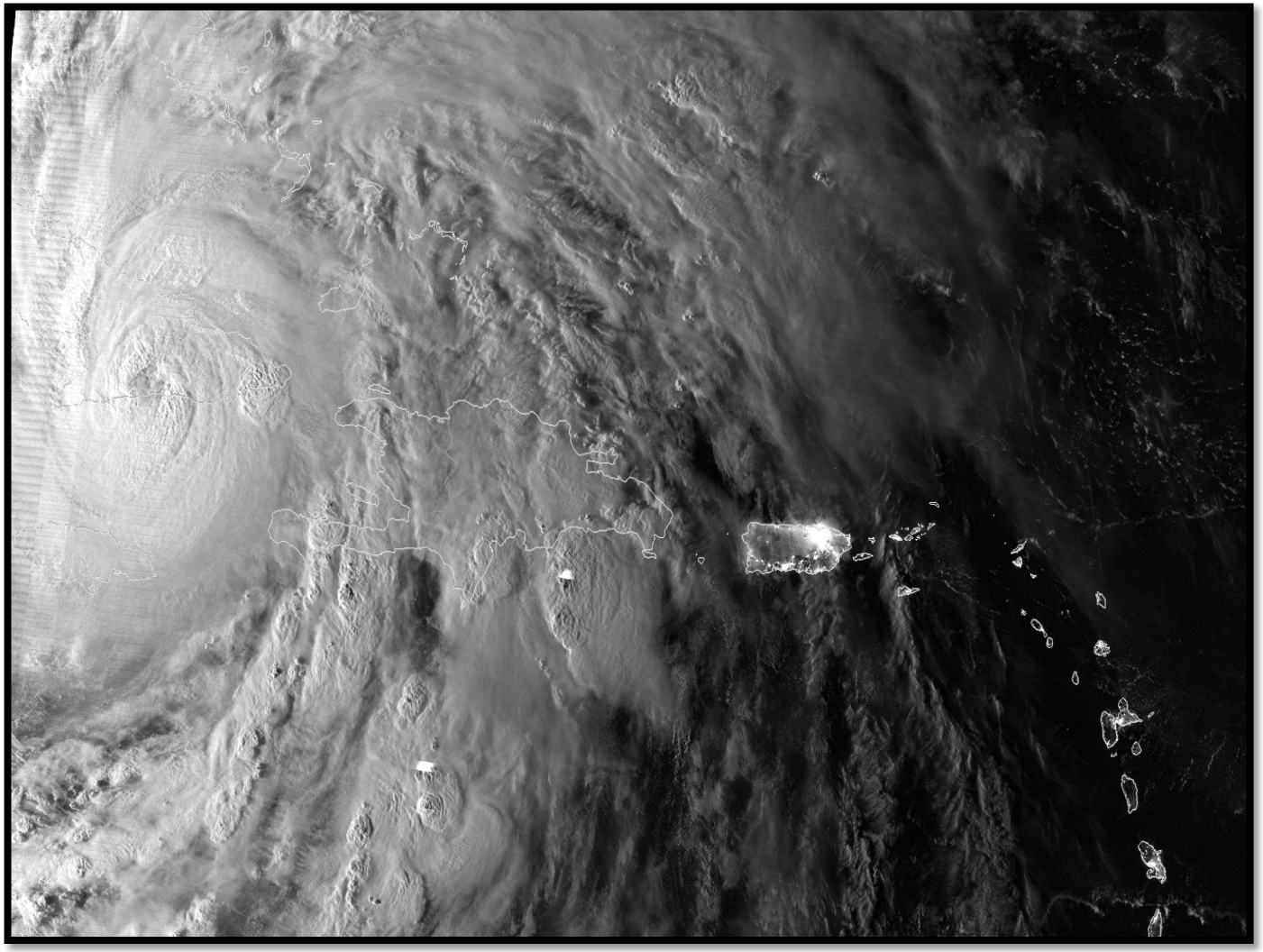
Post-mortem Hurricane Sandy

Marine Forecast Review
October 25-30, 2012

Ernesto Rodriguez
Marine Program Leader

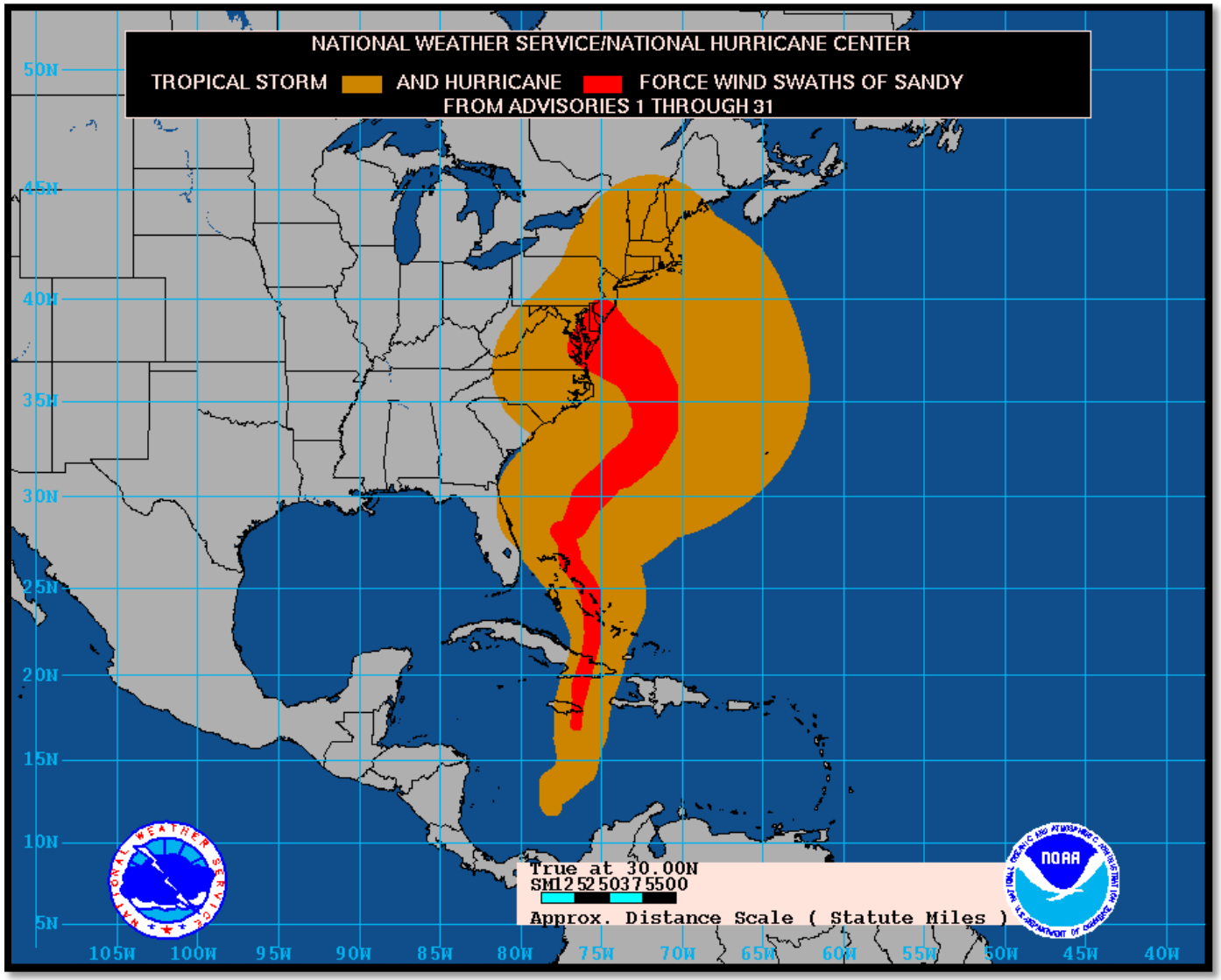
Satellite Imagery



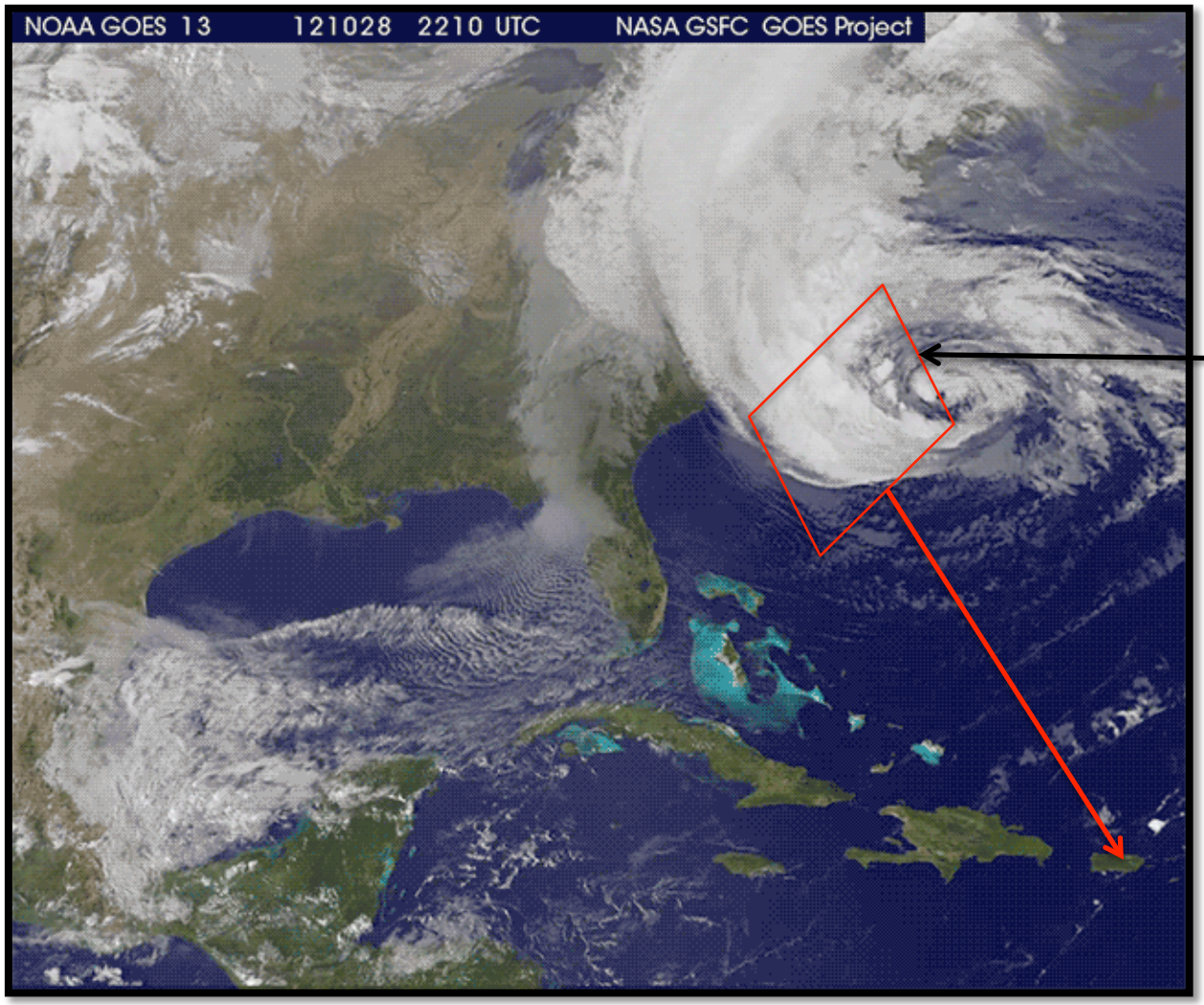
Hurricane Sandy after it made landfall over Cuba

Photo Credit: NOAA/NASA

Wind History



Satellite Imagery



Fetch

Waves Generation Area

Hurricane Sandy: a gigantic hurricane with more than 970 miles of diameter

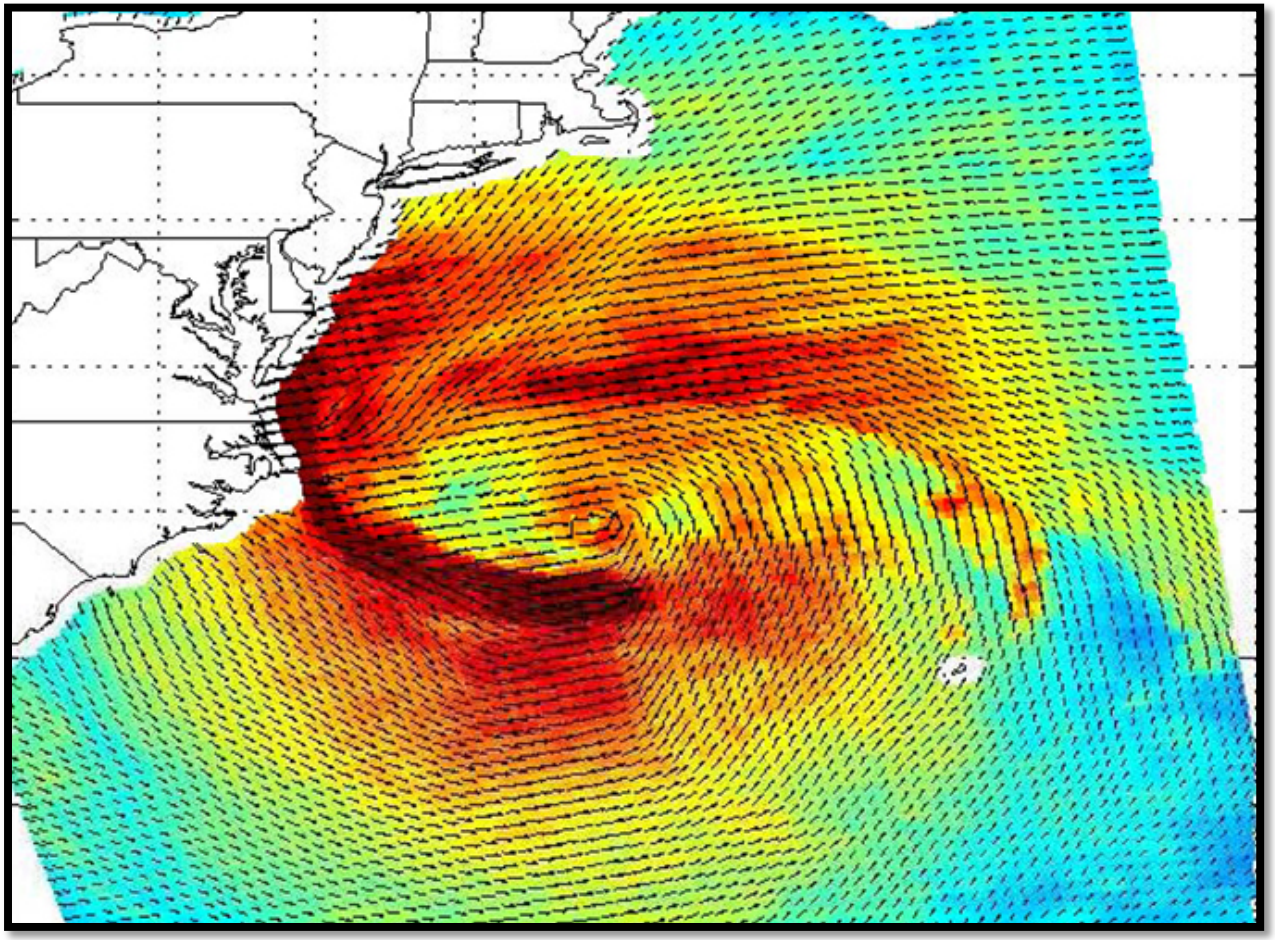
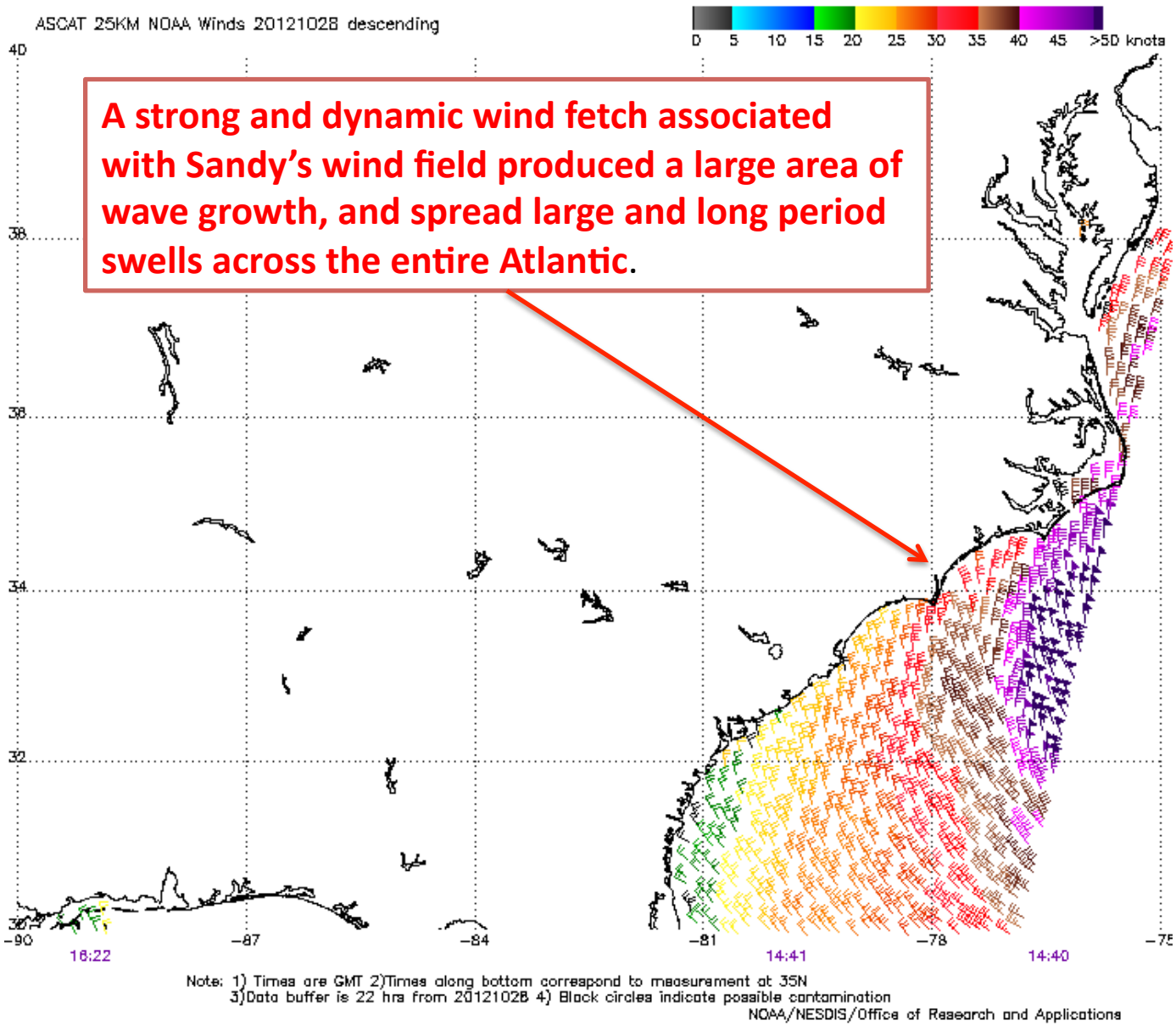


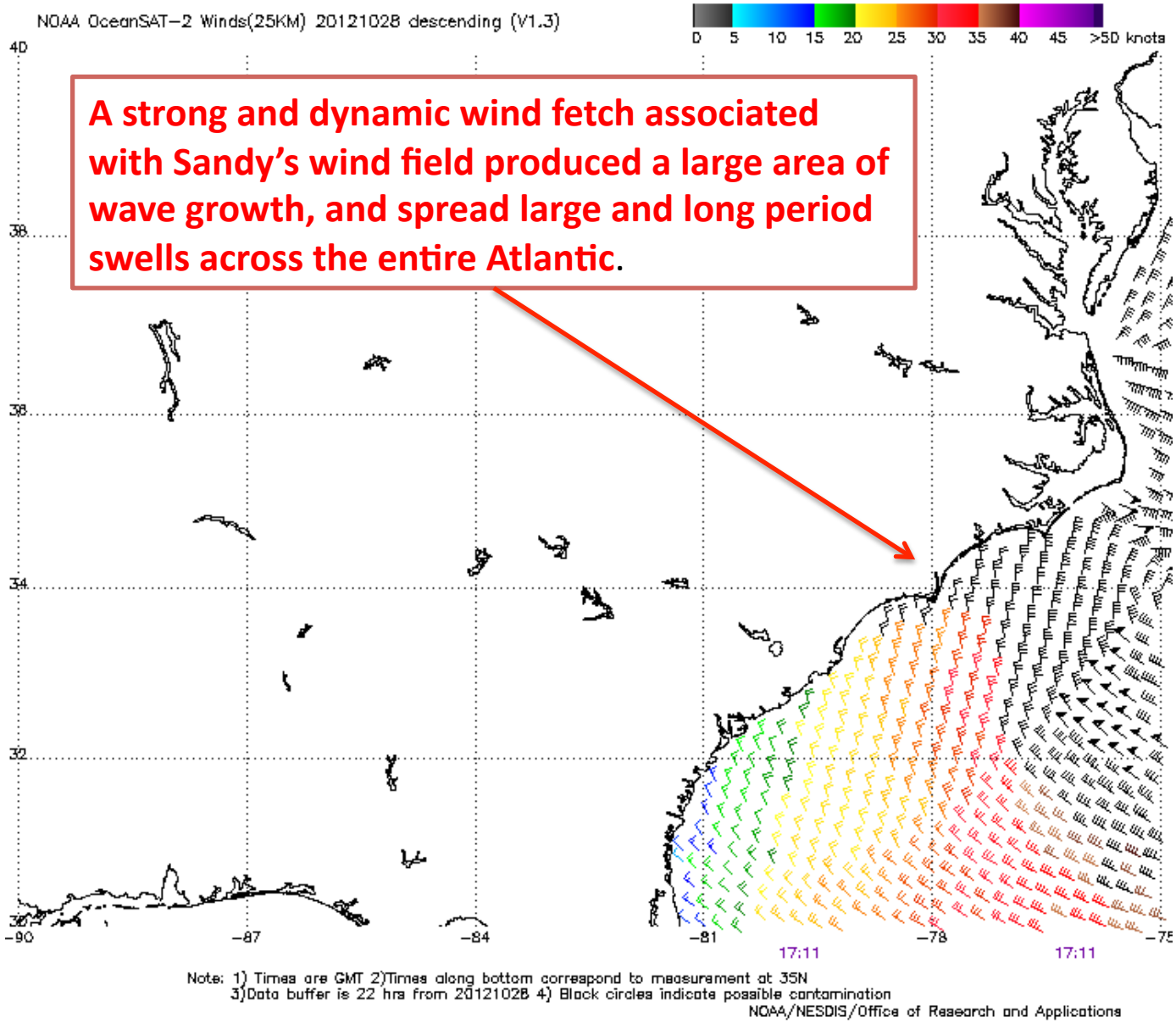
Image credit : ISRO/NASA/JPL-Caltech

ASCAT - Ocean Surface Winds

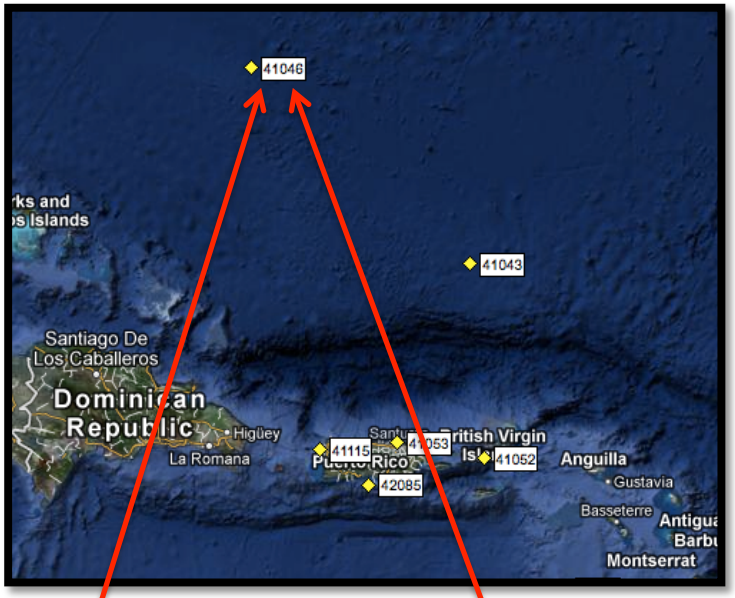


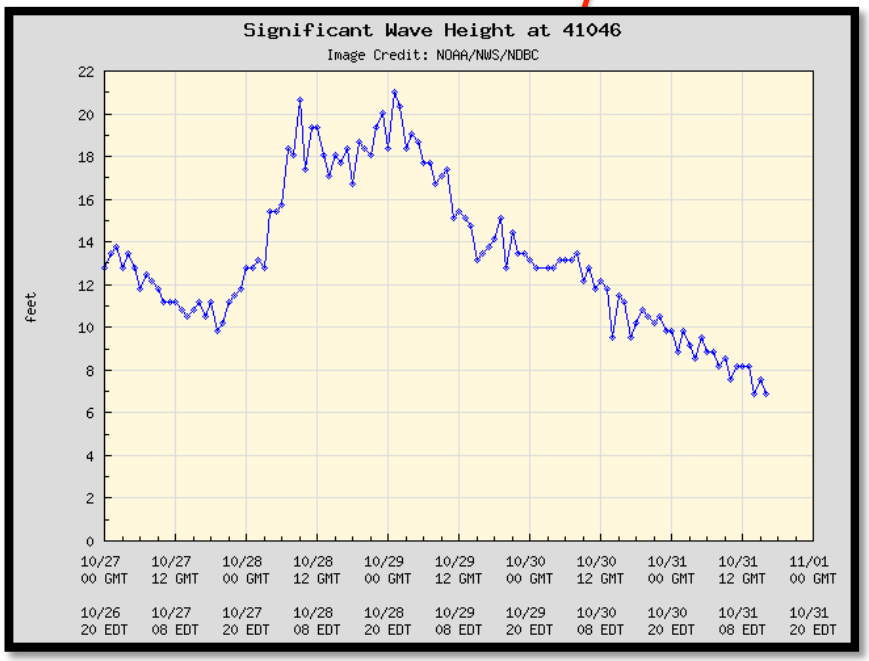
A strong and dynamic wind fetch associated with Sandy's wind field produced a large area of wave growth, and spread large and long period swells across the entire Atlantic.

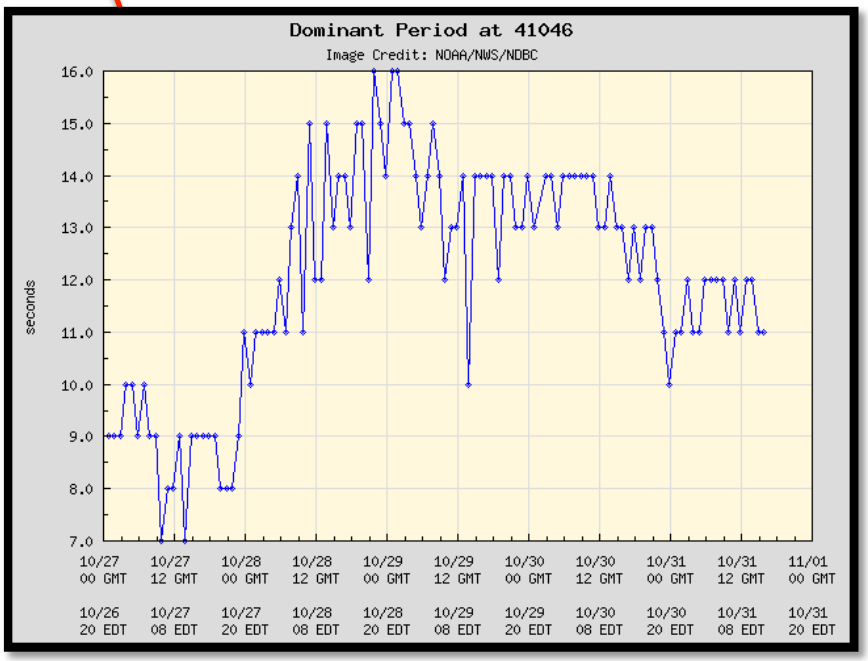
OceanSat - Ocean Surface Winds



A strong and dynamic wind fetch associated with Sandy's wind field produced a large area of wave growth, and spread large and long period swells across the entire Atlantic.


41046
41043
Santiago De
Los Caballeros
Dominican
Republic
Higüey
La Romana
41115
42085
41052
Anguilla
Gustavia
Basseterre
Montserrat


Significant Wave Height at 41046
Image Credit: NOAA/NWS/NDBC
feet
22
20
18
16
14
12
10
8
6
4
2
0
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 EDT
10/27 08 EDT
10/27 20 EDT
10/28 08 EDT
10/28 20 EDT
10/29 08 EDT
10/29 20 EDT
10/30 08 EDT
10/30 20 EDT
10/31 08 EDT
10/31 20 EDT


Dominant Period at 41046
Image Credit: NOAA/NWS/NDBC
seconds
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 EDT
10/27 08 EDT
10/27 20 EDT
10/28 08 EDT
10/28 20 EDT
10/29 08 EDT
10/29 20 EDT
10/30 08 EDT
10/30 20 EDT
10/31 08 EDT
10/31 20 EDT

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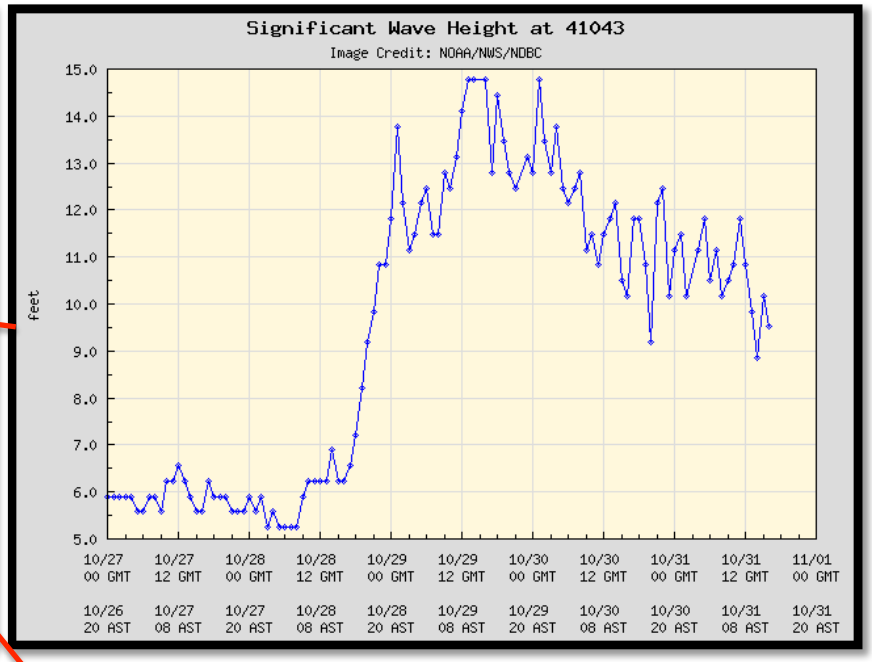
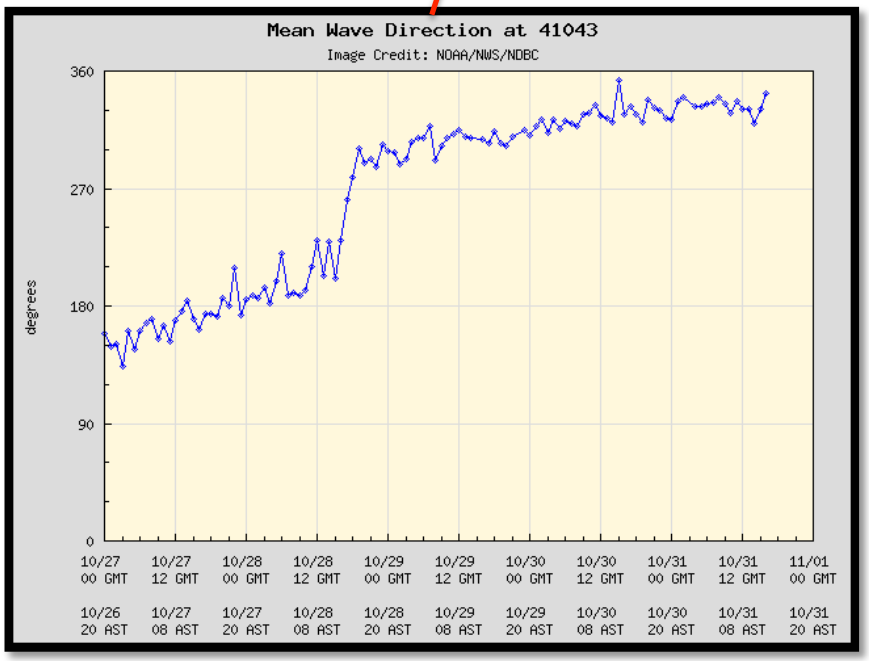
Anguilla
Gustavia
Basseterre
Montserrat


Significant Wave Height at 41043
Image Credit: NOAA/NWS/NDBC
feet
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 AST
10/27 08 AST
10/27 20 AST
10/28 08 AST
10/28 20 AST
10/29 08 AST
10/29 20 AST
10/30 08 AST
10/30 20 AST
10/31 08 AST
10/31 20 AST


Mean Wave Direction at 41043
Image Credit: NOAA/NWS/NDBC
degrees
360
270
180
90
0
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 AST
10/27 08 AST
10/27 20 AST
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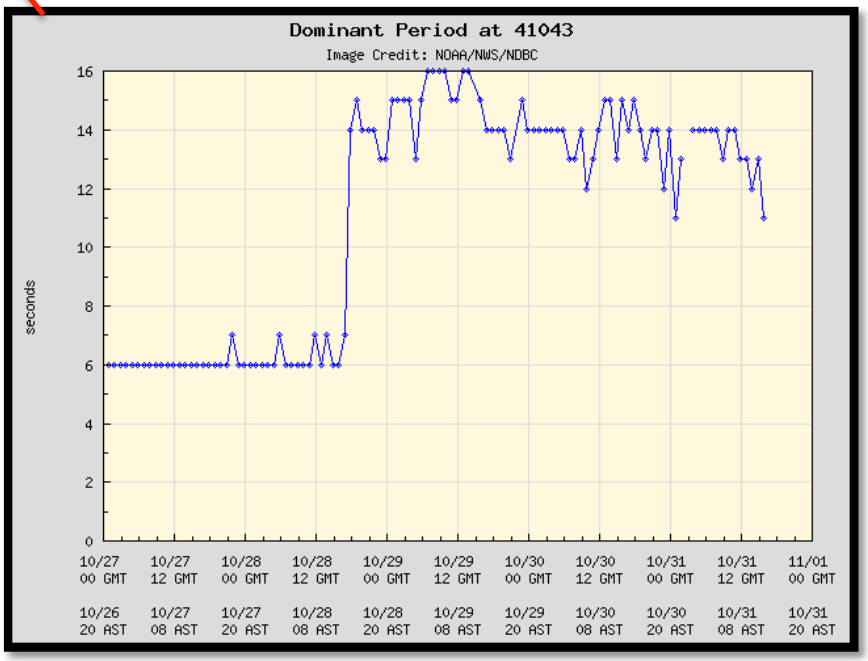
10/30 20 AST
10/31 08 AST
10/31 20 AST


Dominant Period at 41043
Image Credit: NOAA/NWS/NDBC
seconds
16
14
12
10
8
6
4
2
0
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 AST
10/27 08 AST
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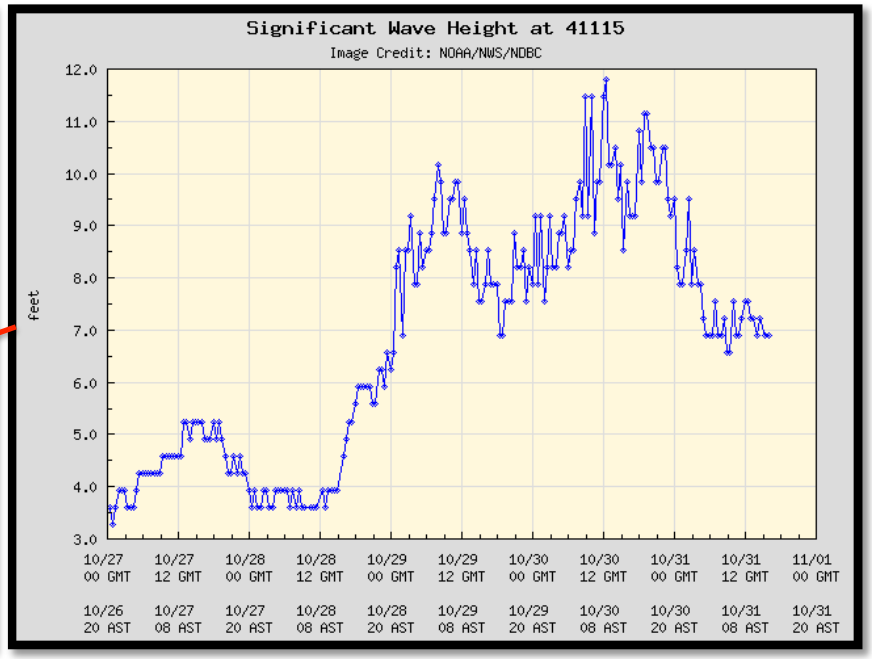
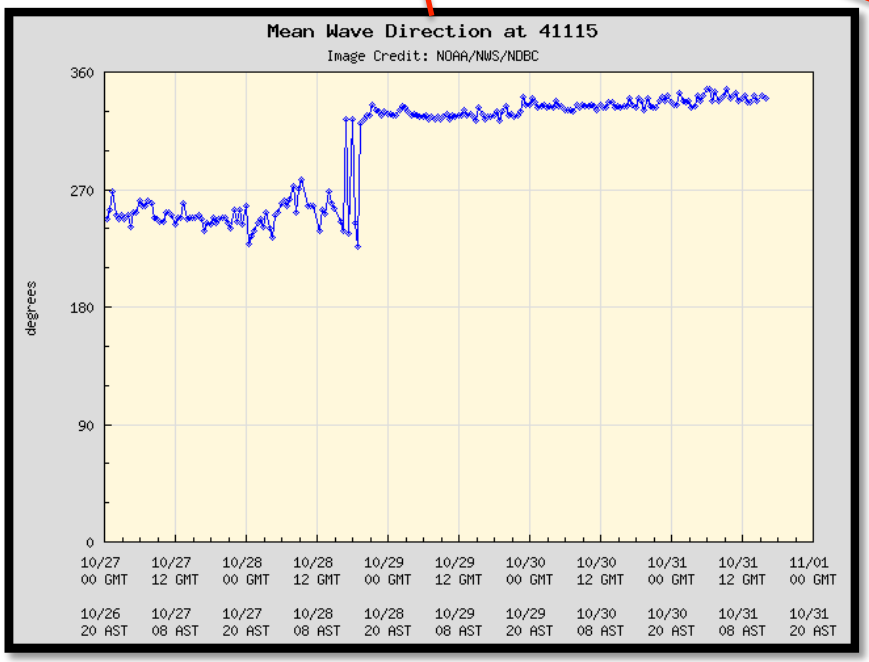

Significant Wave Height at 41115
Image Credit: NOAA/NWS/NDBC
feet
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 AST
10/27 08 AST
10/27 20 AST
10/28 08 AST
10/28 20 AST
10/29 08 AST
10/29 20 AST
10/30 08 AST
10/30 20 AST
10/31 08 AST
10/31 20 AST


Mean Wave Direction at 41115
Image Credit: NOAA/NWS/NDBC
degrees
360
270
180
90
0
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 AST
10/27 08 AST
10/27 20 AST
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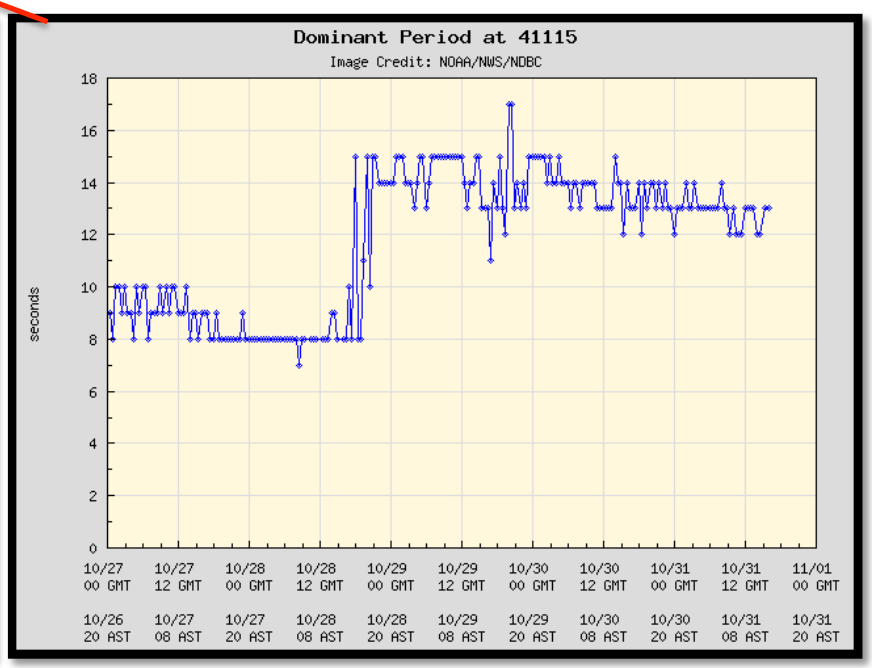
10/31 08 AST
10/31 20 AST


Dominant Period at 41115
Image Credit: NOAA/NWS/NDBC
seconds
18
16
14
12
10
8
6
4
2
0
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 AST
10/27 08 AST
10/27 20 AST
10/28 08 AST
10/28 20 AST
10/29 08 AST
10/29 20 AST
10/30 08 AST
10/30 20 AST
10/31 08 AST
10/31 20 AST

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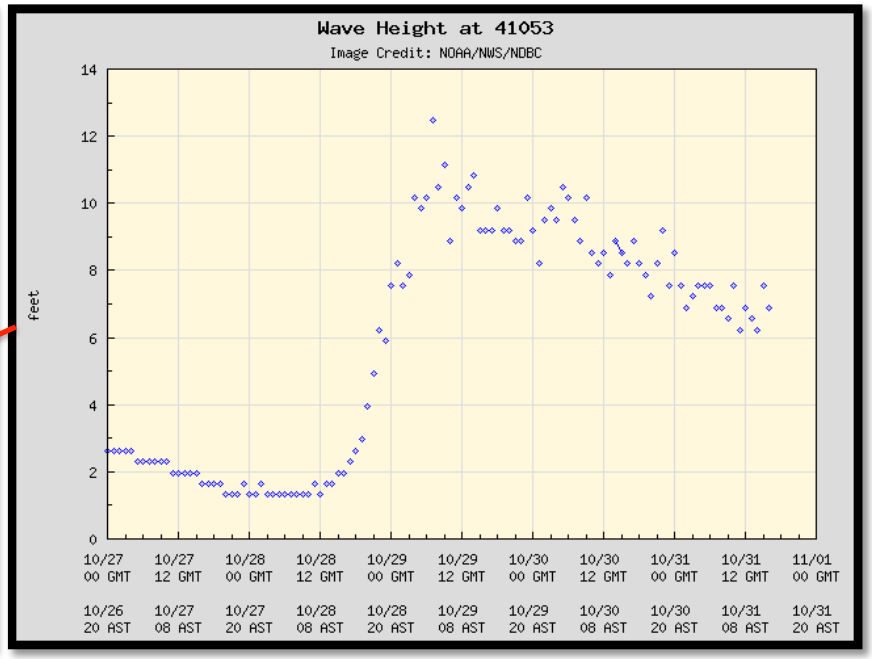
Montserrat


Wave Height at 41053
Image Credit: NOAA/NWS/NDBC
Feet
0
2
4
6
8
10
12
14
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 AST
10/27 08 AST
10/27 20 AST
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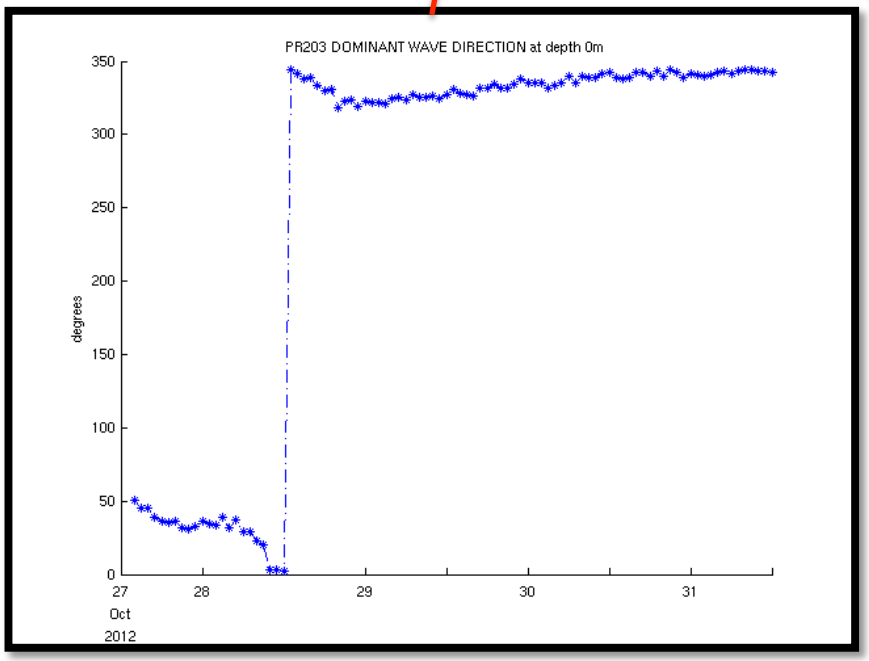
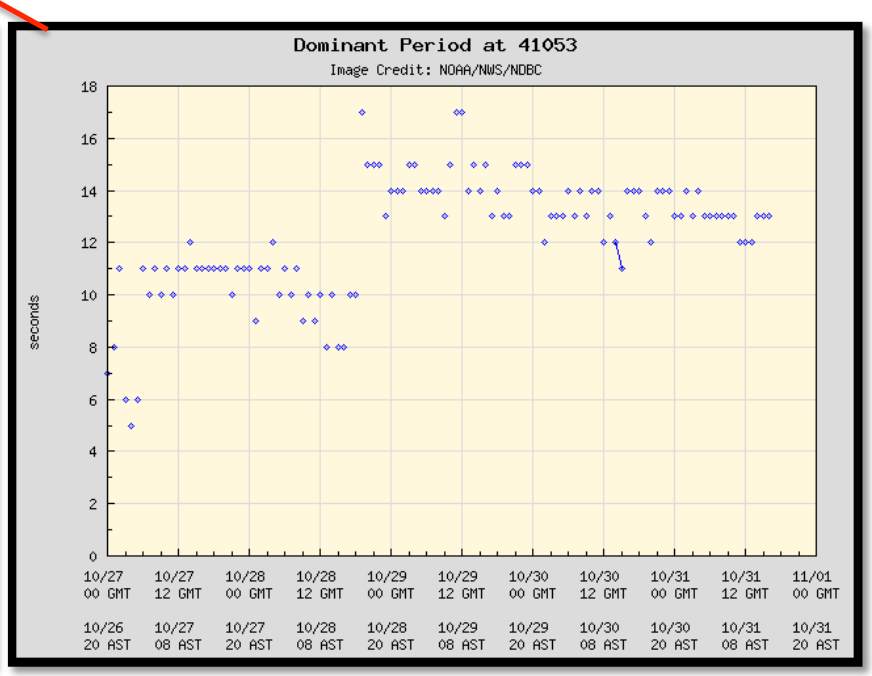
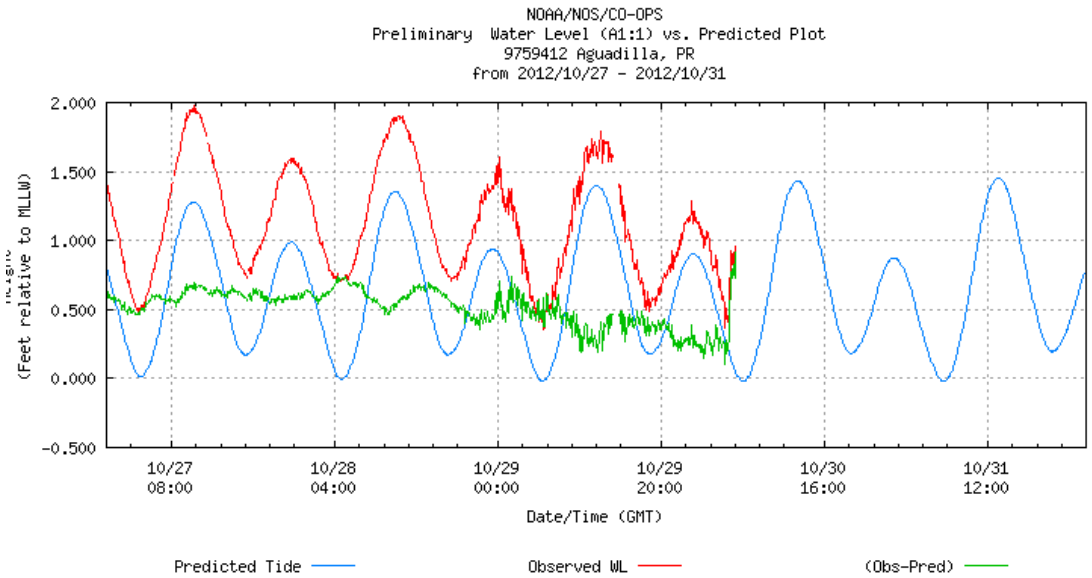
10/30 20 AST
10/31 08 AST
10/31 20 AST


PR203 DOMINANT WAVE DIRECTION at depth 0m
degrees
0
50
100
150
200
250
300
350
27
28
29
30
31
Oct
2012


Dominant Period at 41053
Image Credit: NOAA/NWS/NDBC
seconds
0
2
4
6
8
10
12
14
16
18
10/27 00 GMT
10/27 12 GMT
10/28 00 GMT
10/28 12 GMT
10/29 00 GMT
10/29 12 GMT
10/30 00 GMT
10/30 12 GMT
10/31 00 GMT
10/31 12 GMT
11/01 00 GMT
10/26 20 AST
10/27 08 AST
10/27 20 AST
10/28 08 AST
10/28 20 AST
10/29 08 AST
10/29 20 AST
10/30 08 AST
10/30 20 AST
10/31 08 AST
10/31 20 AST

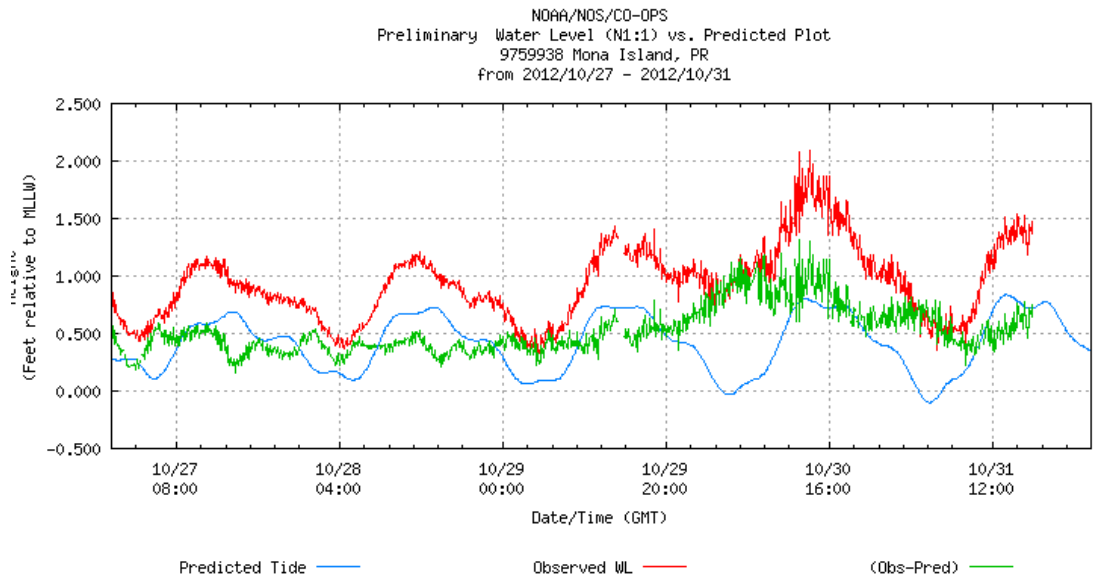
Wave Setup

Aguadilla, PR



Wave setup: 0.7 ft

Mona Island, PR

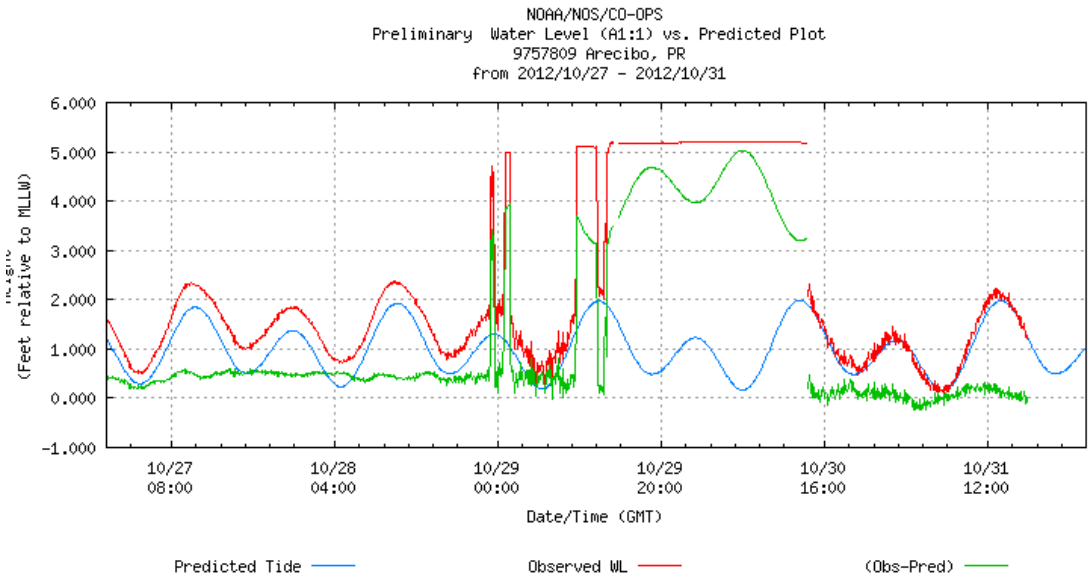


Wave setup: 1.3 ft

wave setup is the water rise at the coast due to the action of waves breaking on the beach.

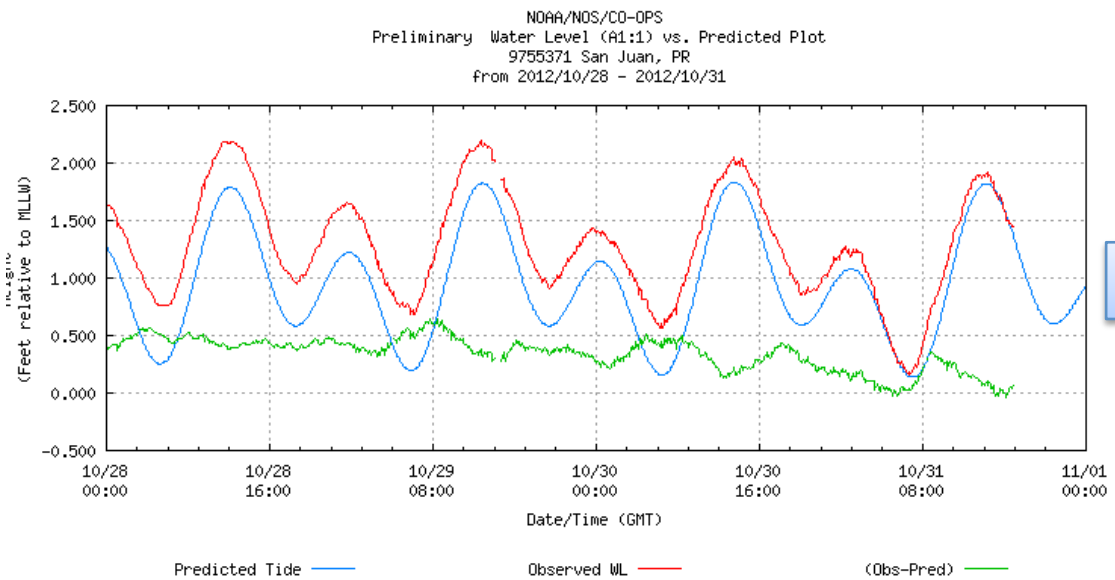
Wave Setup

Arecibo, PR



Sensor Failed

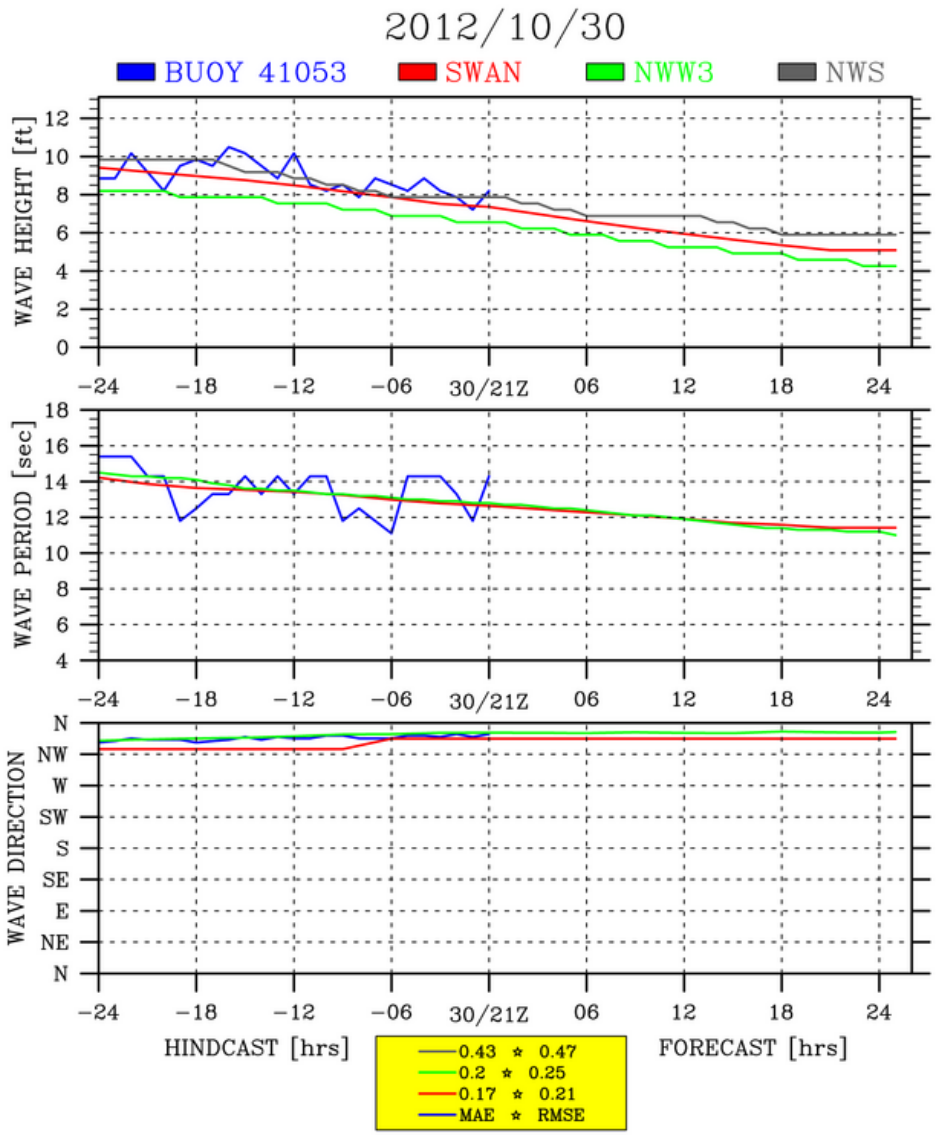
San Juan, PR

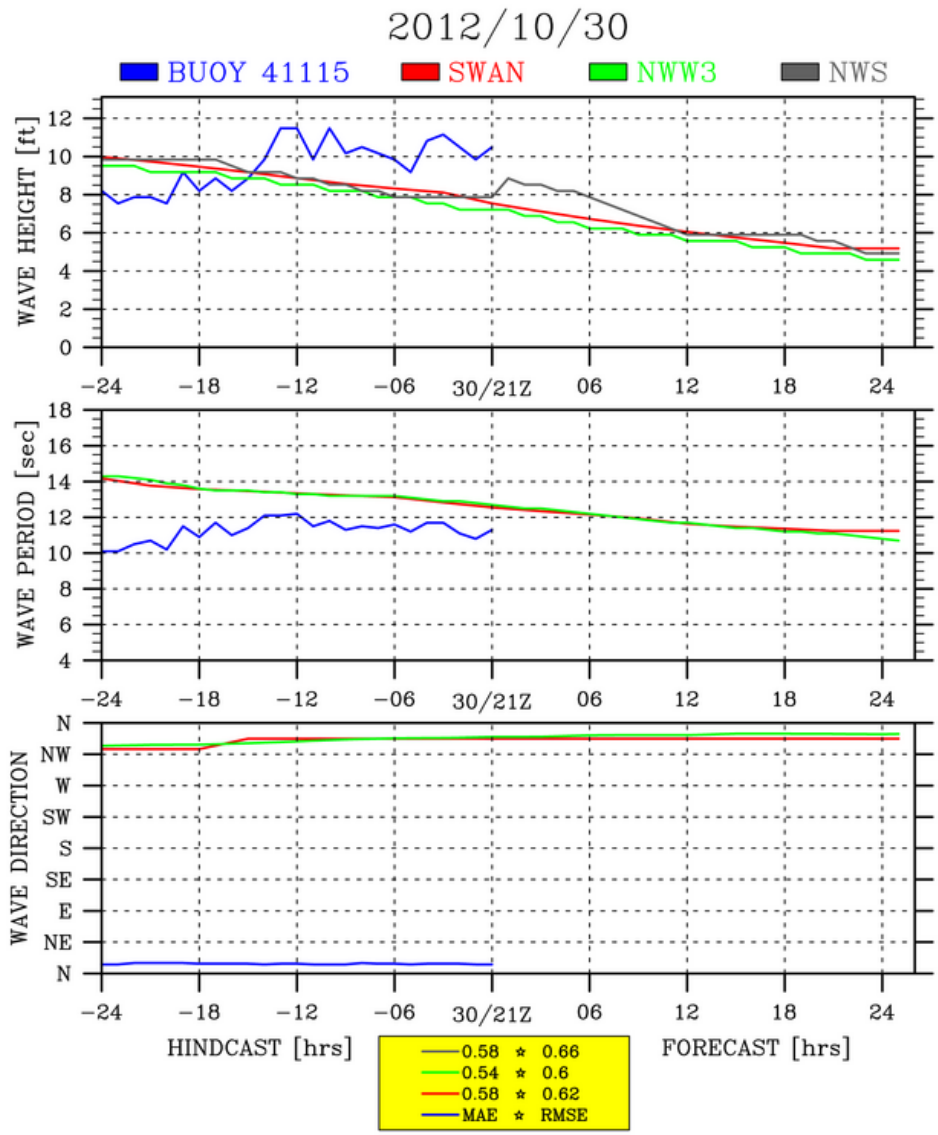


Wave setup: 0.55 ft

wave setup is the water rise at the coast due to the action of waves breaking on the beach.

Forecast Verification





Impacts: Beach Erosion

Image credit : PREMA Camuy

Impacts: Coastal Flooding

Image credit : PREMA Mayaguez

Reference Links

- NOAA National Hurricane Center
  - http://www.nhc.noaa.gov/
- NOAA National Data Buoy Center
  - http://www.ndbc.noaa.gov/maps/Caribbean.shtml
- NOAA Tides and Currents
  - http://tidesandcurrents.noaa.gov/
- NASA Hurricane Resources Page
  - http://www.nasa.gov/mission_pages/hurricanes
- CarICOOS
  - http://caricoos.org/drupal/