PROGRESS REPORT

JANUARY TO JUNE 2014

NEW REGIONAL SOURCES

SUBMITTED TO

PUERTO RICO COMPONENT OF THE USA NATIONAL TSUNAMI HAZARD MITIGATION PROGRAM

PUERTO RICO SEISMIC NETWORK

by

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EXECUTIVE SUMMARY

Five new tsunami scenarios, one far-field, and four regional, have been submitted for addition to the tsunami data bank at the Puerto Rico Seismic Network. The far-field scenario, located at the generation region of the 1755 Lisbon tsunami, has run without any problem and results are included in a separate report titled Report On Puerto Rico Tsunami Flood Maps For Far-Field Events. On the other hand, three of the four regional scenarios have come up with computational instabilities that as of this moment we are trying to debug.

INTRODUCTION

During the second semester of the 2013-2014 academic year five new regional sources were submitted to us to be added to the previous regional sources already in the tsunami data bank being prepared at the Puerto Rico Seismic Network (PRSN). One of these was the far-field Lantex 2014 scenario, and a separate report was prepared. Later four new regional scenarios, with locations shown in Figure 1, were submitted, and labeled as: Haiti, Haiti Norte, Bonaire, and Panama. This report is about this four new regional scenarios.

Before proceeding, it should be stated that instability problems in the inundation runs for the four new regional scenarios, have arisen and have not been solved yet .This report will show results whether instabilities are present or not. For the results with instabilities, new runs are being made. A handicap is the slowness of the MOST tsunami model, which takes 6 to 10 days to execute even though the island has been divided into three parts that are run simultaneously. This slowness makes it difficult to debug. As soon as the problem is solved we will proceed to update this report.

At the same time, this problem will be personally discussed with NCTR staff at PMEL at the M&M meeting during the days 19-21 of August, 2014. The MOST inundation version we use dates back to the early 2000's, and we will check whether there is a newer, more robust version, and capable of computing inundation all over the island without having to break it into three pieces.

In what follows we will present propagation and inundation results for the four new regional scenarios. There was no problem with the propagation results. For the inundation results, they will be presented even if they show instabilities. For the only event for which there was no problem (HAITI NORTE), a mosaic where all the three island parts have been joined will also be presented. For those events with instabilities, no mosaic will be presented.

For each regional scenario we will first present the propagation input parameters, followed by images of the initial sea surface deformation and the **M**aximum **E**nvelope **O**f **W**aters (MEOW) for all of the propagation grid. This will be followed by the inundation results. This will start with the required input parameters and inundation images, for each of the three sections in which the island has been broken up. For HAITI NORTE the mosaic will also be shown, in which the three island parts are put together.

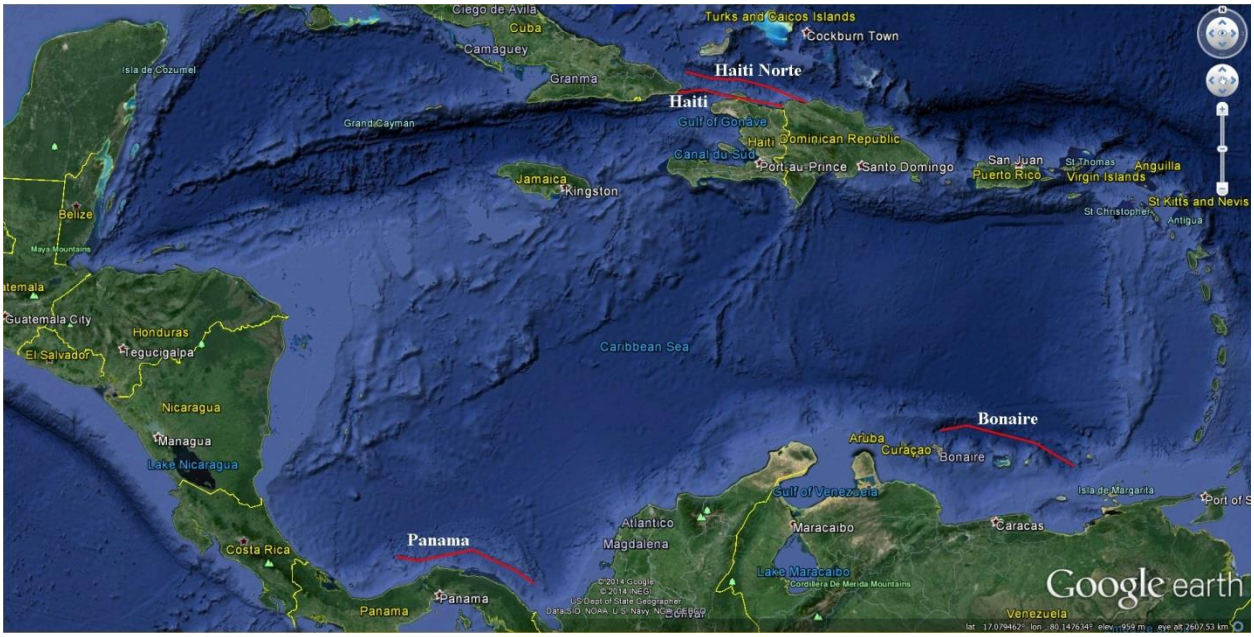

Figure 1. Locations of the four new regional sources evaluated in this report.

SOURCES

HAITI:

The propagation source parameters for the source named HAITI are:

```
######################### SEGMENT 1 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-71.764330
# 'Latitude'      [fault paramters]
19.791811
# 'Length (km):'  [fault paramters]
125.6
# 'Width (km):'   [fault paramters]
54.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
25.
# 'RAKE (deg):'   [fault paramters]
```

```
90.0
# 'STRIKE (deg):' [fault paramters]
280.1
# 'SLIP (m)'      [fault paramters]
4.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 2 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-72.945488
# 'Latitude'      [fault paramters]
19.989105
# 'Length (km):'  [fault paramters]
75.8
# 'Width (km):'   [fault paramters]
54.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
25.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
283.2
# 'SLIP (m)'      [fault paramters]
4.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 3 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-73.640234
```

```
# 'Latitude'      [fault paramters]
20.144176
# 'Length (km):'  [fault paramters]
61.1
# 'Width (km):'   [fault paramters]
54.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
25.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
264.3
# 'SLIP (m)'      [fault paramters]
4.
# 'DEPTH (km):'   [fault paramters]
5.
```

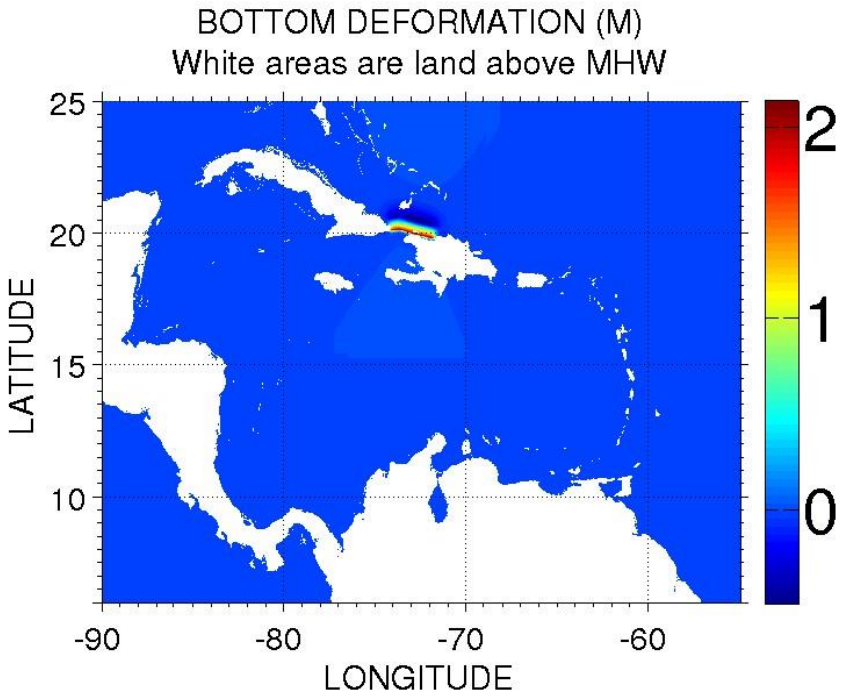

Figure 2. HAITI initial sea surface deformation as shown in the propagation grid.

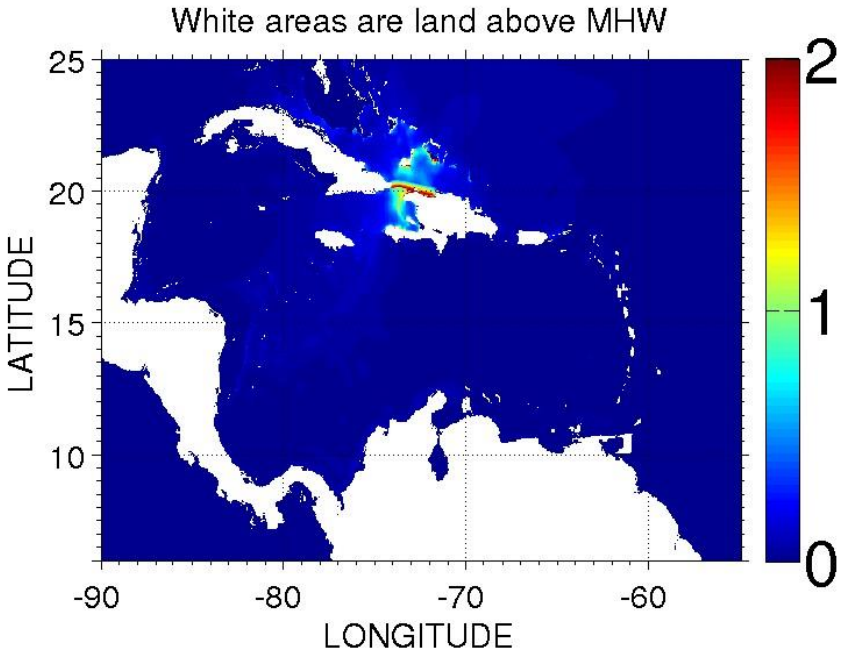

Figure 3. HAITI Maximum Envelope of Waters as shown in the propagation grid.

HAITI Inundation input parameters:

West

```
0.0050   Minimum amp. of input offshore wave (m)
5.0      Minimum depth of offshore (m)
0.1      Dry land depth of inundation (m)
0.0009   Friction coefficient (n**2)
1        Let A-Grid and B-Grid run up
100.0    Max eta before blow-up (m)
0.12     Time step (sec)******** reduced (from 0.16) time step to see if we get rid of
garbage
120000   Total number of time steps in run (4 hrs)
48       Time steps between A-Grid computations
8        Time steps between B-Grid computations
240      Time steps between output steps (28.8 s)
1        Time steps before saving first output step
1        Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/west_v3.dat'
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Haiti/'
'./'
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)
0      Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)
```

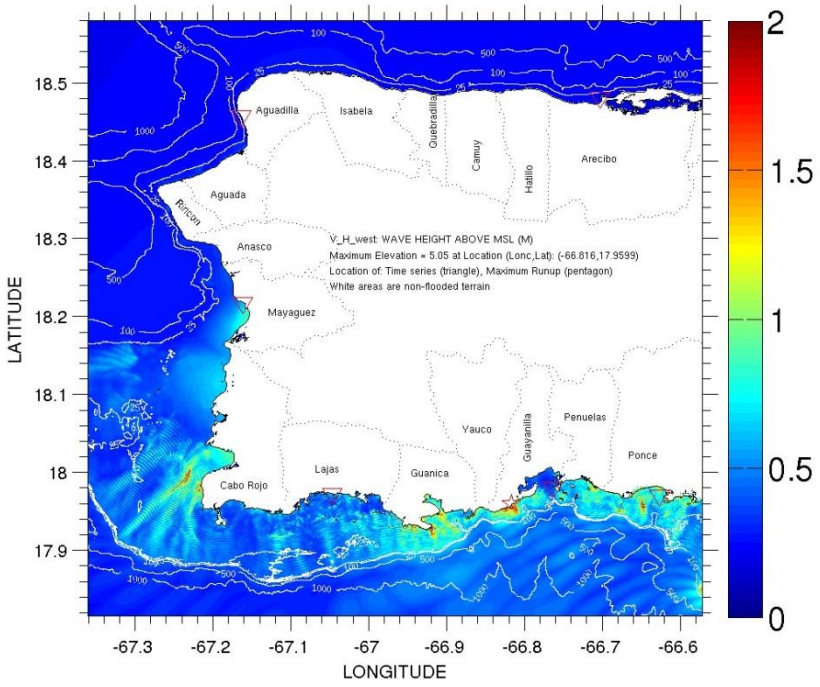

Figure 4. HAITI inundation for West grid.

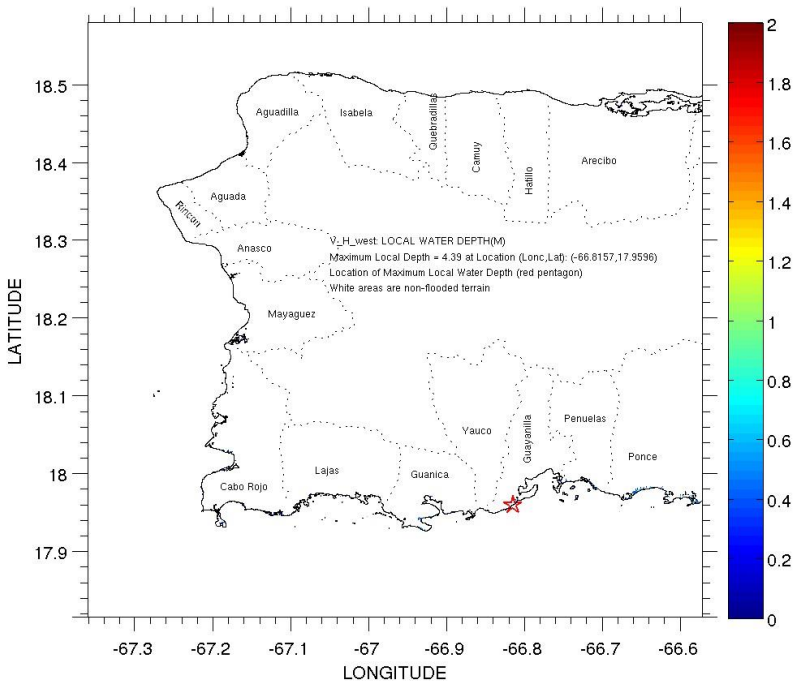

Figure 5. HAITI Local Water Depth for West grid. This is the inundation above the local terrain elevation.

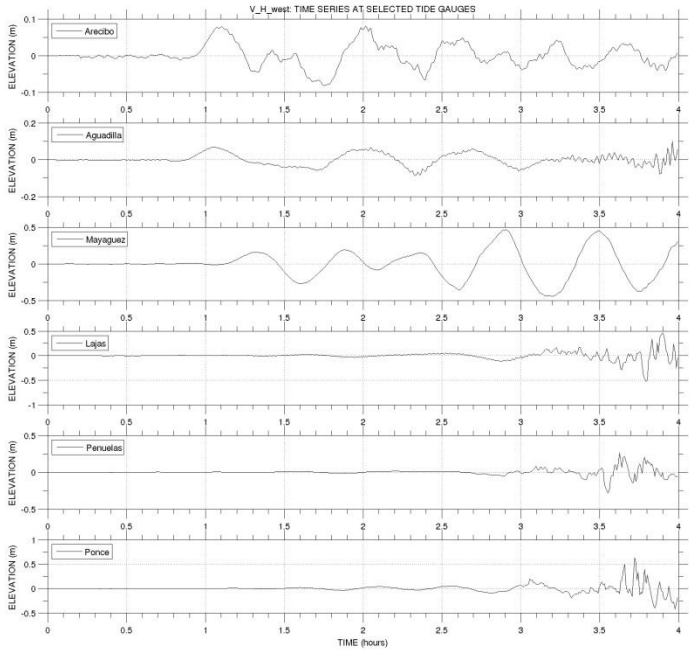

Figure 6. HAITI time series at selected locations in the West grid.

Central

```
0.0050   Minimum amp. of input offshore wave (m)
5.0      Minimum depth of offshore (m)
0.1      Dry land depth of inundation (m)
0.0009   Friction coefficient (n**2)
1        Let A-Grid and B-Grid run up
100.0    Max eta before blow-up (m)
0.18     Time step (sec)
80000    Total number of time steps in run (4 hrs)
30       Time steps between A-Grid computations
5        Time steps between B-Grid computations
90       Time steps between output steps (18 s)
1        Time steps before saving first output step
1        Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/central.dat'
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Haiti/'
'./'
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)
0     Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)
```

East

```
0.0050   Minimum amp. of input offshore wave (m)
5.0      Minimum depth of offshore (m)
0.1      Dry land depth of inundation (m)
0.0009   Friction coefficient (n**2)
1        Let A-Grid and B-Grid run up
100.0    Max eta before blow-up (m)
0.17     Time step (sec)
84706    Total number of time steps in run (8 hrs)
35       Time steps between A-Grid computations
5        Time steps between B-Grid computations
140      Time steps between output steps (23.5 s)
1        Time steps before saving first output step
1        Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v5.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/east.dat'
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Haiti/'
'./'
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)
0     Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)
```

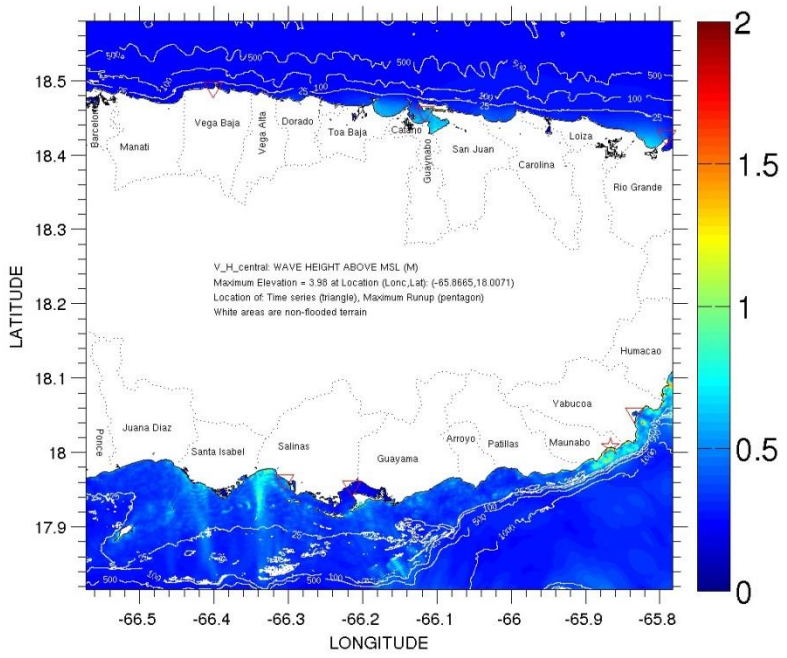

Figure 7. HAITI inundation for Central grid.

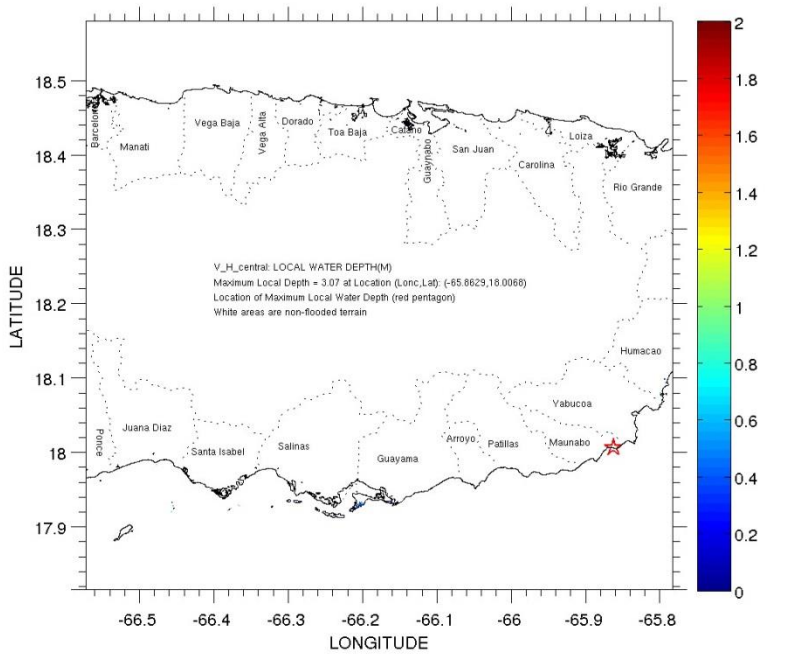

Figure 8. HAITI Local Water Depth for Central grid. This is the inundation above the local terrain elevation.

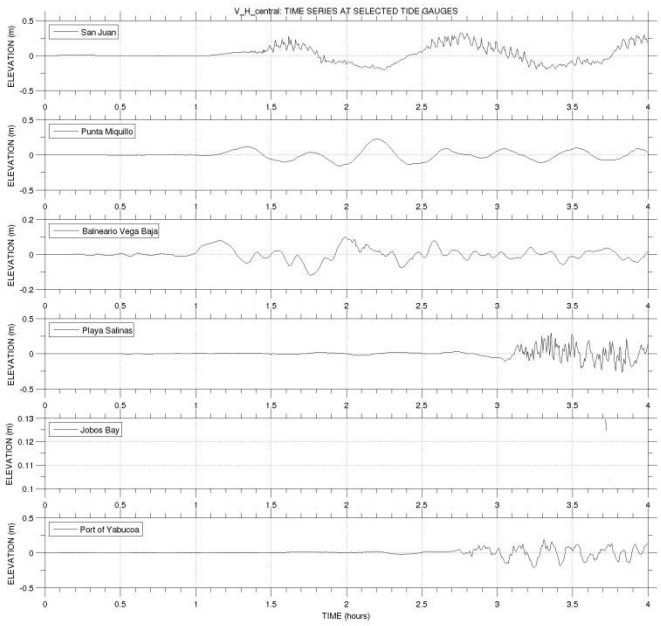

Figure 9. HAITI time series at selected locations in the Central grid.

East

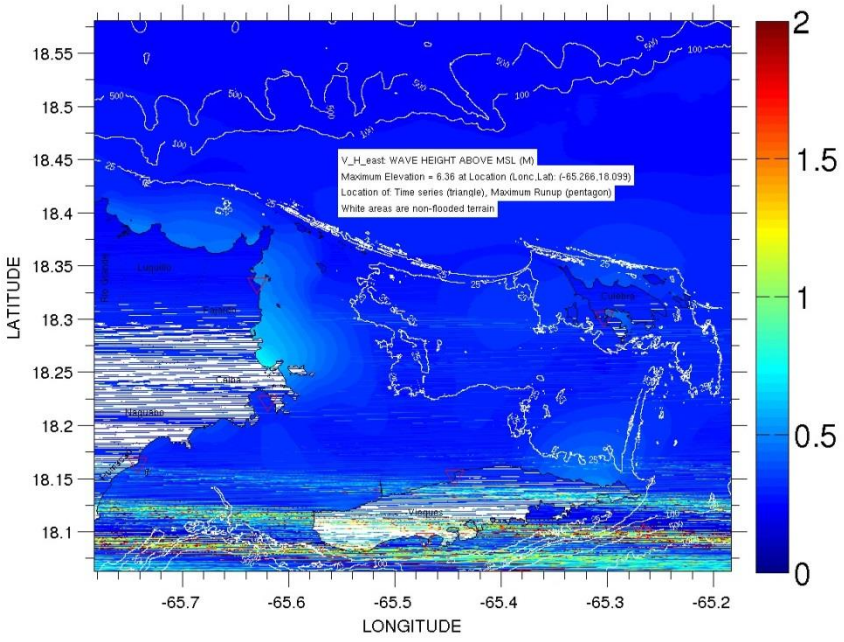

Figure 10. HAITI inundation for East grid. This run became unstable and will be repeated after debugging.

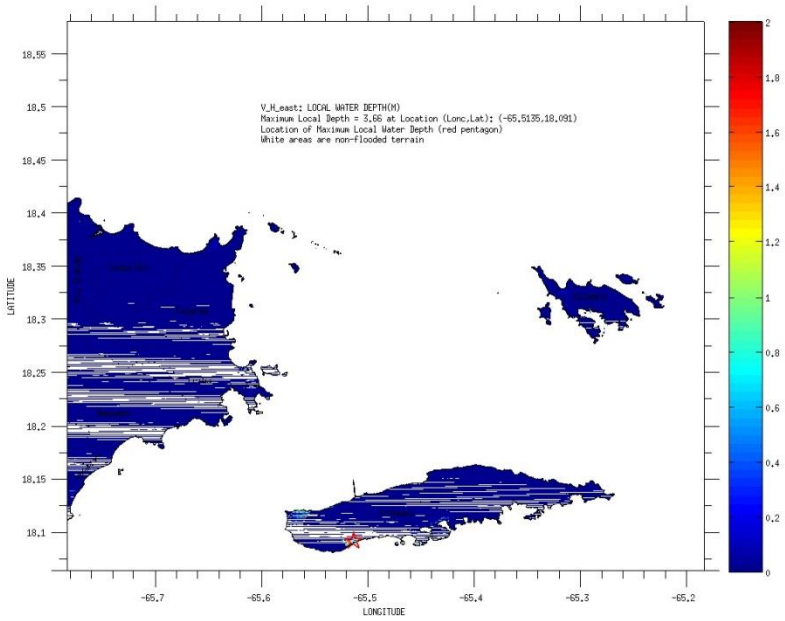

Figure 11. HAITI Local Water Depth for East grid. This is the inundation above the local terrain elevation. This run became unstable and will be repeated after debugging.

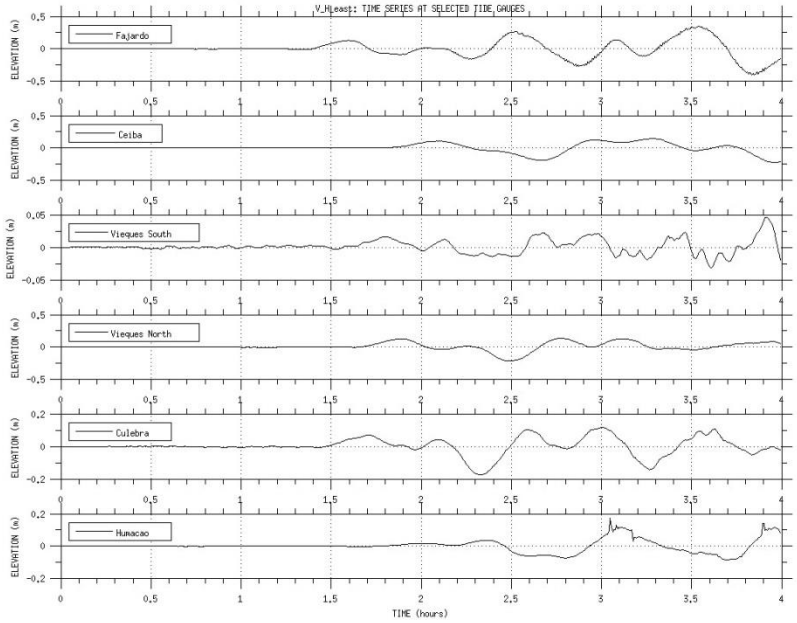

Figure 12. HAITI time series at selected locations in the East grid.

NO MOSAIC HAS BEEN CREATED

HAITI NORTE:

The propagation source parameters for the source named HAITI NORTE are:

```
######################## SEGMENT 1 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-72.004178
# 'Latitude'      [fault paramters]
20.186741
# 'Length (km):'  [fault paramters]
91.2
# 'Width (km):'   [fault paramters]
71.0
# 'DIP (deg):'    [fault paramters]
35.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
112.8
# 'SLIP (m)'      [fault paramters]
5.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 2 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-72.793465
# 'Latitude'      [fault paramters]
```

```
20.395798
# 'Length (km):'  [fault paramters]
89.4
# 'Width (km):'   [fault paramters]
71.0
# 'DIP (deg):'    [fault paramters]
35.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
105.3
# 'SLIP (m)'      [fault paramters]
5.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 3 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-73.396247
# 'Latitude'      [fault paramters]
20.392168
# 'Length (km):'  [fault paramters]
63.9
# 'Width (km):'   [fault paramters]
71.0
# 'DIP (deg):'    [fault paramters]
35.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
90.1
# 'SLIP (m)'      [fault paramters]
5.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 4 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
```

```
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-74.036783
# 'Latitude'      [fault paramters]
20.556887
# 'Length (km):'  [fault paramters]
70.1
# 'Width (km):'   [fault paramters]
71.0
# 'DIP (deg):'    [fault paramters]
35.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
104.91
# 'SLIP (m)'      [fault paramters]
5.
# 'DEPTH (km):'   [fault paramters]
5.
```

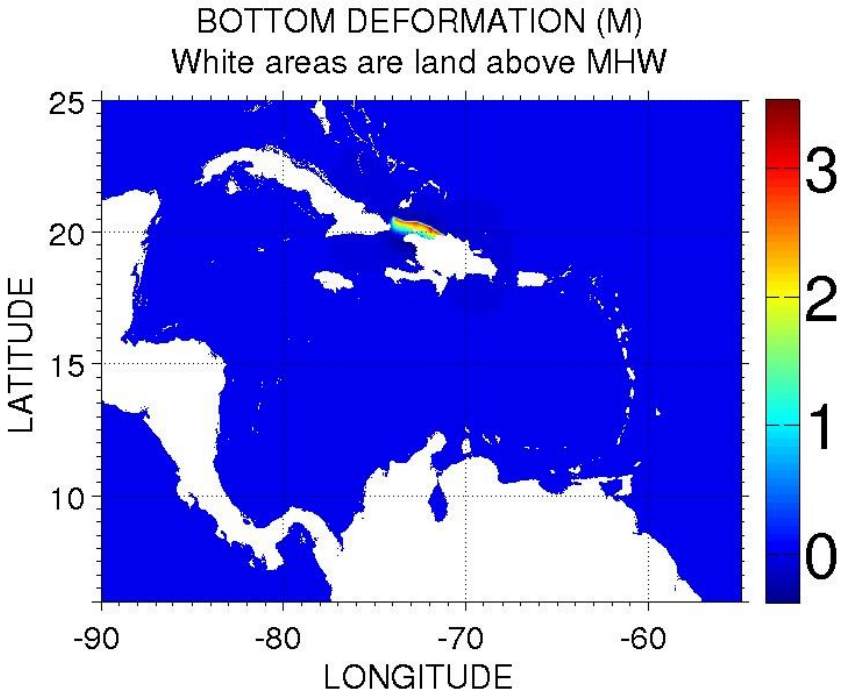

Figure 13. HAITI NORTE initial sea surface deformation as shown in the propagation grid.

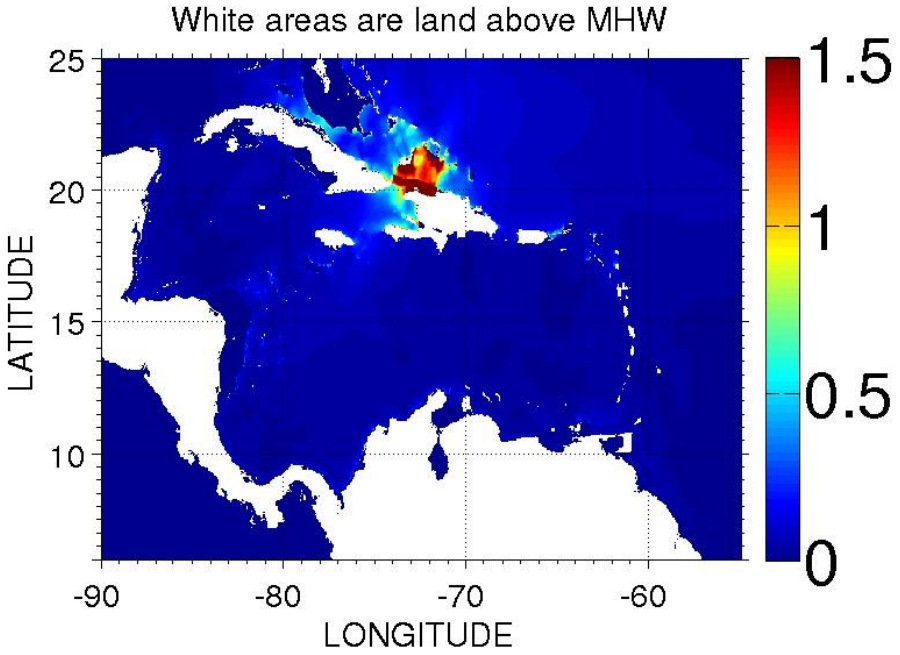

Figure 14. HAITI NORTE Maximum Envelope of Waters as shown in the propagation grid.

Inundation input parameters:

West

```
0.0050   Minimum amp. of input offshore wave (m)
5.0      Minimum depth of offshore (m)
0.1      Dry land depth of inundation (m)
0.0009   Friction coefficient (n**2)
1        Let A-Grid and B-Grid run up
100.0    Max eta before blow-up (m)
0.12     Time step (sec)******** reduced (from 0.16) time step to see if we get rid of garbage
120000   Total number of time steps in run (4 hrs)
48       Time steps between A-Grid computations
8        Time steps between B-Grid computations
240      Time steps between output steps (28.8 s)
1        Time steps before saving first output step
1        Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/west_v3.dat'
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Haiti_Norte/'
'./'
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)
0      Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)
```

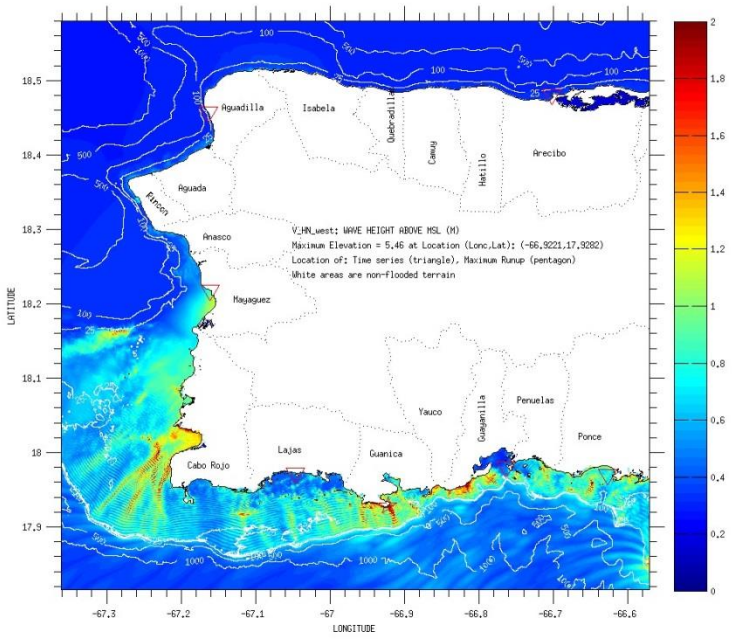

Figure 15. HAITI NORTE inundation for West grid.

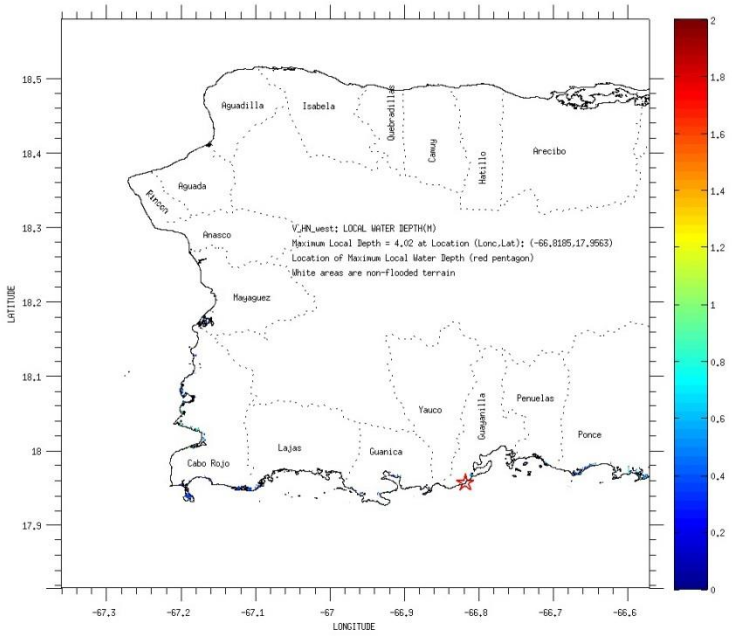

Figure 16. HAITI NORTE Local Water Depth for West grid. This is the inundation above the local terrain elevation.

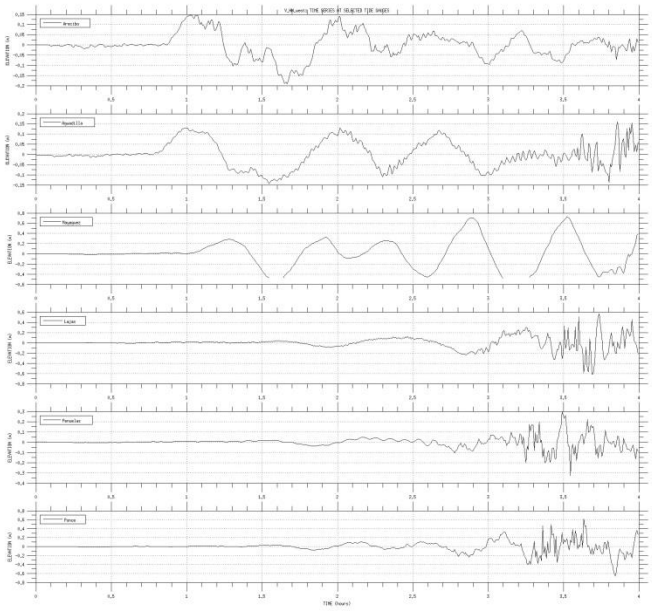

Figure 17. HAITI NORTE time series at selected locations in the West grid.

Central

0.0050	Minimum amp. of input offshore wave (m)
5.0	Minimum depth of offshore (m)
0.1	Dry land depth of inundation (m)
0.0009	Friction coefficient (n**2)
1	Let A-Grid and B-Grid run up
100.0	Max eta before blow-up (m)
0.18	Time step (sec)
80000	Total number of time steps in run (4 hrs)
30	Time steps between A-Grid computations
5	Time steps between B-Grid computations
90	Time steps between output steps (18 s)
1	Time steps before saving first output step
1	Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/central.dat'	
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Haiti_Norte/'	
'./'	
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)	
0	Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)	

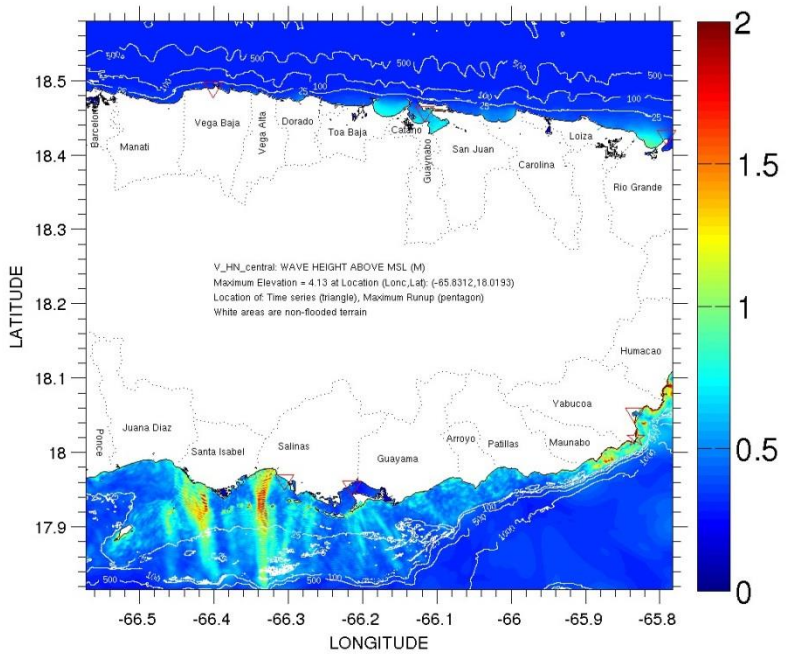

Figure 18. HAITI NORTE inundation for Central grid.

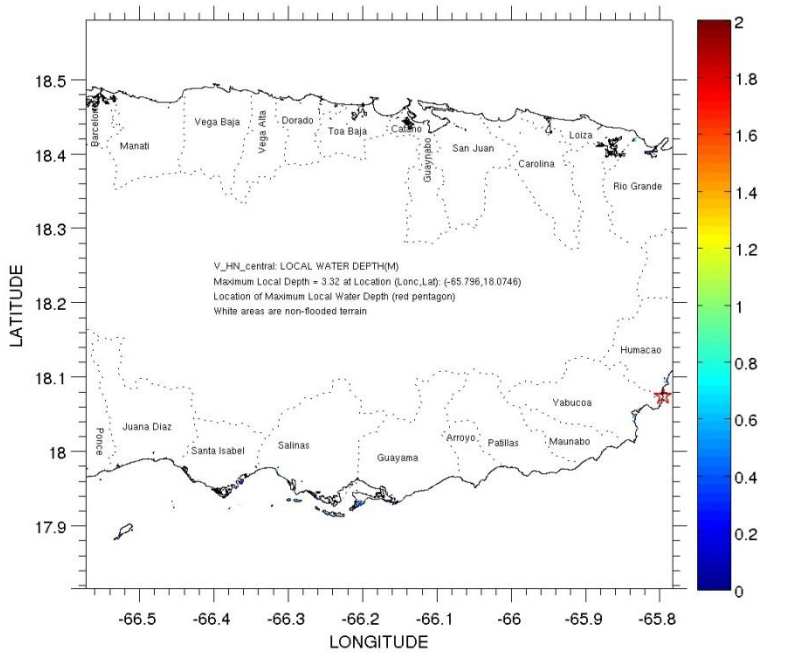

Figure 19. HAITI NORTE Local Water Depth for Central grid. This is the inundation above the local terrain elevation.

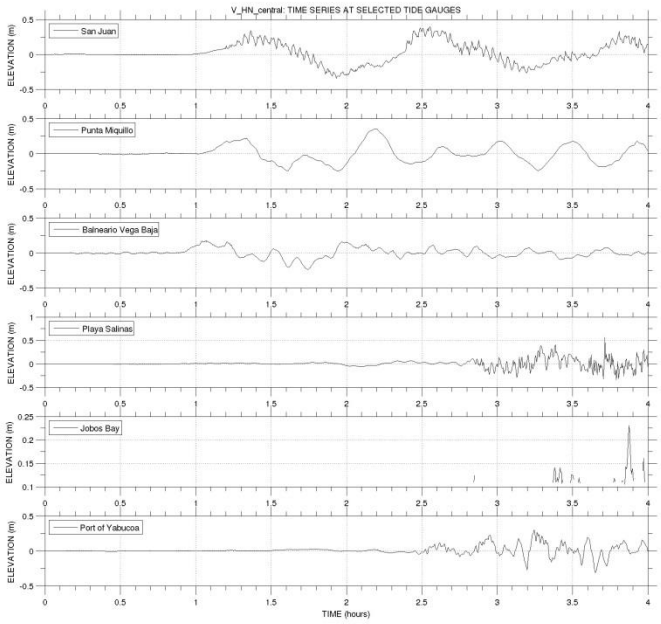

Figure 20. HAITI NORTE time series at selected locations in the Central grid.

East

0.0050	Minimum amp. of input offshore wave (m)
5.0	Minimum depth of offshore (m)
0.1	Dry land depth of inundation (m)
0.0009	Friction coefficient (n**2)
1	Let A-Grid and B-Grid run up
100.0	Max eta before blow-up (m)
0.17	Time step (sec)
84706	Total number of time steps in run (8 hrs)
35	Time steps between A-Grid computations
5	Time steps between B-Grid computations
140	Time steps between output steps (23.5 s)
1	Time steps before saving first output step
1	Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/east.dat'	
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Haiti_Norte/'	
'./'	
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)	
0	Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)	

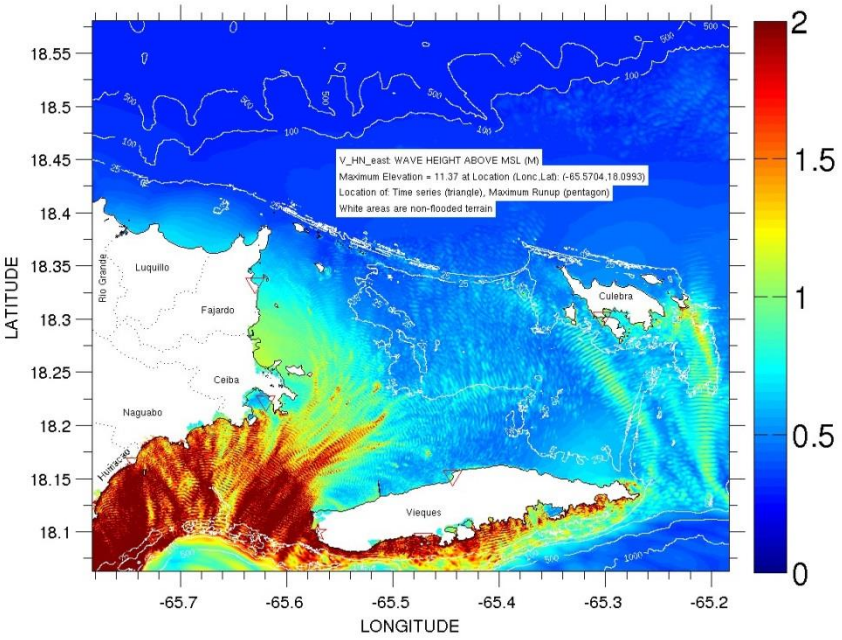

Figure 21. HAITI NORTE inundation for East grid. Although the run did finish, this run will be repeated after making a new East computational grid extending south up to the same latitude as the West and Central grids to see if the red areas persist.

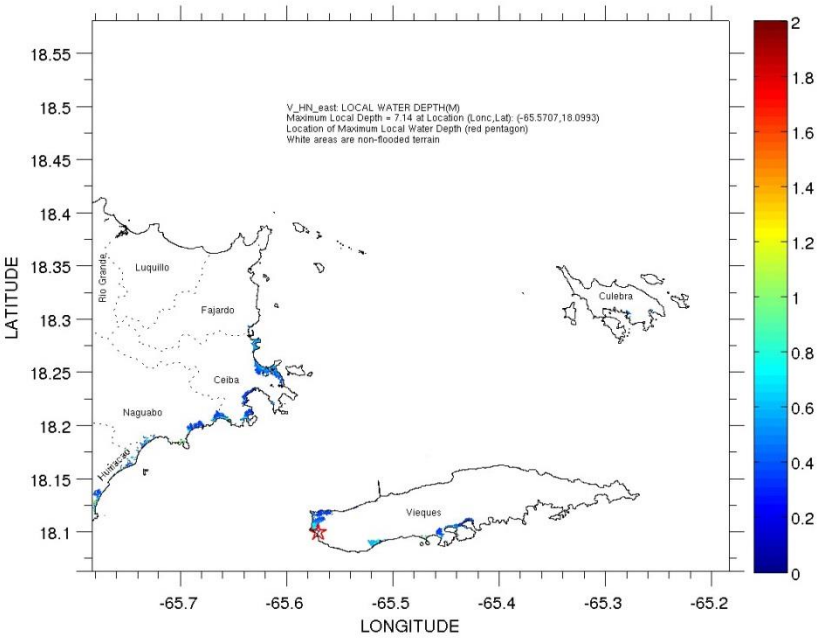

Figure 22 HAITI NORTE Local Water Depth for East grid. This is the inundation above the local terrain elevation.

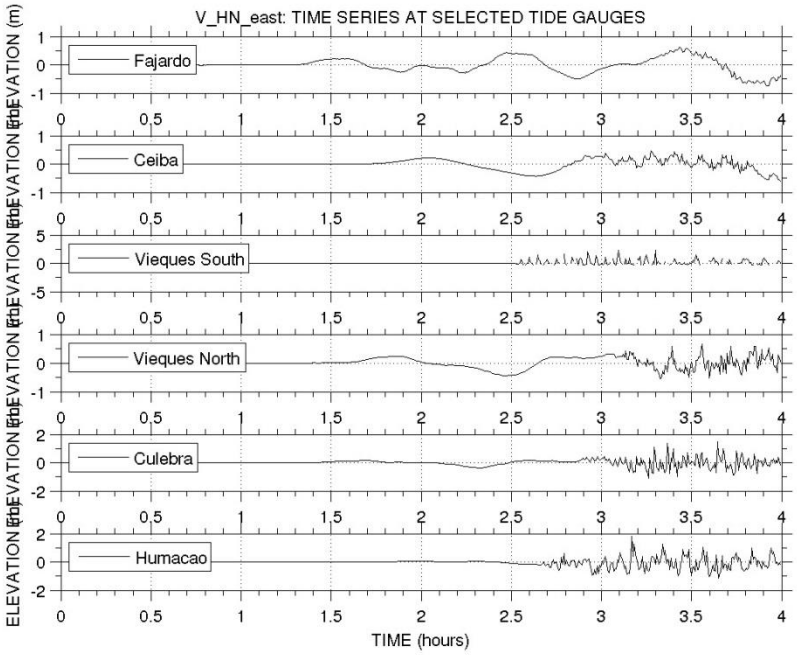

Figure 23. HAITI NORTE time series at selected locations in the East grid.

MOSAIC

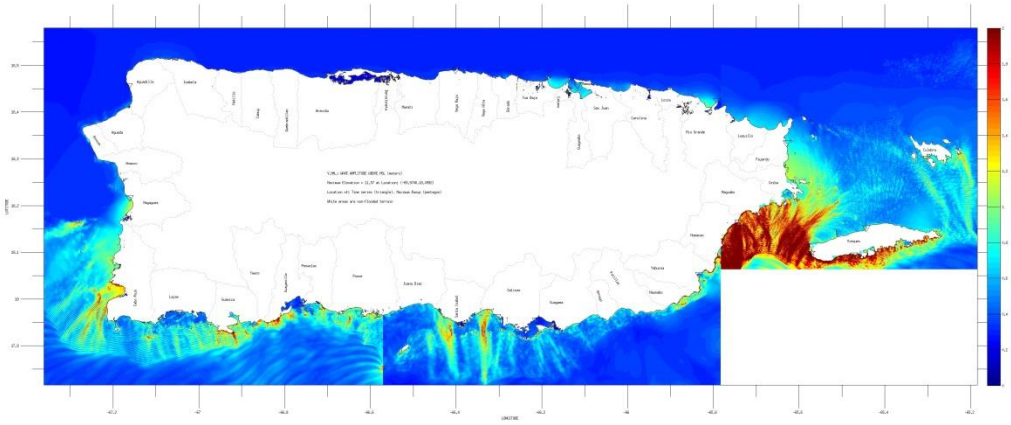

Figure 24. HAITI NORTE MEOW mosaic prepared by joining results from the West, Central, and East grids.

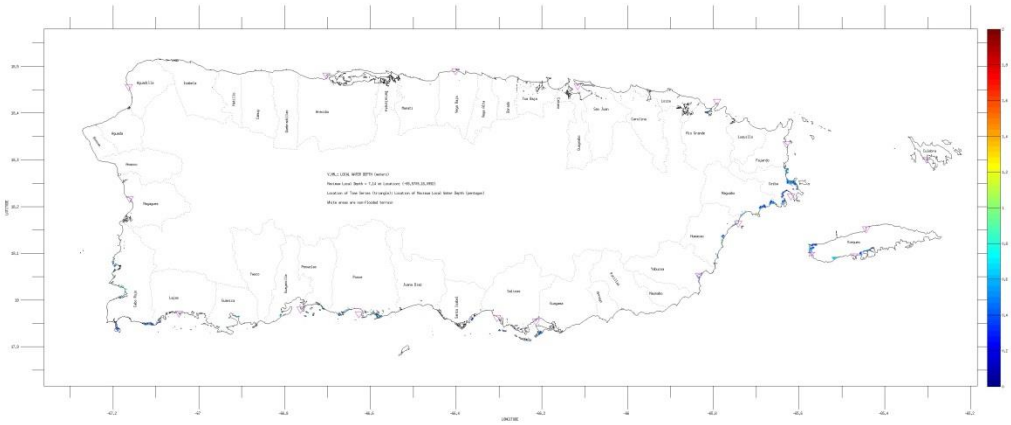

Figure 25. HAITI NORTE Local Water Depth mosaic prepared by joining results from the West, Central, and East grids.

BONAIRE:

The propagation source parameters for the source named BONAIRE are:

```
######################## SEGMENT 1 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-64.985160
# 'Latitude'      [fault paramters]
11.645171
# 'Length (km):'  [fault paramters]
123.3
# 'Width (km):'   [fault paramters]
30.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
25.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
301.7
# 'SLIP (m)'      [fault paramters]
4.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 2 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-65.949400
# 'Latitude'      [fault paramters]
```

```
12.227800
# 'Length (km):'  [fault paramters]
175.12
# 'Width (km):'   [fault paramters]
30.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
25.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
285.7
# 'SLIP (m)'      [fault paramters]
4.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 3 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
600
# 'Longitude'     [fault paramters]
-67.469737
# 'Latitude'      [fault paramters]
12.684644
# 'Length (km):'  [fault paramters]
85.4
# 'Width (km):'   [fault paramters]
30
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
25.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
264.83
# 'SLIP (m)'      [fault paramters]
4.
# 'DEPTH (km):'   [fault paramters]
5.
```

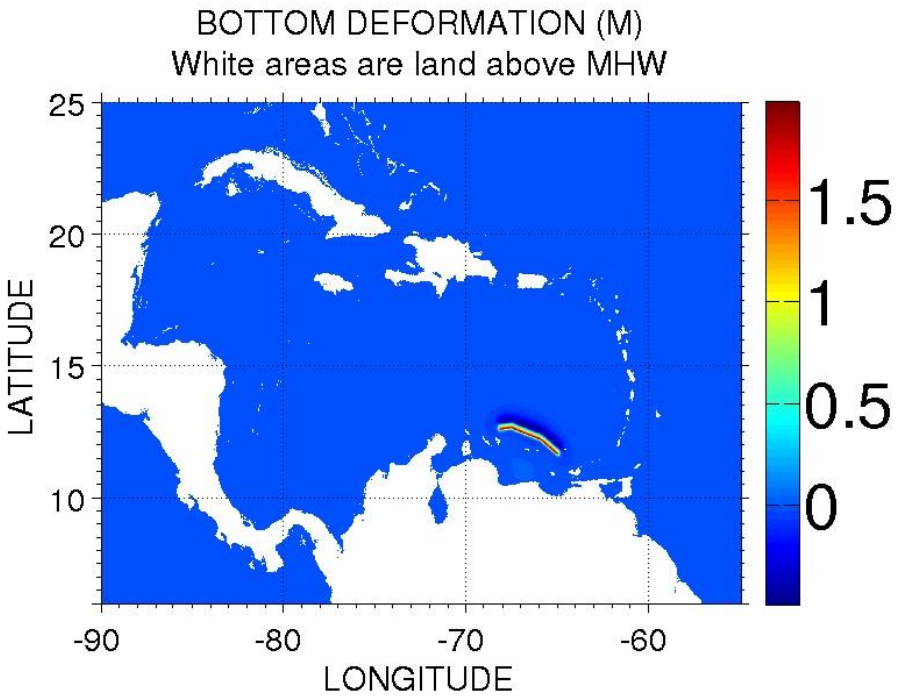

Figure 26. BONAIRE initial sea surface deformation as shown in the propagation grid.

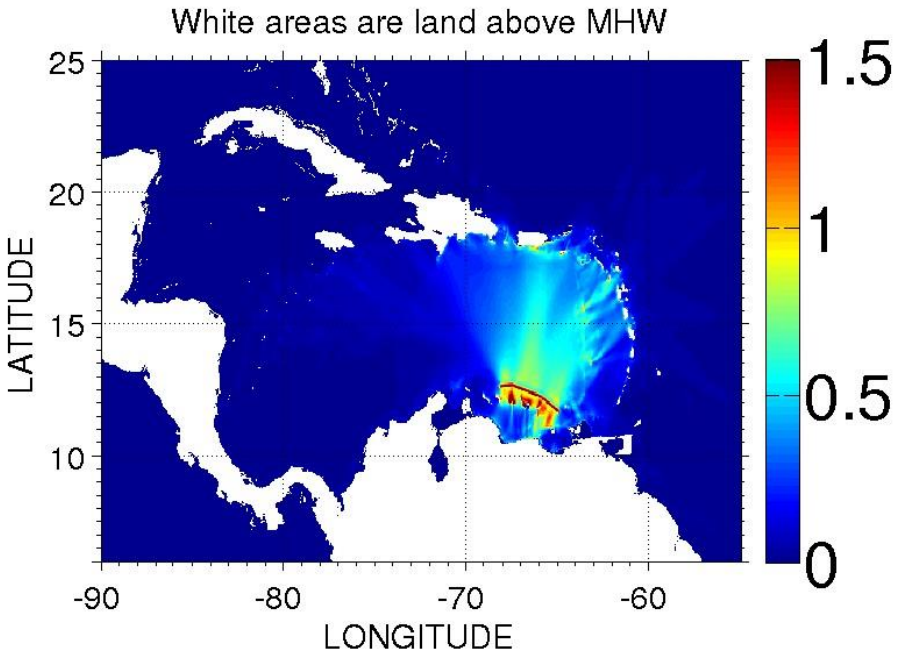

Figure 27. BONAIRE Maximum Envelope of Waters as shown in the propagation grid.

Inundation input parameters:

West

```
0.0050   Minimum amp. of input offshore wave (m)
5.0      Minimum depth of offshore (m)
0.1      Dry land depth of inundation (m)
0.0009   Friction coefficient (n**2)
1        Let A-Grid and B-Grid run up
100.0    Max eta before blow-up (m)
0.12     Time step (sec)******** reduced (from 0.16) time step to see if we get rid of garbage
120000   Total number of time steps in run (4 hrs)
48       Time steps between A-Grid computations
8        Time steps between B-Grid computations
240      Time steps between output steps (28.8 s)
1        Time steps before saving first output step
1        Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/west_v3.dat'
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Bonaire/'
'./'
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)
0      Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)
```

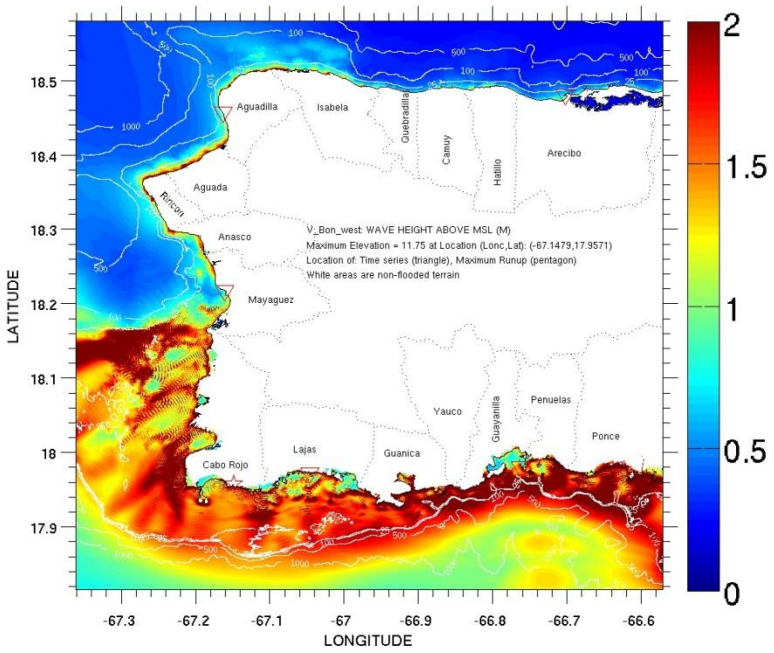

Figure 28. BONAIRE inundation for West grid.

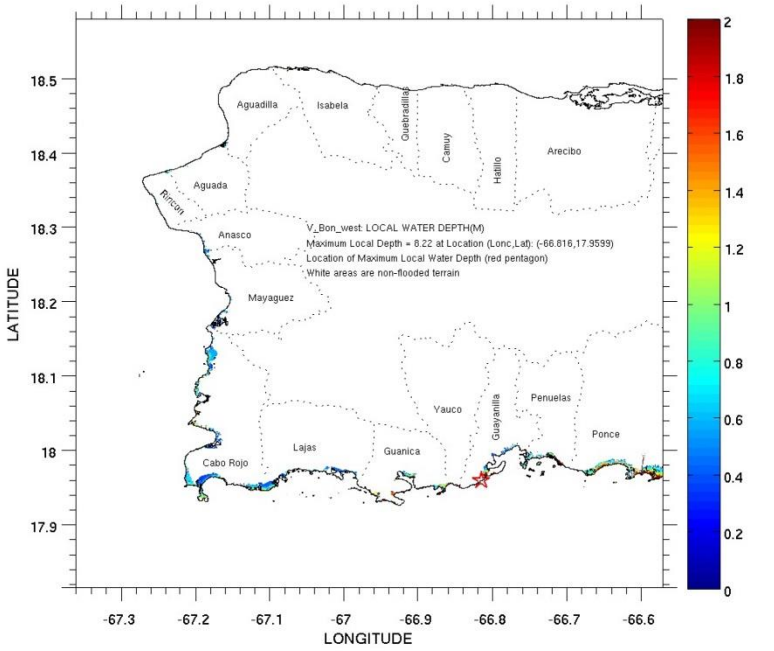

Figure 29. BONAIRE Local Water Depth for West grid. This is the inundation above the local terrain elevation.

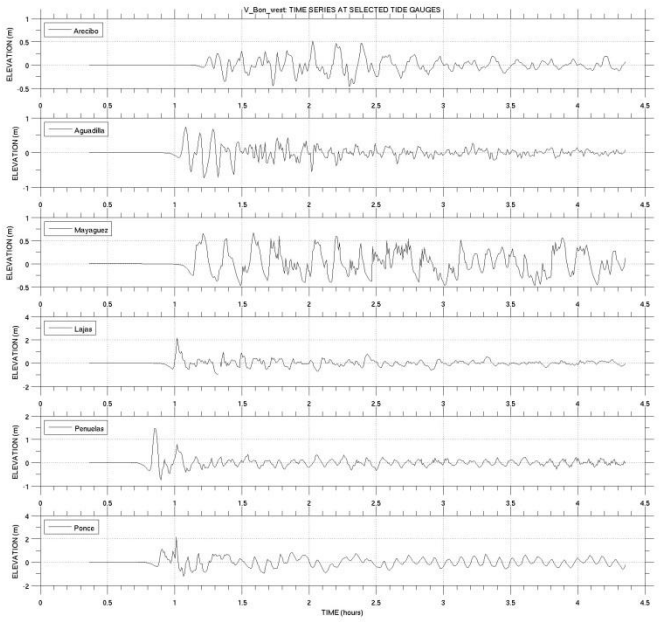

Figure 30. BONAIRE time series at selected locations in the West grid.

Central

```
0.0050  Minimum amp. of input offshore wave (m)
5.0     Minimum depth of offshore (m)
0.1     Dry land depth of inundation (m)
0.0009  Friction coefficient (n**2)
1       Let A-Grid and B-Grid run up
100.0   Max eta before blow-up (m)
0.18    Time step (sec)
80000   Total number of time steps in run (4 hrs)
30      Time steps between A-Grid computations
5       Time steps between B-Grid computations
90      Time steps between output steps (18 s)
1       Time steps before saving first output step
1       Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v5.dat'
'/home4/amercado/NTHMP_PR/computational_grids/inundation/central.dat'
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Bonaire/'
'./'
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)
0       Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)
```

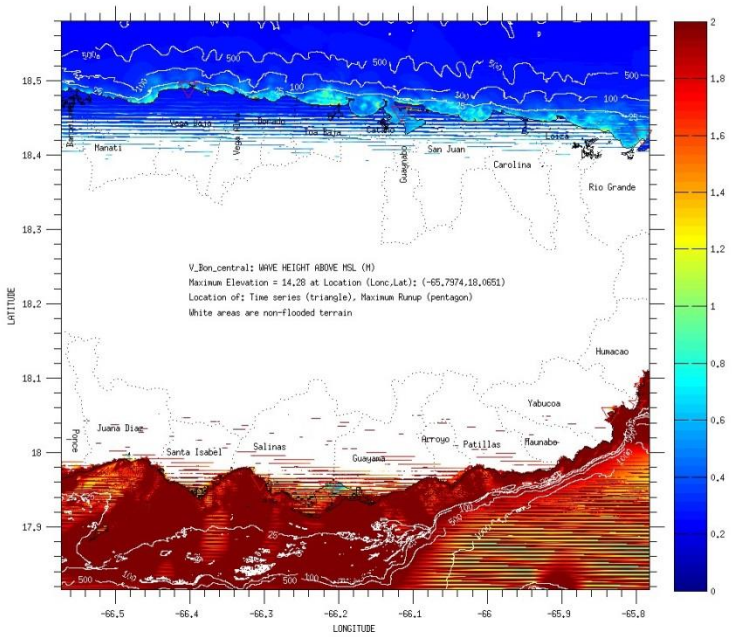

Figure 31. BONAIRE inundation for Central grid. This run became unstable and will be repeated after debugging.

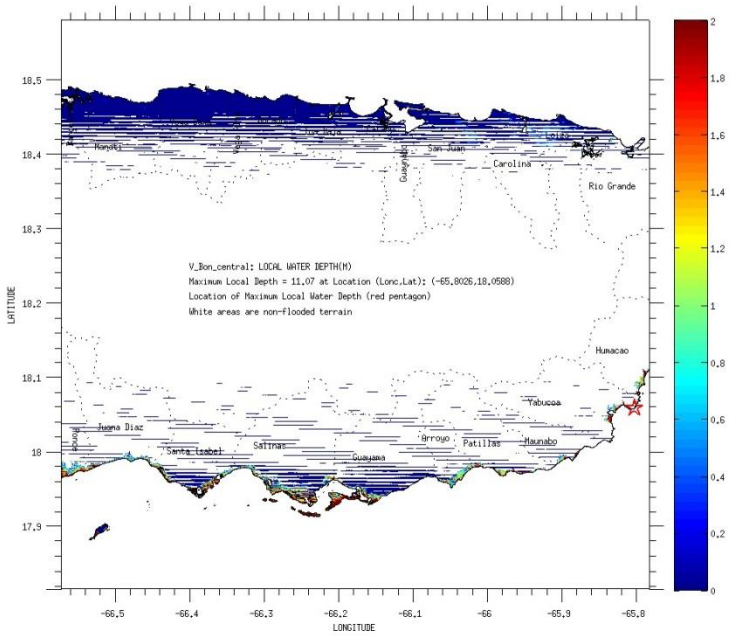

Figure 32. BONAIRE Local Water Depth for Central grid. This is the inundation above the local terrain elevation. This run became unstable and will be repeated after debugging.

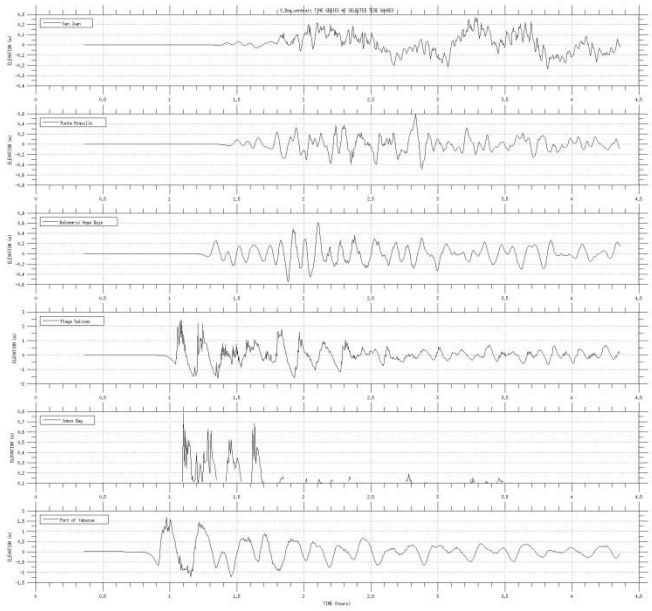

Figure 33. BONAIRE time series at selected locations in the Central grid.

East

0.0050	Minimum amp. of input offshore wave (m)
5.0	Minimum depth of offshore (m)
0.1	Dry land depth of inundation (m)
0.0009	Friction coefficient (n**2)
1	Let A-Grid and B-Grid run up
100.0	Max eta before blow-up (m)
0.17	Time step (sec)
84706	Total number of time steps in run (4 hrs)
35	Time steps between A-Grid computations
5	Time steps between B-Grid computations
140	Time steps between output steps (23.8 s)
1	Time steps before saving first output step
1	Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v6.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/east.dat'	
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Bonaire/'	
'./'	
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)	
0	Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)	

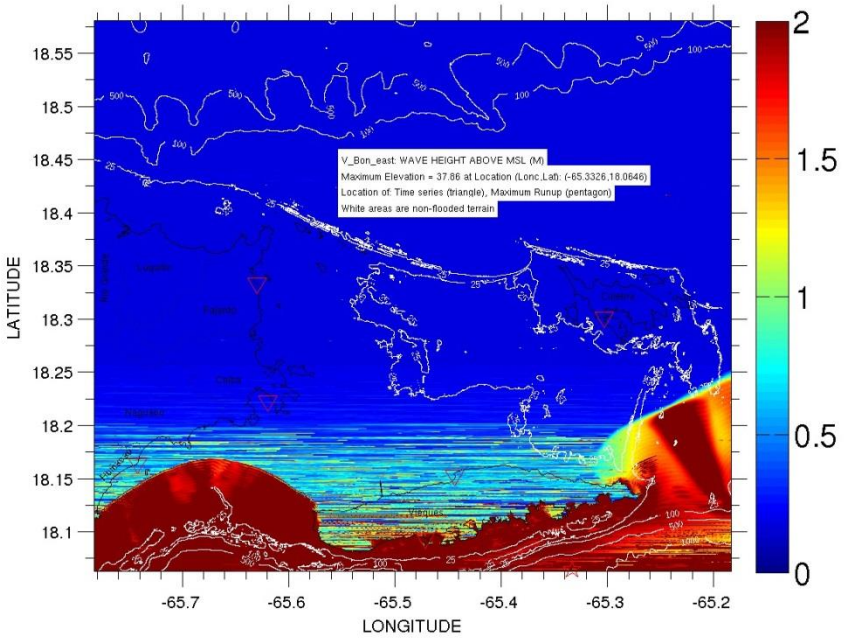

Figure 34. BONAIRE inundation for East grid. This run became unstable and will be repeated after debugging.

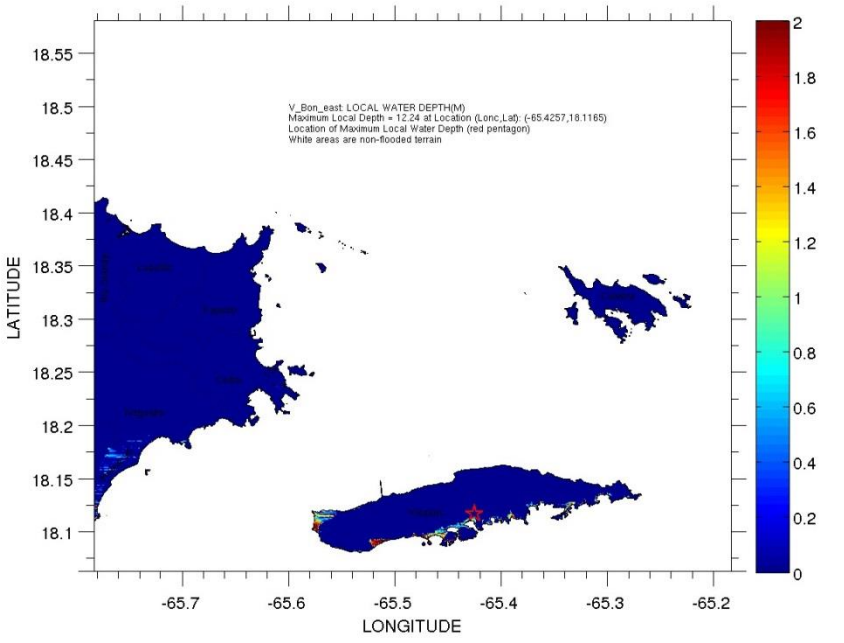

Figure 35. BONAIRE Local Water Depth for East grid. This is the inundation above the local terrain elevation. This run became unstable and will be repeated after debugging.

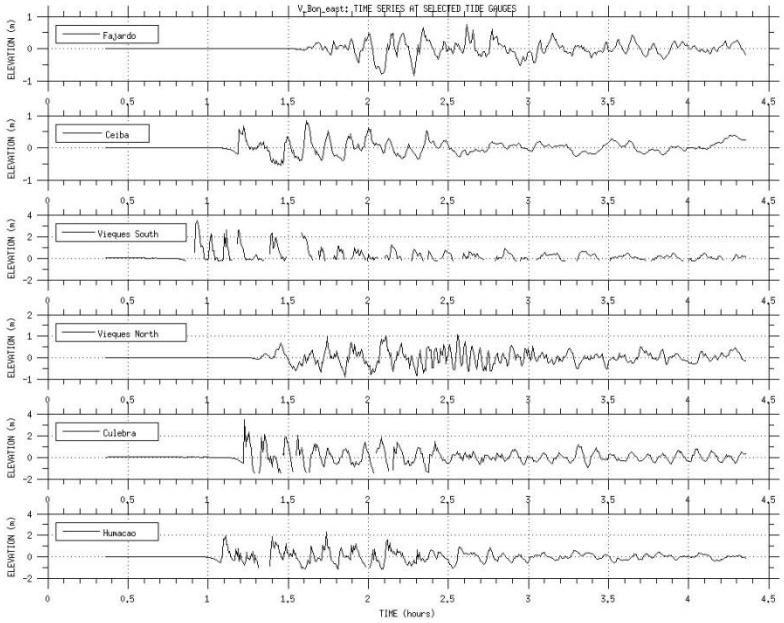

Figure 36. BONAIRE time series at selected locations in the East grid.

PANAMA:

The propagation source parameters for the source named PANAMA are:

```
######################## SEGMENT 1 ###################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
400
# 'Longitude'     [fault paramters]
-77.386571
# 'Latitude'      [fault paramters]
9.308856
# 'Length (km):'  [fault paramters]
57.2
# 'Width (km):'   [fault paramters]
73.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
30.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
305.1
# 'SLIP (m)'      [fault paramters]
5
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 2 ###################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
400
# 'Longitude'     [fault paramters]
-77.807588
# 'Latitude'      [fault paramters]
9.600278
```

```
# 'Length (km):'  [fault paramters]
117.8
# 'Width (km):'   [fault paramters]
73.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
30.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
293.9
# 'SLIP (m)'      [fault paramters]
5.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 3 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
400
# 'Longitude'     [fault paramters]
-78.780859
# 'Latitude'      [fault paramters]
10.027375
# 'Length (km):'  [fault paramters]
136.6
# 'Width (km):'   [fault paramters]
73.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
30.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
256.6
# 'SLIP (m)'      [fault paramters]
5.
# 'DEPTH (km):'   [fault paramters]
5.
######################## SEGMENT 4 ##################################################
# x-integration [default value]
41
# y-integration [default value = 21]
21
# Vp - P-wave velocity [default value = 8.11]
8.11
# Vs - S-wave velocity [default value = 4.49]
```

```
4.49
# 'Deform Area X' [size of deformation area in X direction]
600
# 'Deform Area Y' [size of deformation area in y direction]
400
# 'Longitude'     [fault paramters]
-79.981508
# 'Latitude'      [fault paramters]
9.741532
# 'Length (km):'  [fault paramters]
58.5
# 'Width (km):'   [fault paramters]
73.
# 'DIP (deg):'    [fault paramters]/home/amercado/bin
30.
# 'RAKE (deg):'   [fault paramters]
90.0
# 'STRIKE (deg):' [fault paramters]
276.9
# 'SLIP (m)'      [fault paramters]
5.
# 'DEPTH (km):'   [fault paramters]
5.
```

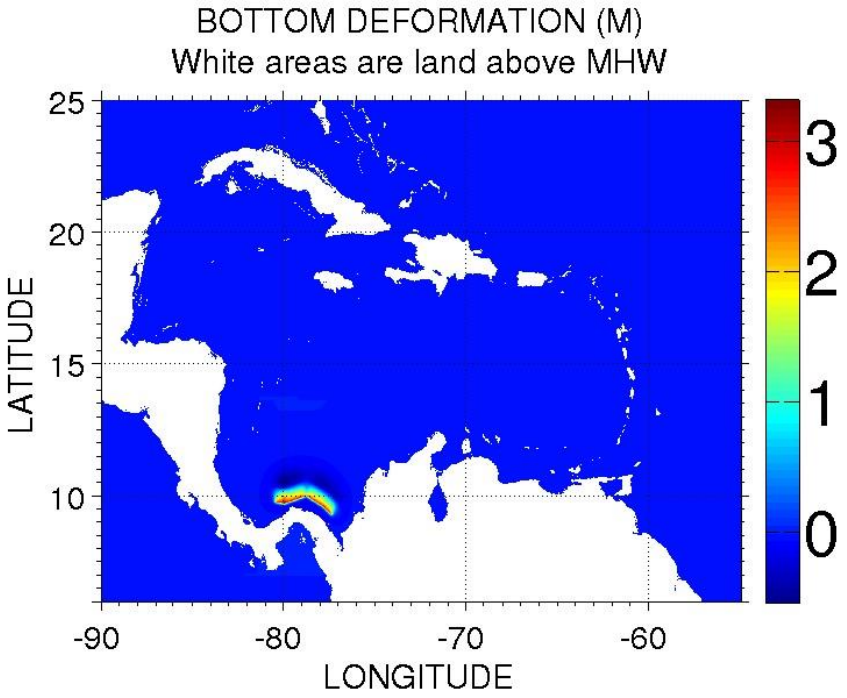

Figure 37. PANAMA initial sea surface deformation as shown in the propagation grid.

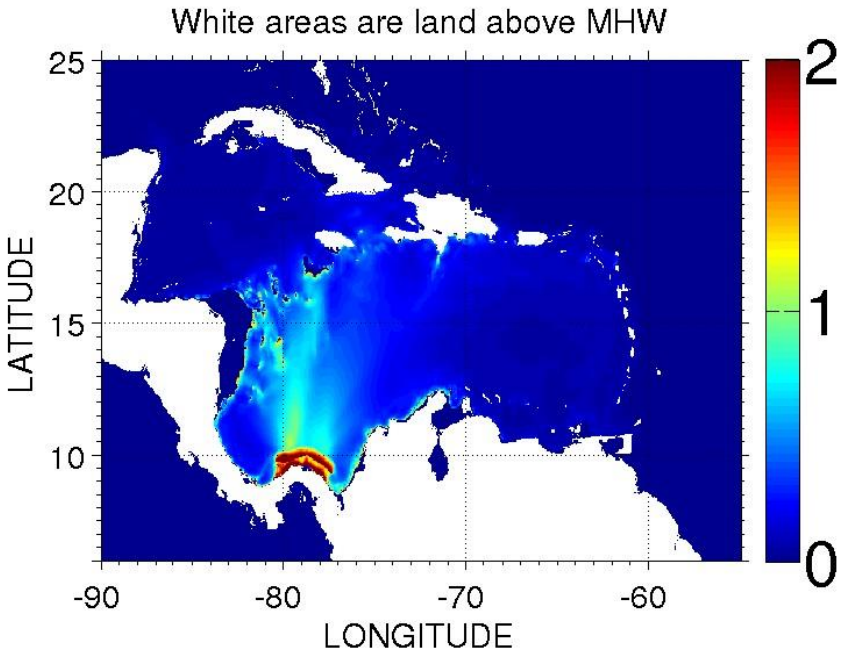

Figure 38. PANAMA Maximum Envelope of Waters as shown in the propagation grid.

Inundation input parameters:

West

0.0050	Minimum amp. of input offshore wave (m)
5.0	Minimum depth of offshore (m)
0.1	Dry land depth of inundation (m)
0.0009	Friction coefficient (n**2)
1	Let A-Grid and B-Grid run up
100.0	Max eta before blow-up (m)
0.12	Time step (sec)******** reduced (from 0.16) time step to see if we get rid of garbage
120000	Total number of time steps in run (4 hrs)
48	Time steps between A-Grid computations
8	Time steps between B-Grid computations
240	Time steps between output steps (28.8 s)
1	Time steps before saving first output step
1	Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/west_v3.dat'	
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Panama/'	
'./'	
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)	
0	Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)	

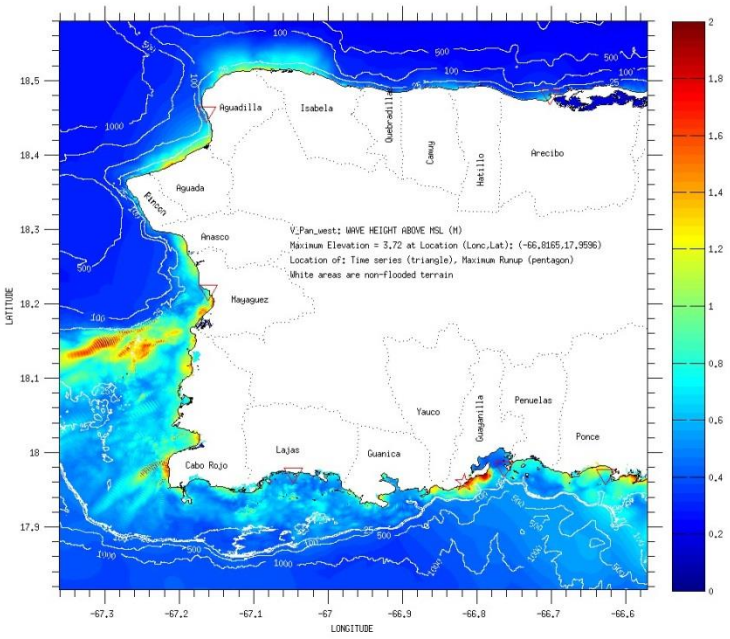

Figure 39. PANAMA inundation for West grid.

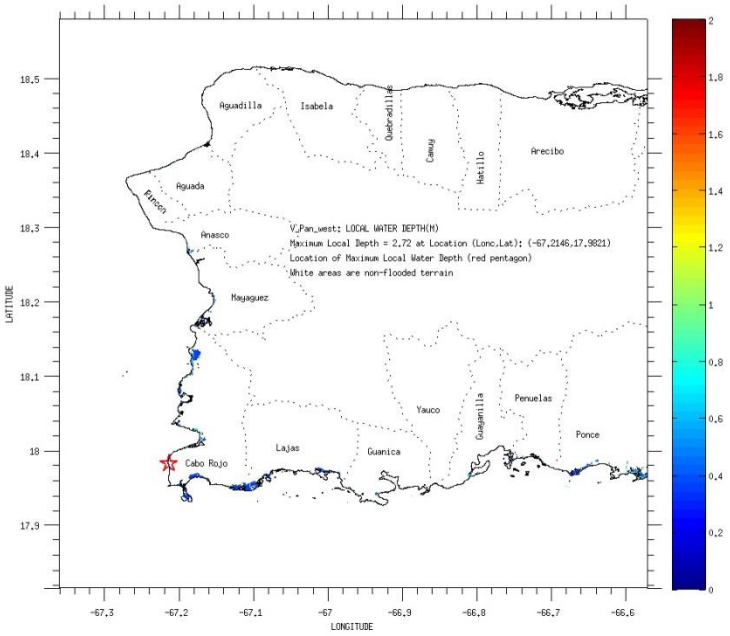

Figure 40. PANAMA Local Water Depth for West grid. This is the inundation above the local terrain elevation.

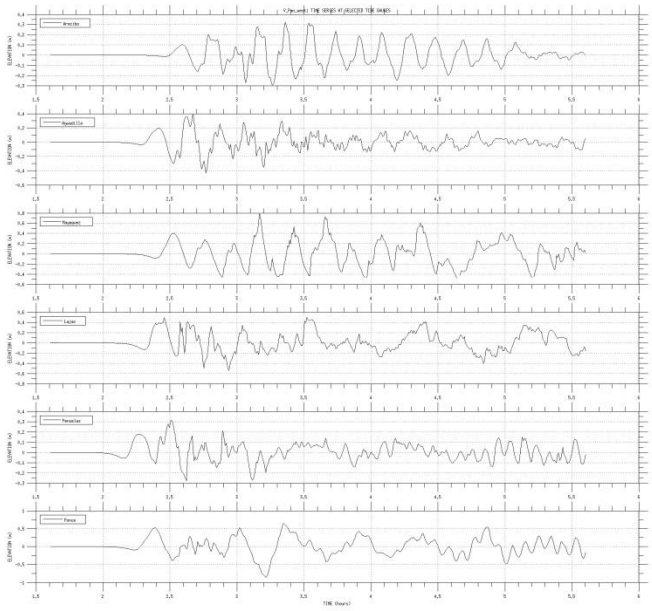

Figure 41. PANAMA time series at selected locations in the West grid.

Central

0.0050	Minimum amp. of input offshore wave (m)
5.0	Minimum depth of offshore (m)
0.1	Dry land depth of inundation (m)
0.0009	Friction coefficient (n**2)
1	Let A-Grid and B-Grid run up
100.0	Max eta before blow-up (m)
0.18	Time step (sec)
80000	Total number of time steps in run (4 hrs)
30	Time steps between A-Grid computations
5	Time steps between B-Grid computations
90	Time steps between output steps (18 s)
1	Time steps before saving first output step
1	Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v5.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/central.dat'	
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Panama/'	
'./'	
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)	
0	Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)	

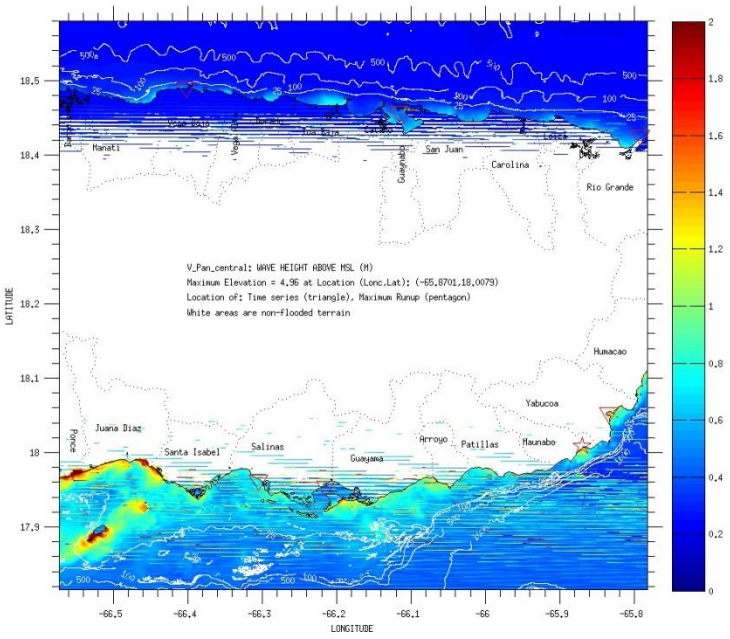

Figure 42 PANAMA inundation for Central grid. This run became unstable and will be repeated after debugging.

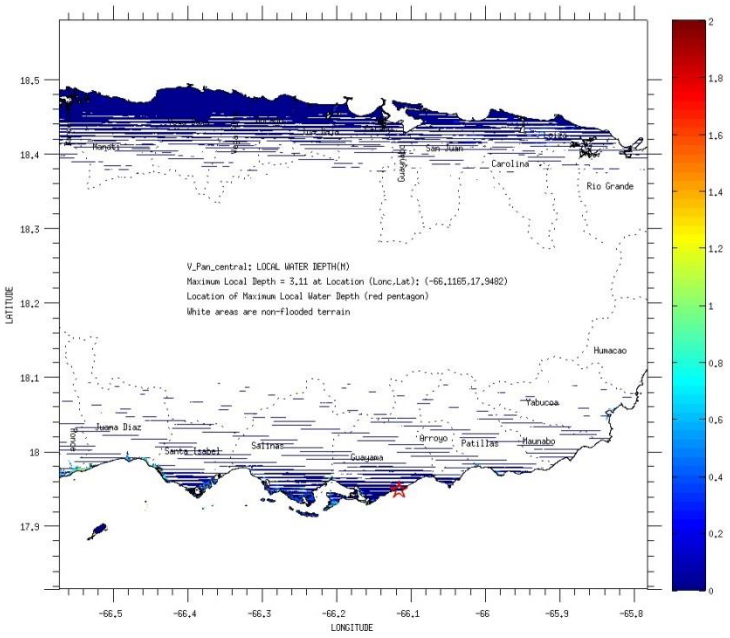

Figure 43. PANAMA Local Water Depth for Central grid. This is the inundation above the local terrain elevation. This run became unstable and will be repeated after debugging.

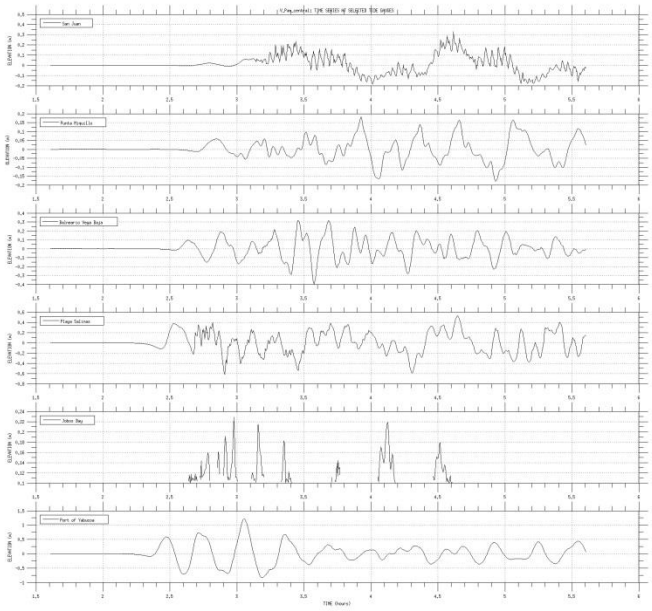

Figure 44. PANAMA time series at selected locations in the Central grid.

East

0.0050	Minimum amp. of input offshore wave (m)
5.0	Minimum depth of offshore (m)
0.1	Dry land depth of inundation (m)
0.0009	Friction coefficient (n**2)
1	Let A-Grid and B-Grid run up
100.0	Max eta before blow-up (m)
0.17	Time step (sec)
84706	Total number of time steps in run (8 hrs)
35	Time steps between A-Grid computations
5	Time steps between B-Grid computations
140	Time steps between output steps (23.5 s)
1	Time steps before saving first output step
1	Save output every n-th grid point
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_A_60s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/grid_B_9s_inun_v4.dat'	
'/home4/amercado/NTHMP_PR/computational_grids/inundation/east.dat'	
'/home5/amercado/NTHMP_PR/Regional_tsunamis/Victor/propagation/summer_2014/Panama/'	
'./'	
0 0 1 1 Produce/Suppress netCDF output for grids (default: 1 1 1 0)	
0	Number of timeseries locations
3 1008 1430 timeseries index (grid number, i, j)	

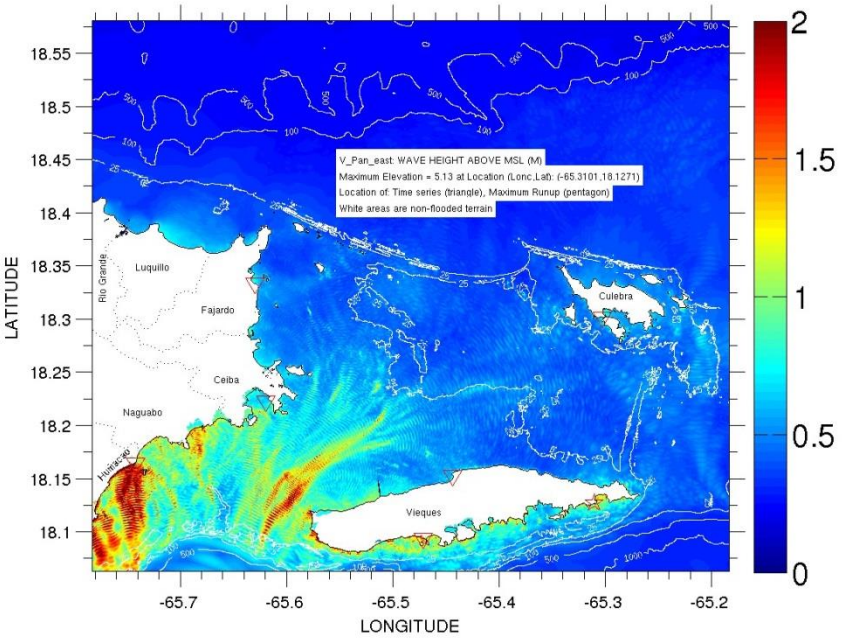

Figure 45. PANAMA inundation for East grid.

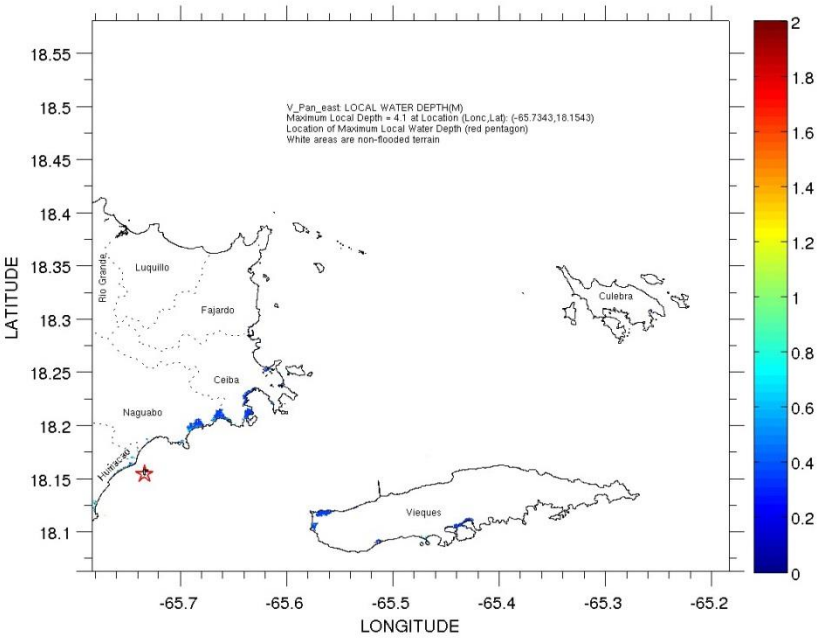

Figure 46. PANAMA Local Water Depth for East grid. This is the inundation above the local terrain elevation.

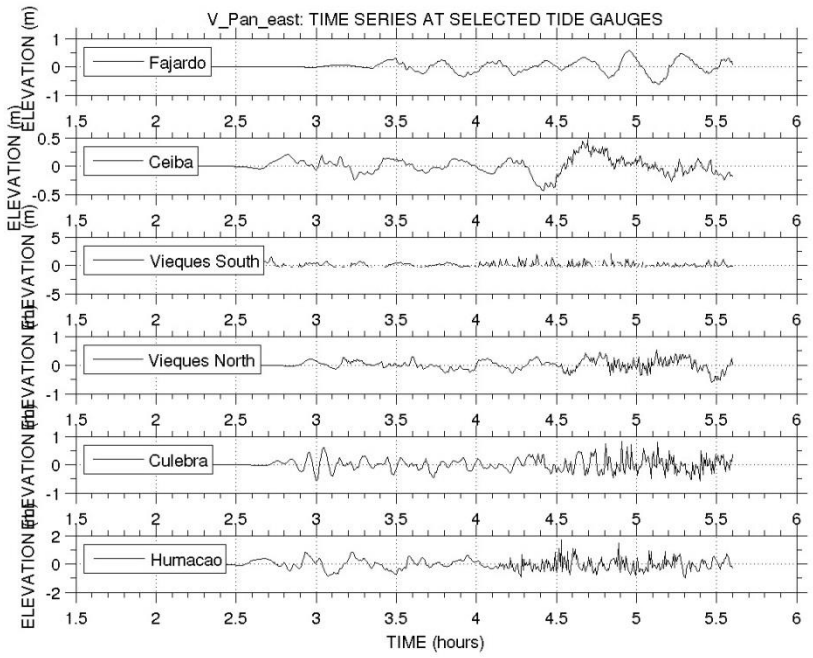

Figure 47. PANAMA time series at selected locations in the East grid.