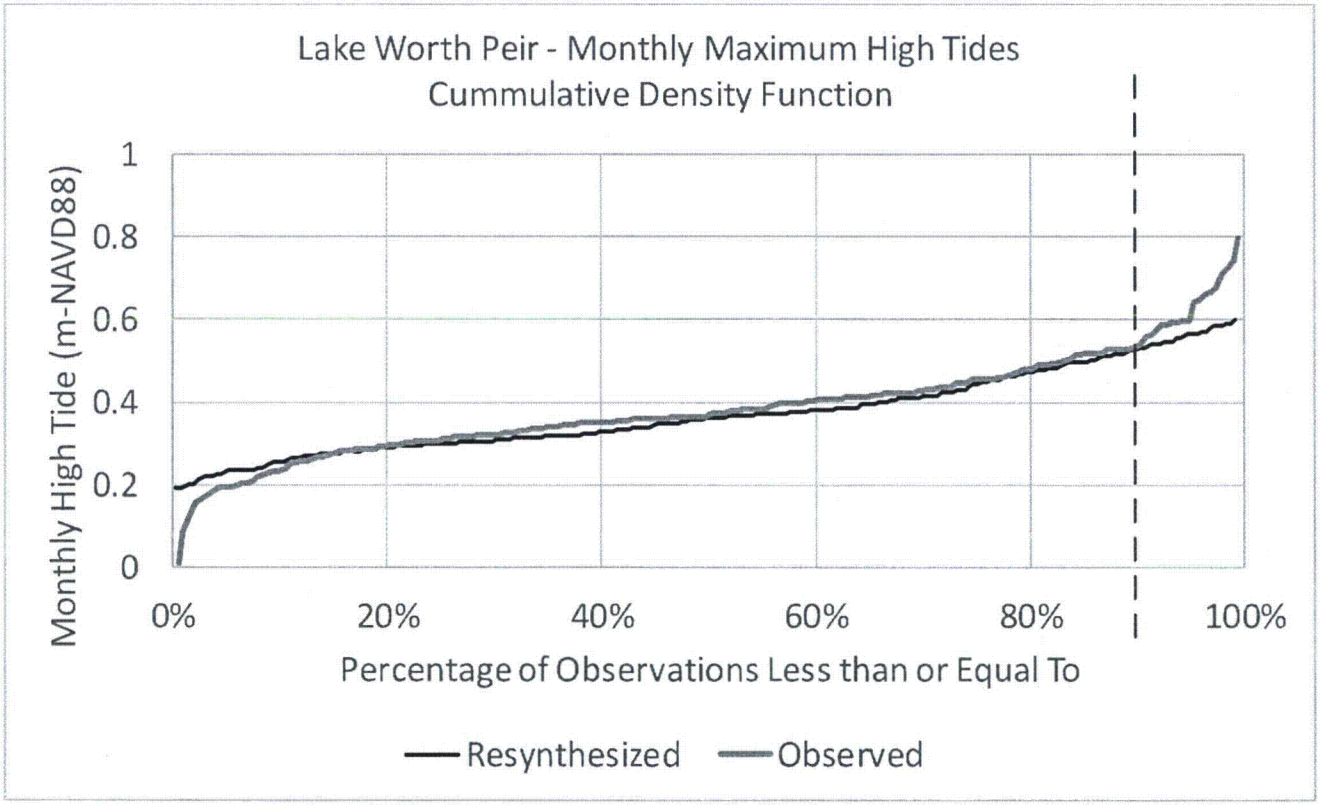

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St. Lucie Nuclear Power Plant Units 1 & 2
Flooding Hazards Reevaluation Report

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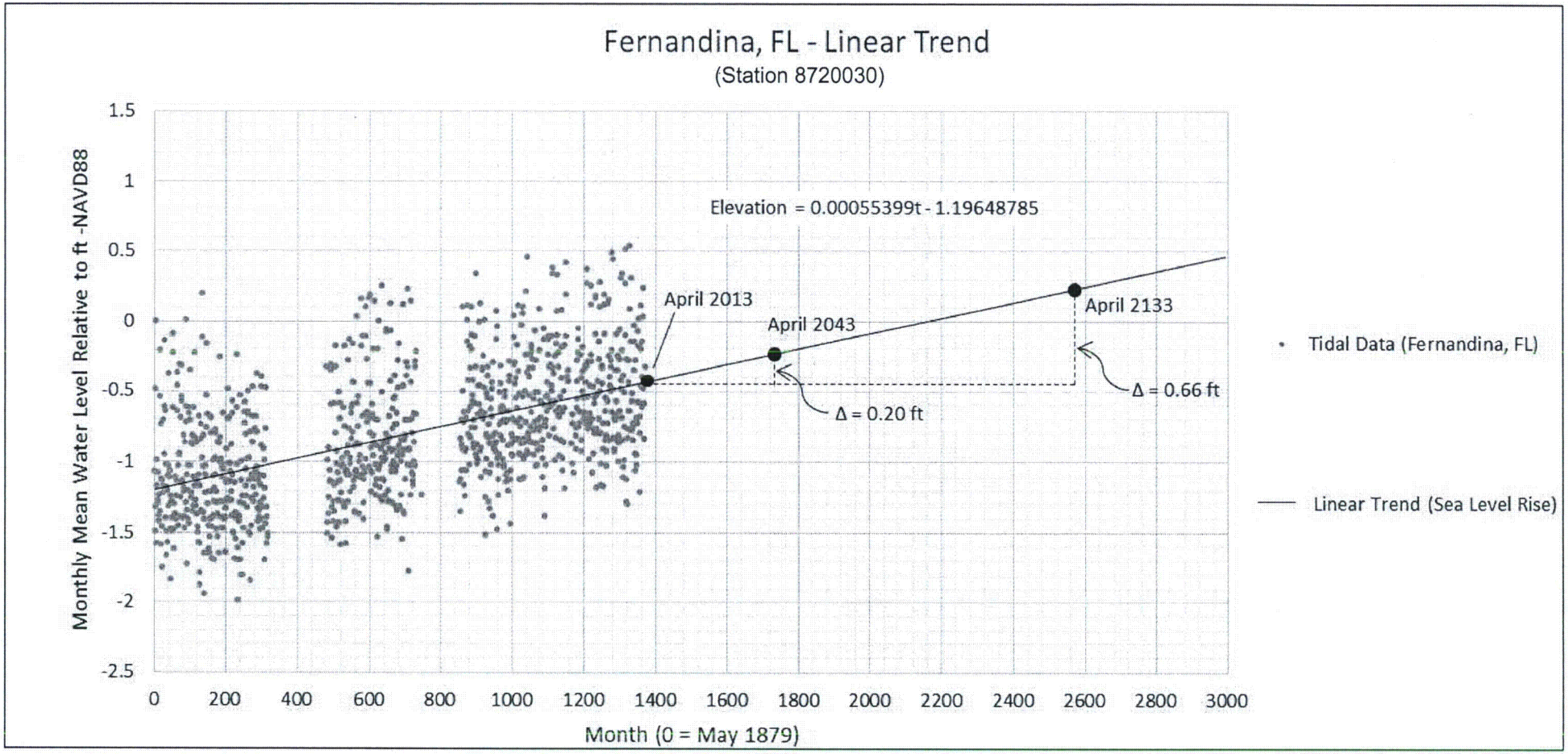
Figure 4-10
Cumulative Density Function

Reference: NOAA, 2013i



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Flooding Hazards Reevaluation Report

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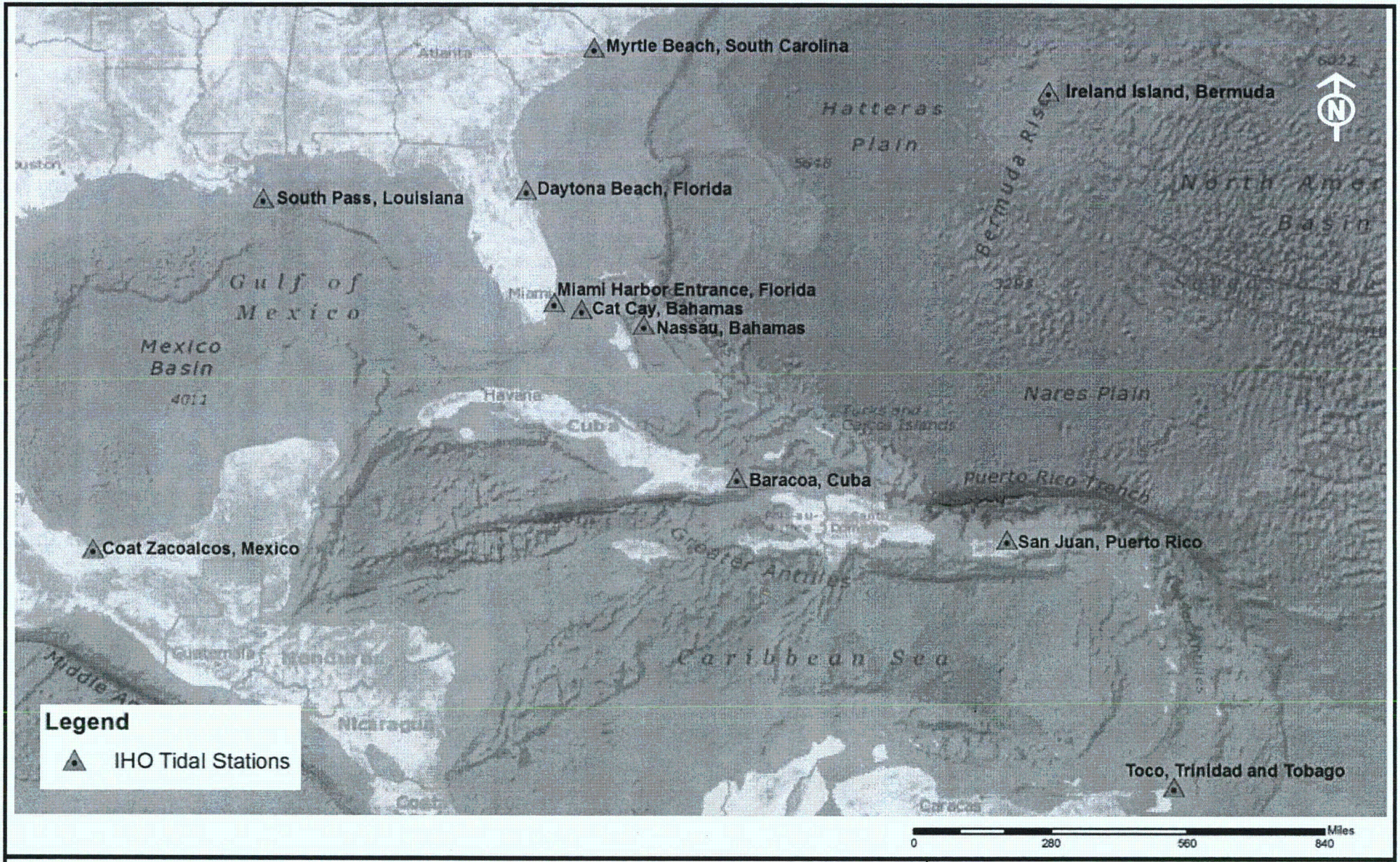
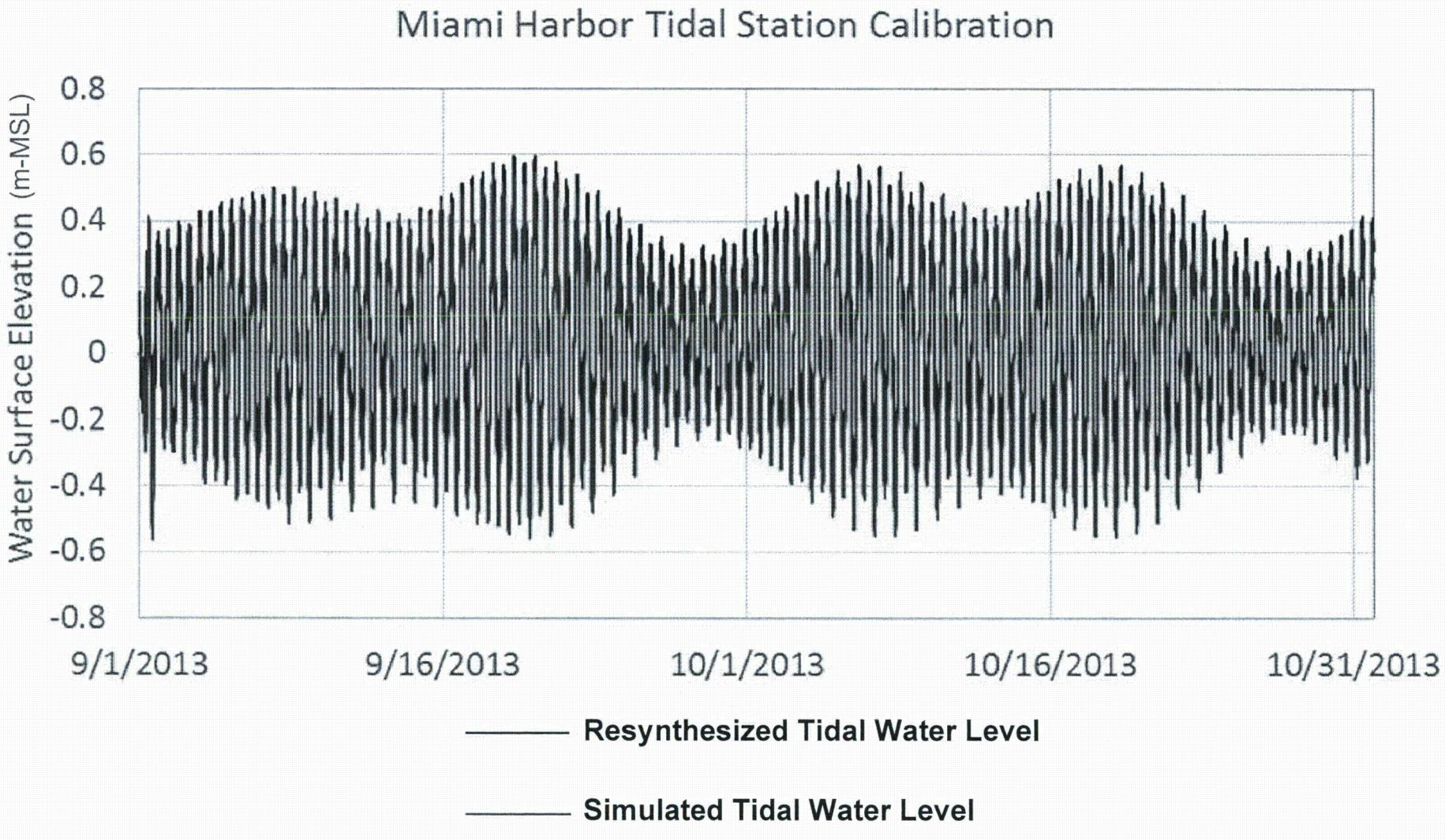
Figure 4-11
Sea Level Rise

Reference: NOAA, 2013k

FPL-072-PR-002 REV. 0



NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-12** IHO Tidal Stations Used for Tidal Calibration
References: Deltares, 2012; ESRI, 2014d	FPL-072-PR-002 REV. 0



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Flooding Hazards Reevaluation Report

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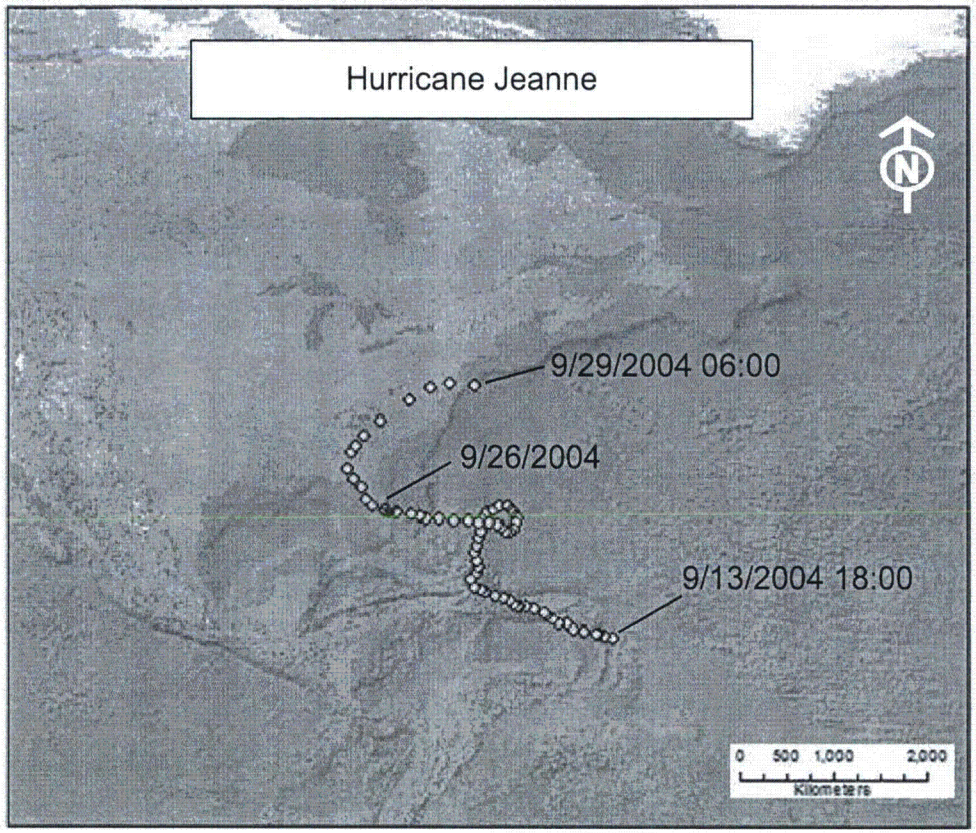
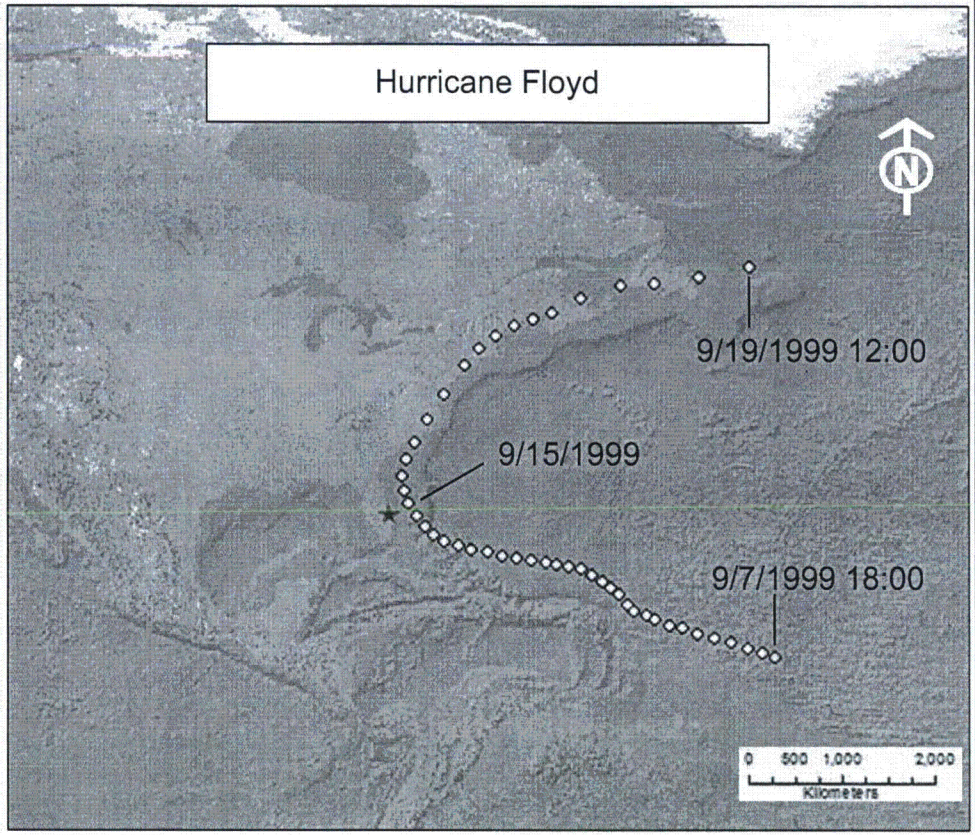
Figure 4-13

Tidal Times Series Comparison of Simulated versus Resynthesized Water Levels at Miami Harbor Entrance

Reference: Deltares, 2012

FPL-072-PR-002 REV. 0



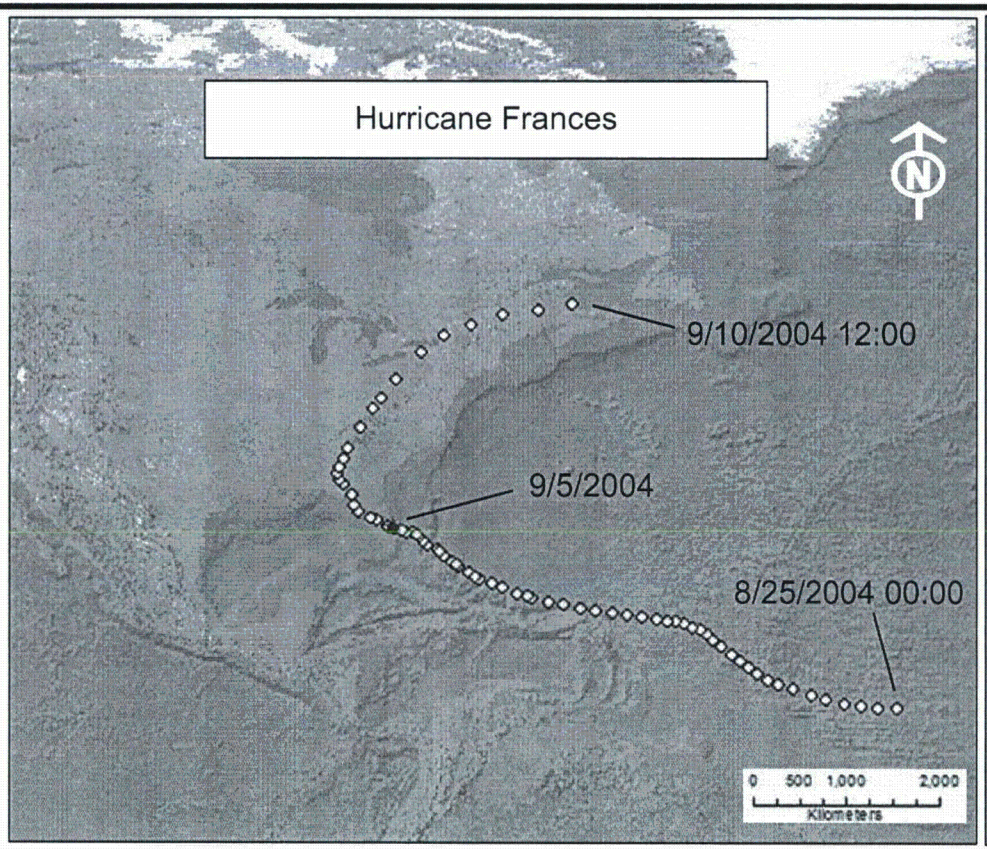


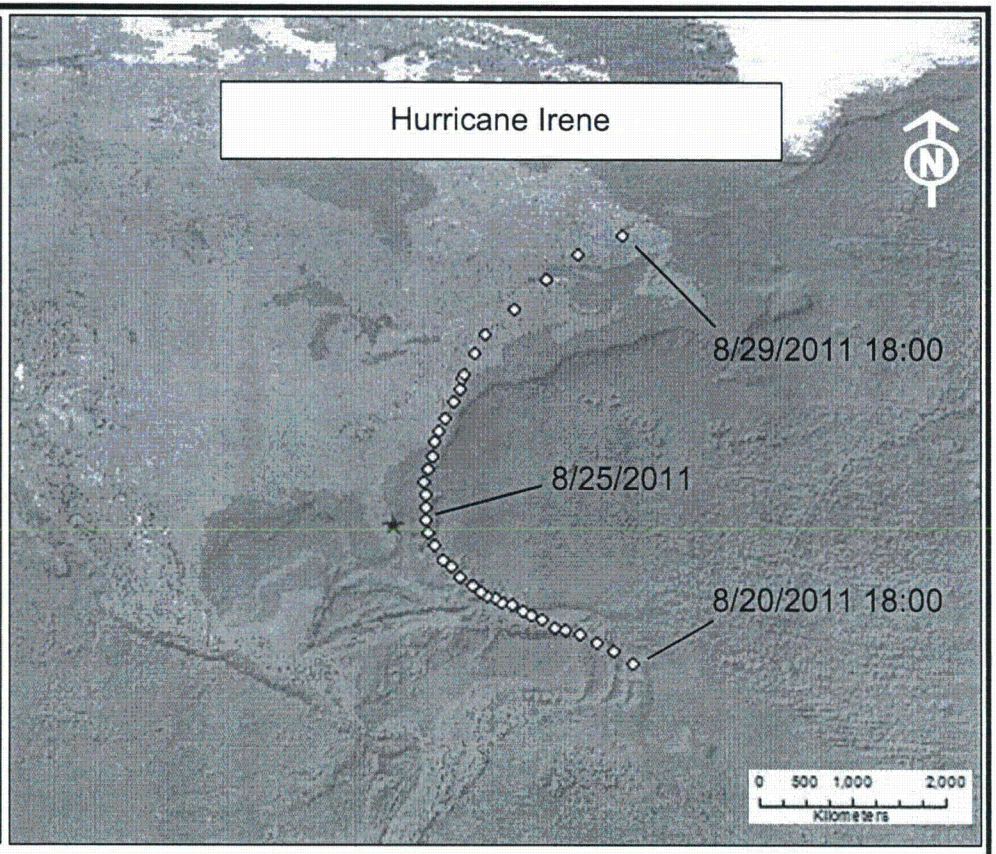
★ PSL

◇ Hurricane Track

Note: Each point represents a six-hour time interval

NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-14** Hurricane Jeanne and Hurricane Floyd Strom Tracks
References: ESRI, 2014d; NOAA, 1999; NOAA, 2004b	FPL-072-PR-002 REV. 0



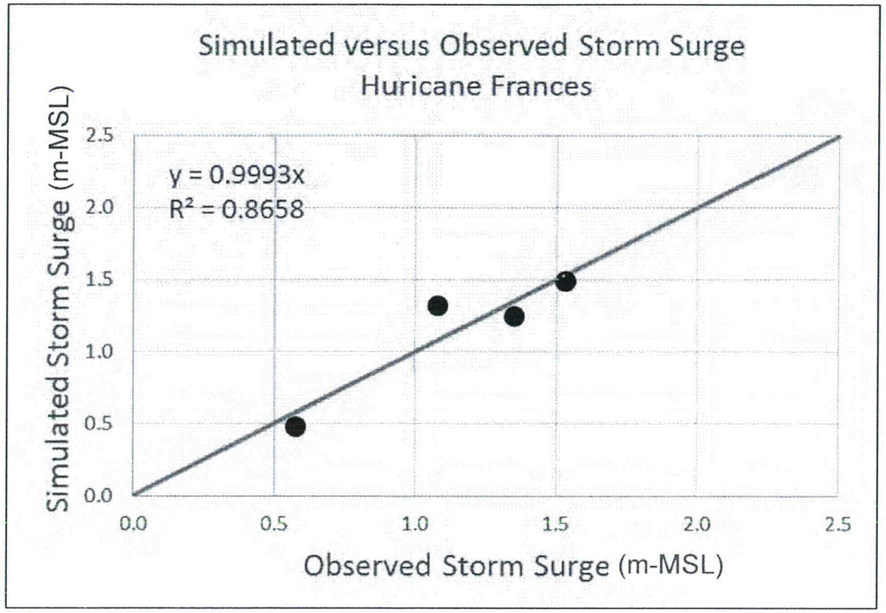


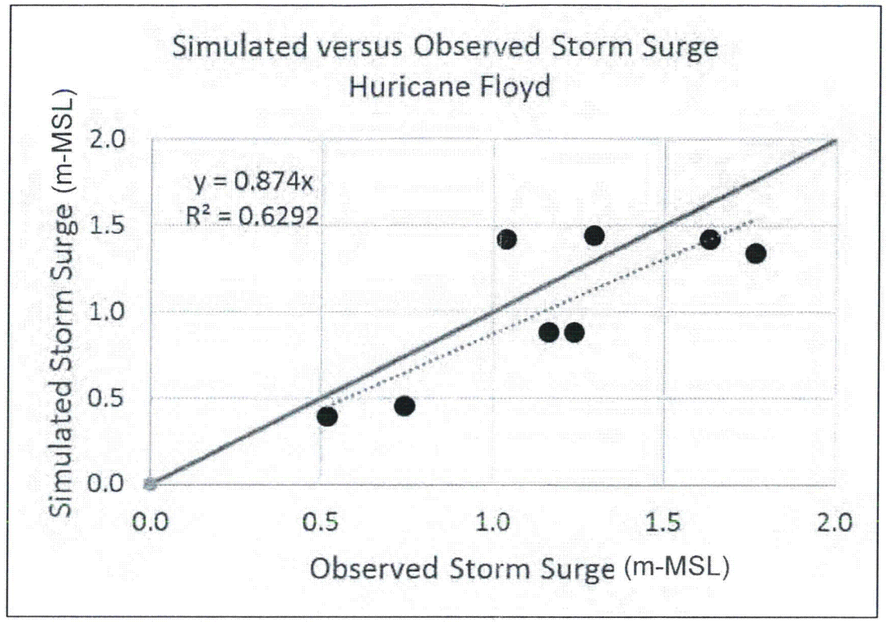
★ PSL

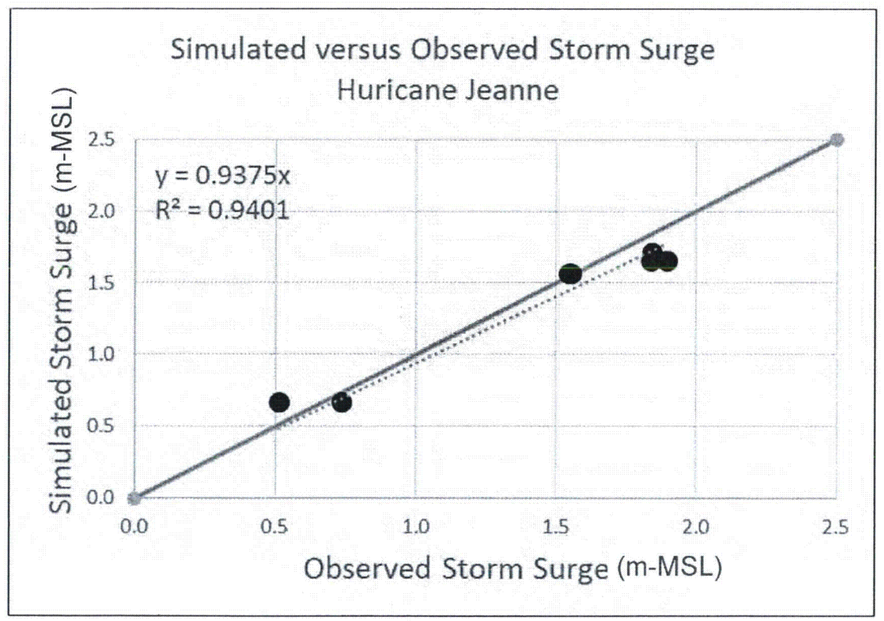
◇ Hurricane Track

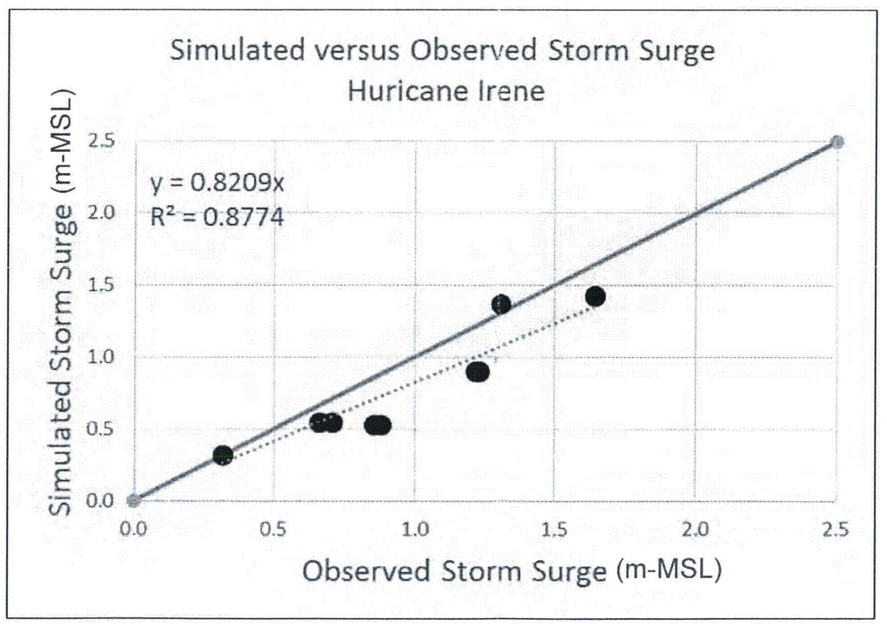
Note: Each point represents a six-hour time interval

NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-15** Hurricane Frances and Hurricane Irene Strom Tracks
References: ESRI, 2014d; NOAA, 2004a; NOAA, 2011a	FPL-072-PR-002 REV. 0









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St. Lucie Nuclear Power Plant Units 1 & 2
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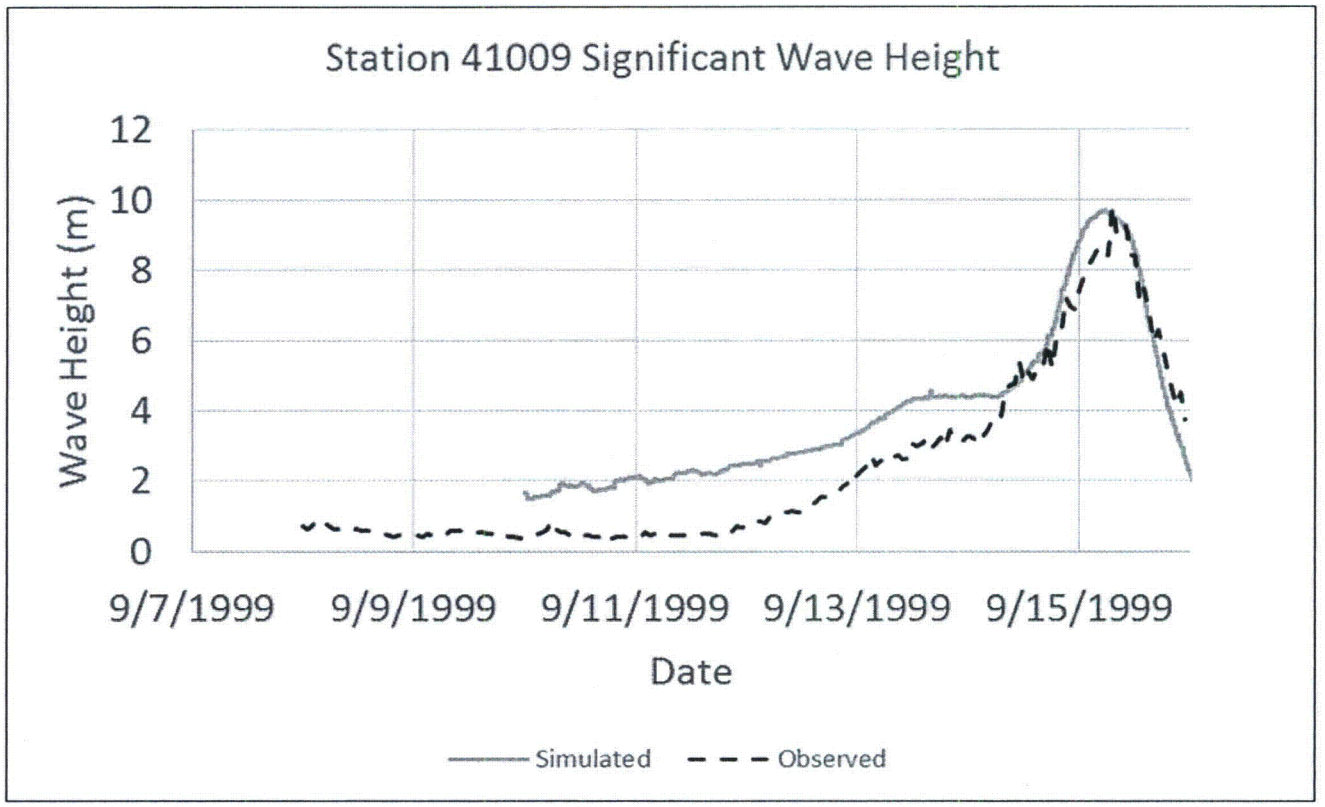
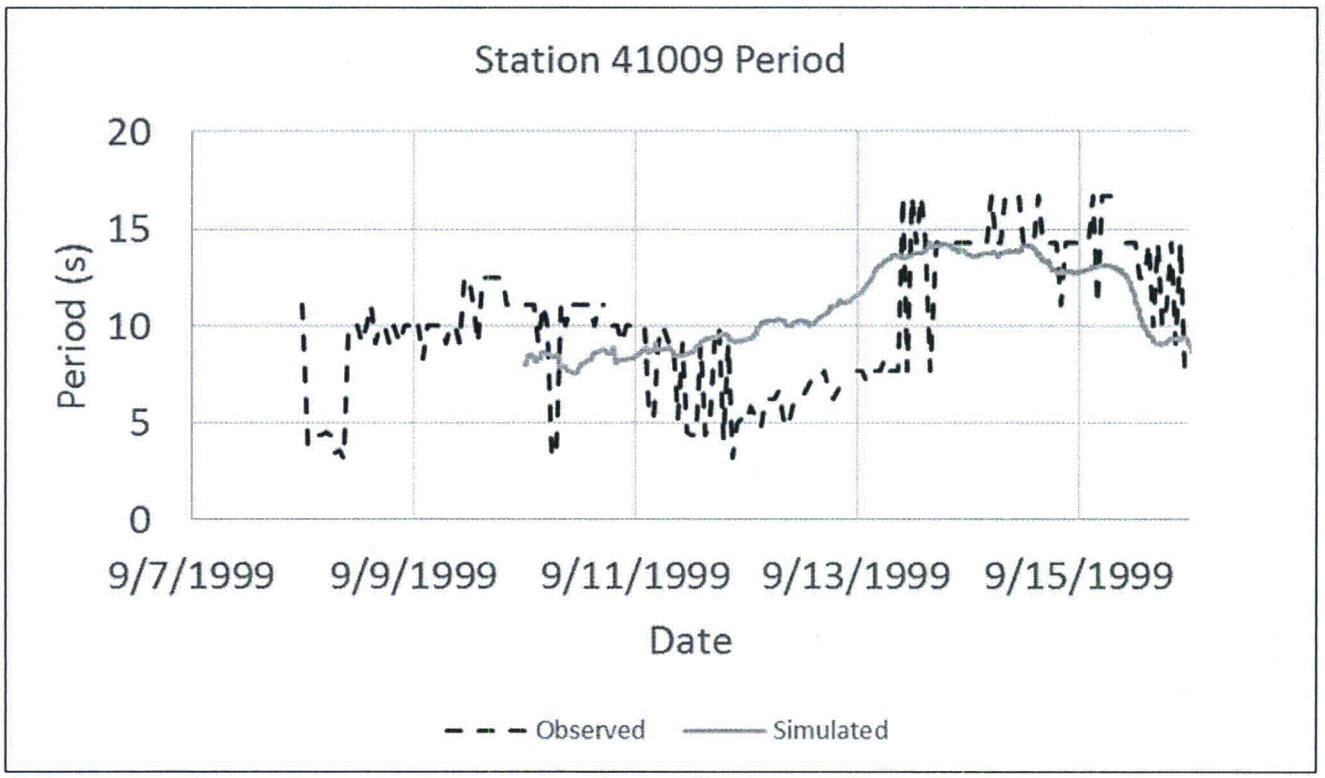
References: NOAA, 2000; NOAA, 2004d; NOAA, 2011b; NOAA, 2013m; NOAA, 2013n, NOAA, 2013o; NOAA, 2013p; NOAA, 2013r; NOAA, 2013x; NOAA, 2013y; NOAA, 2013z; NOAA, 2013aa; NOAA, 2013ab; NOAA, 2013ac; NOAA, 2013ad

ENERCON

Figure 4-16

Scatter Plot of Simulated Versus Observed Maximum WSEL for Hurricane Irene, Hurricane Jeanne, Hurricane Floyd and Hurricane Frances





NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-17** Time Series of Simulated versus Observed Significant Wave Height and Wave Period for Hurricane Floyd at Buoy 41009
Reference: NOAA, 2014a	FPL-072-PR-002 REV. 0

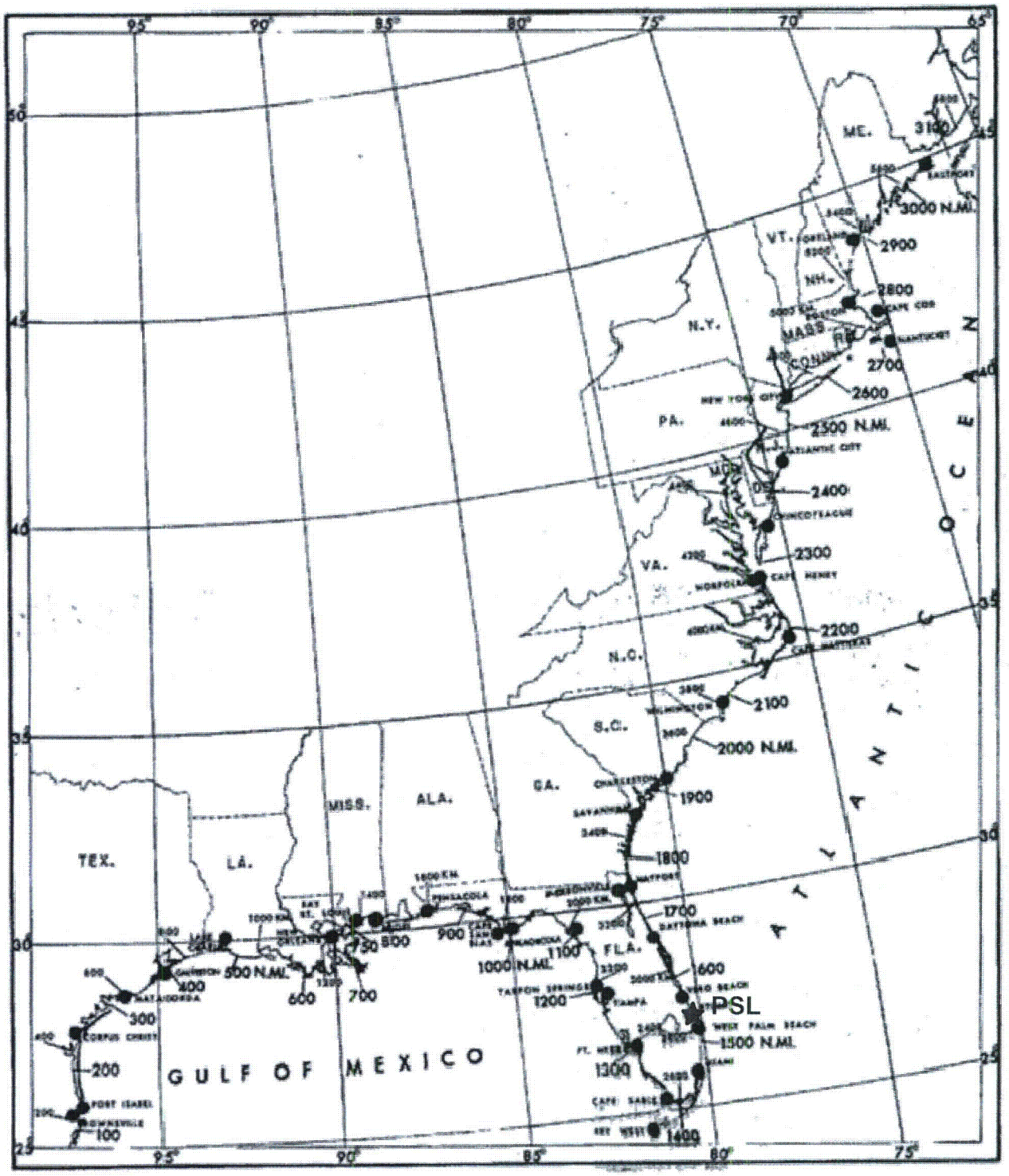


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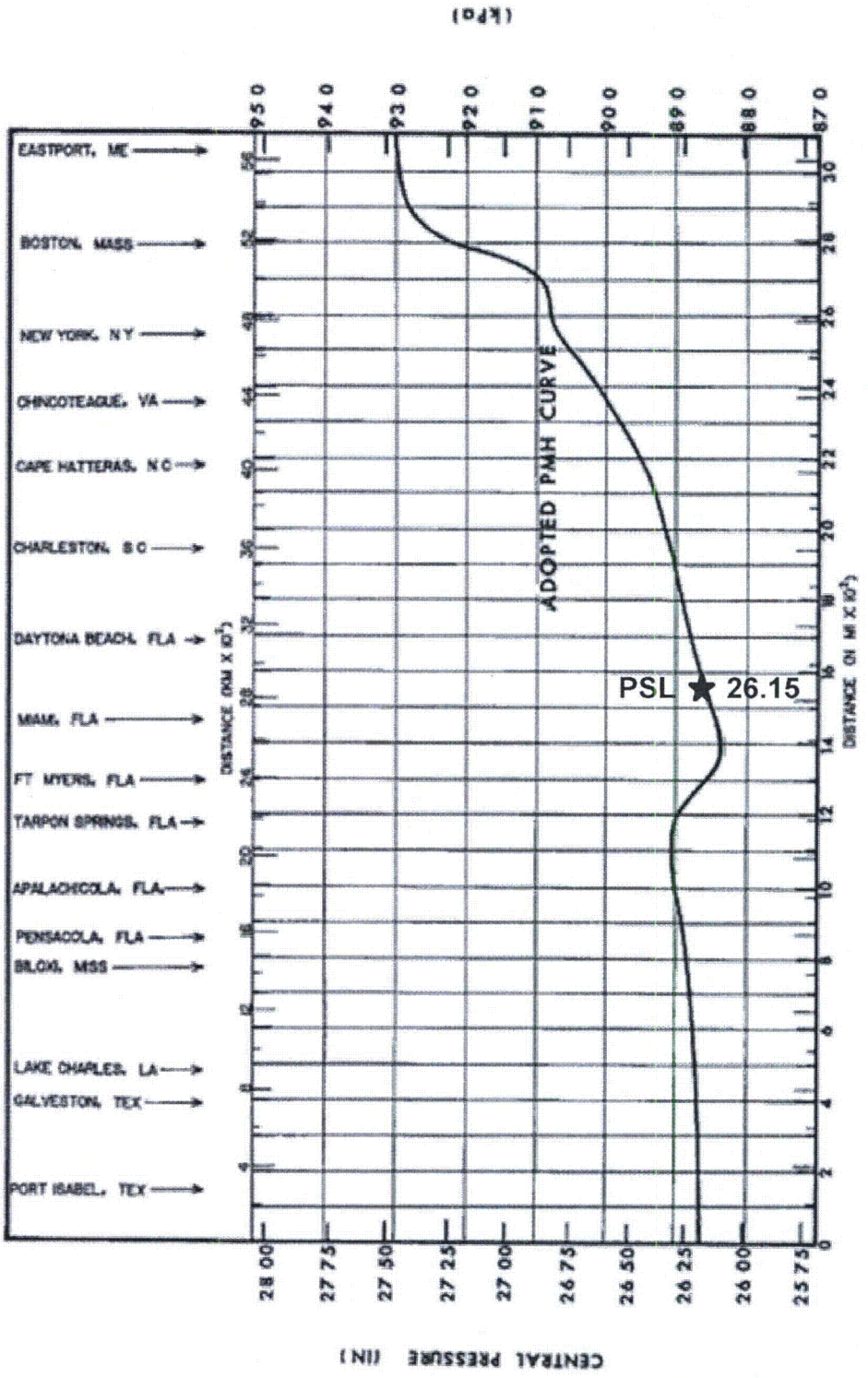
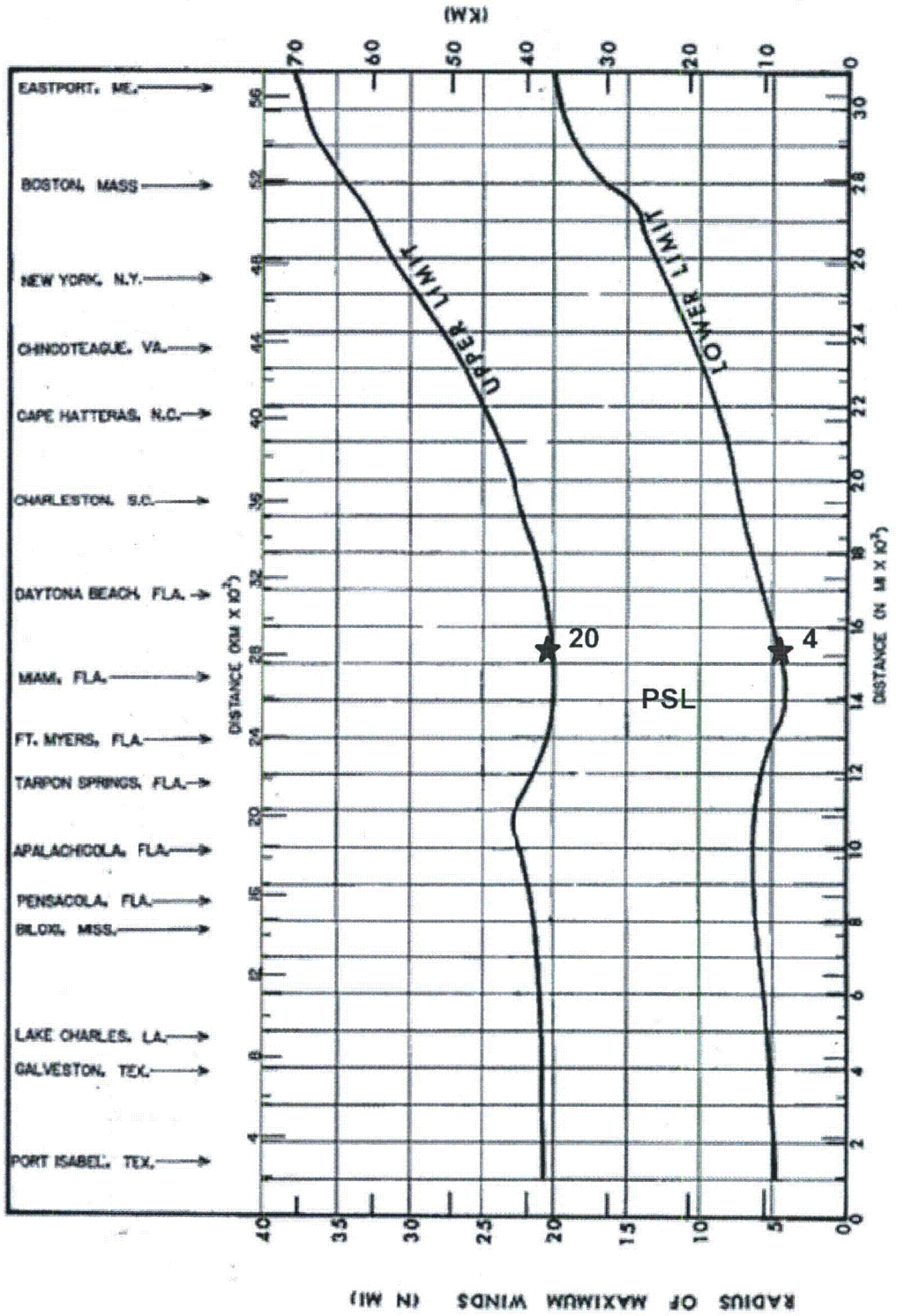
Figure 4-18
Locator Map with Coastal Distance Intervals Marked in Nautical Miles and Kilometers

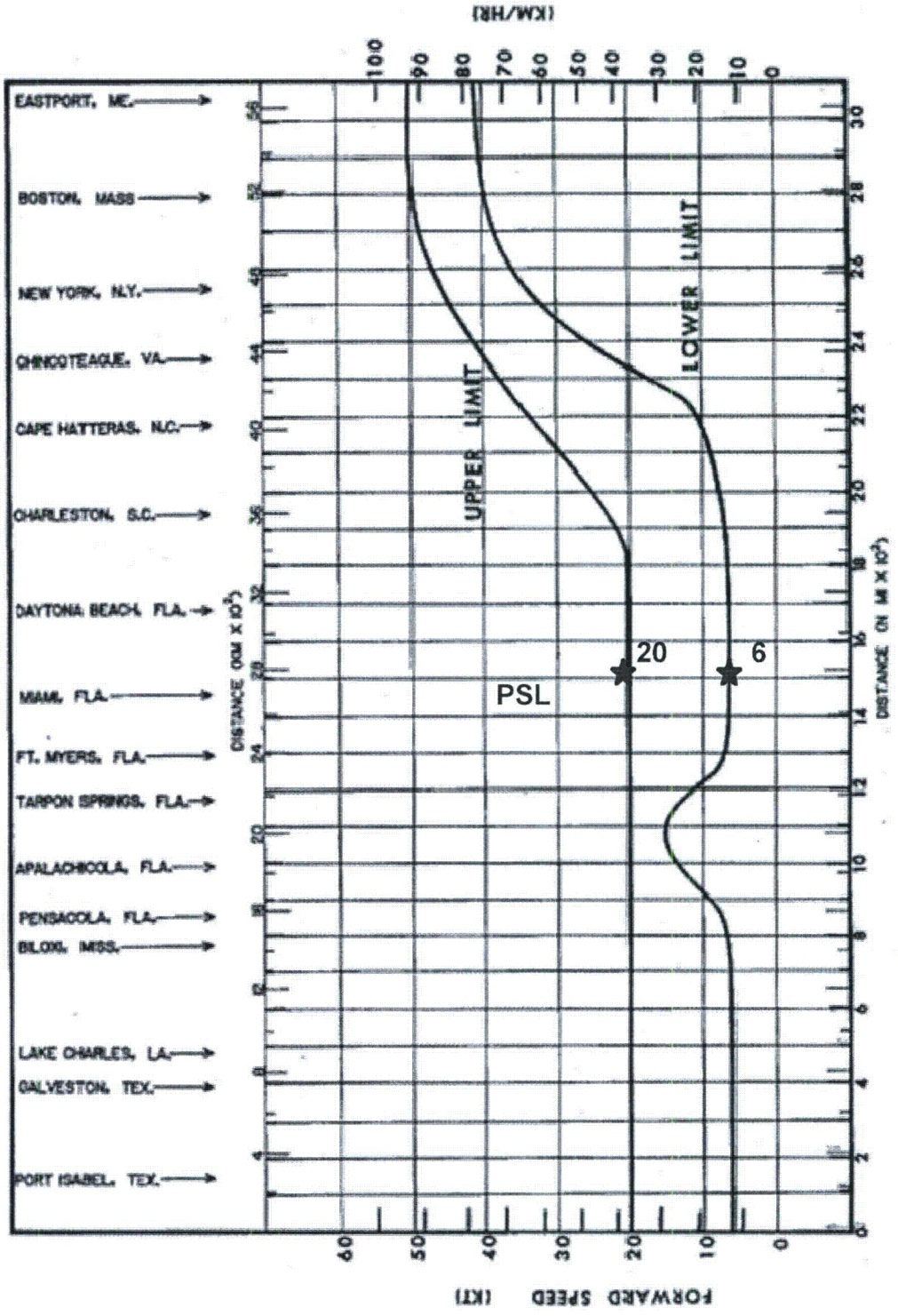
Reference: NWS, 1979



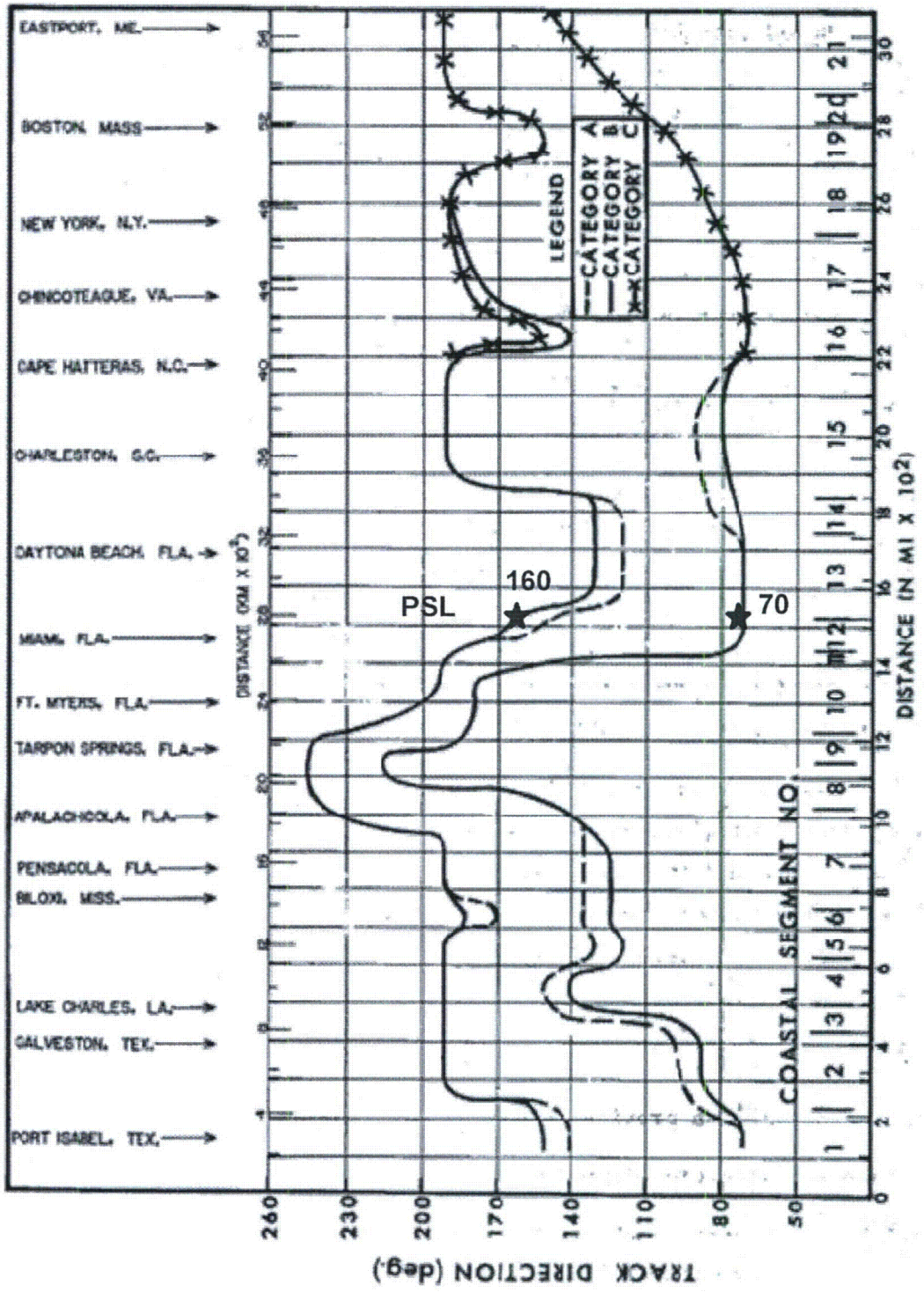
NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-19** Adopted Central Pressure of the Probable Maximum Hurricane
Reference: NWS, 1979	FPL-072-PR-002 REV. 0



NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-20** Adopted Upper and Lower Limits of Radius of Maximum Winds for the PMH
Reference: NWS, 1979	FPL-072-PR-002 REV. 0

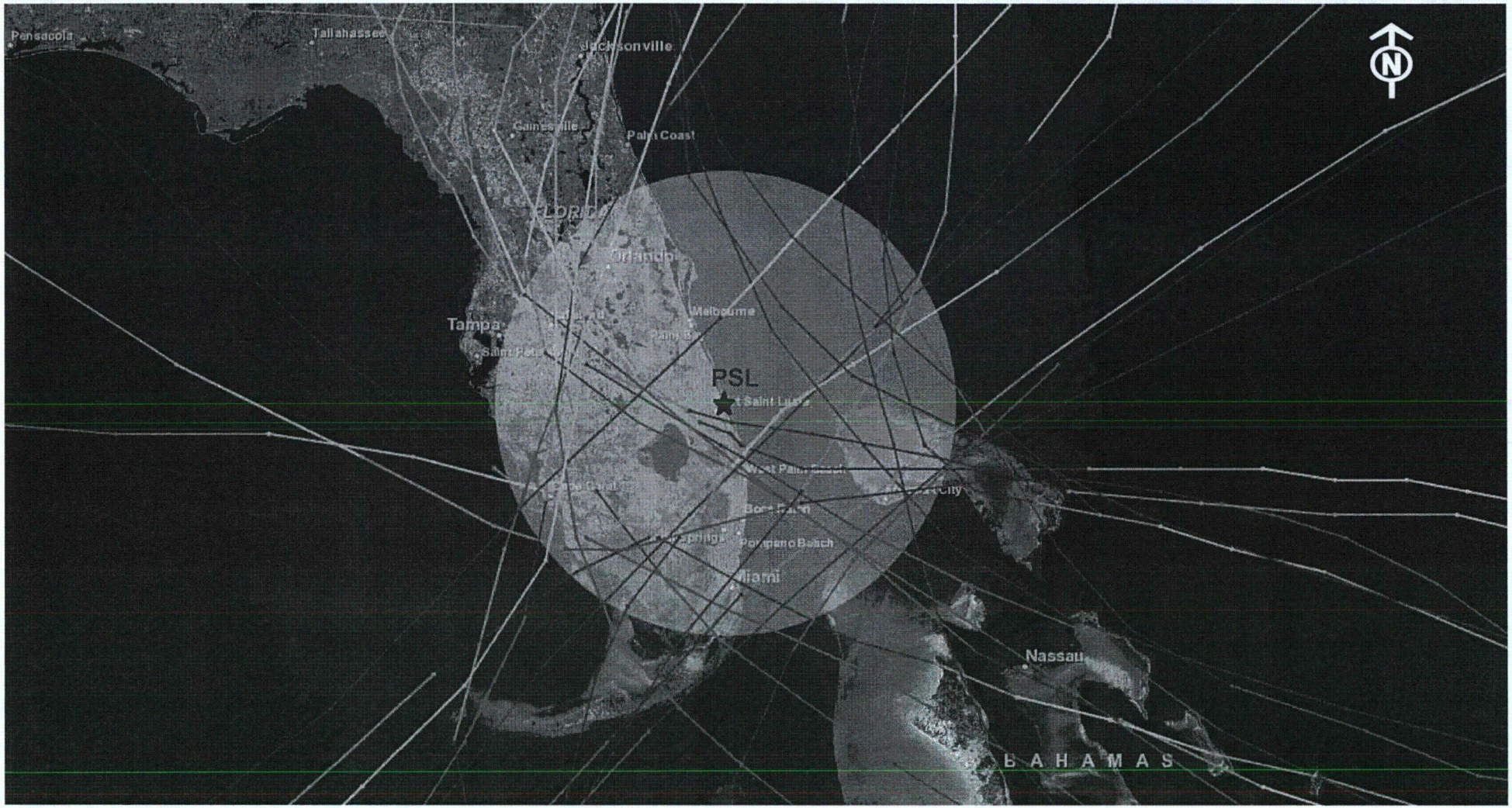


NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-21** Adopted PMH Upper and Lower Limits of Forward Speed
Reference: NWS, 1979	FPL-072-PR-002 REV. 0



Note: The track direction is in accordance with the nautical convention

NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-22** Maximum Allowable Range of the PMH Track Direction
Reference: NWS, 1979	FPL-072-PR-002 REV. 0



H5	Category 5 Hurricane	H3	Category 3 Hurricane	H1	Category 1 Hurricane	TD/SD	Tropical Depression
H4	Category 4 Hurricane	H2	Category 2 Hurricane	TS/SS	Tropical Storm		

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Flooding Hazards Reevaluation Report

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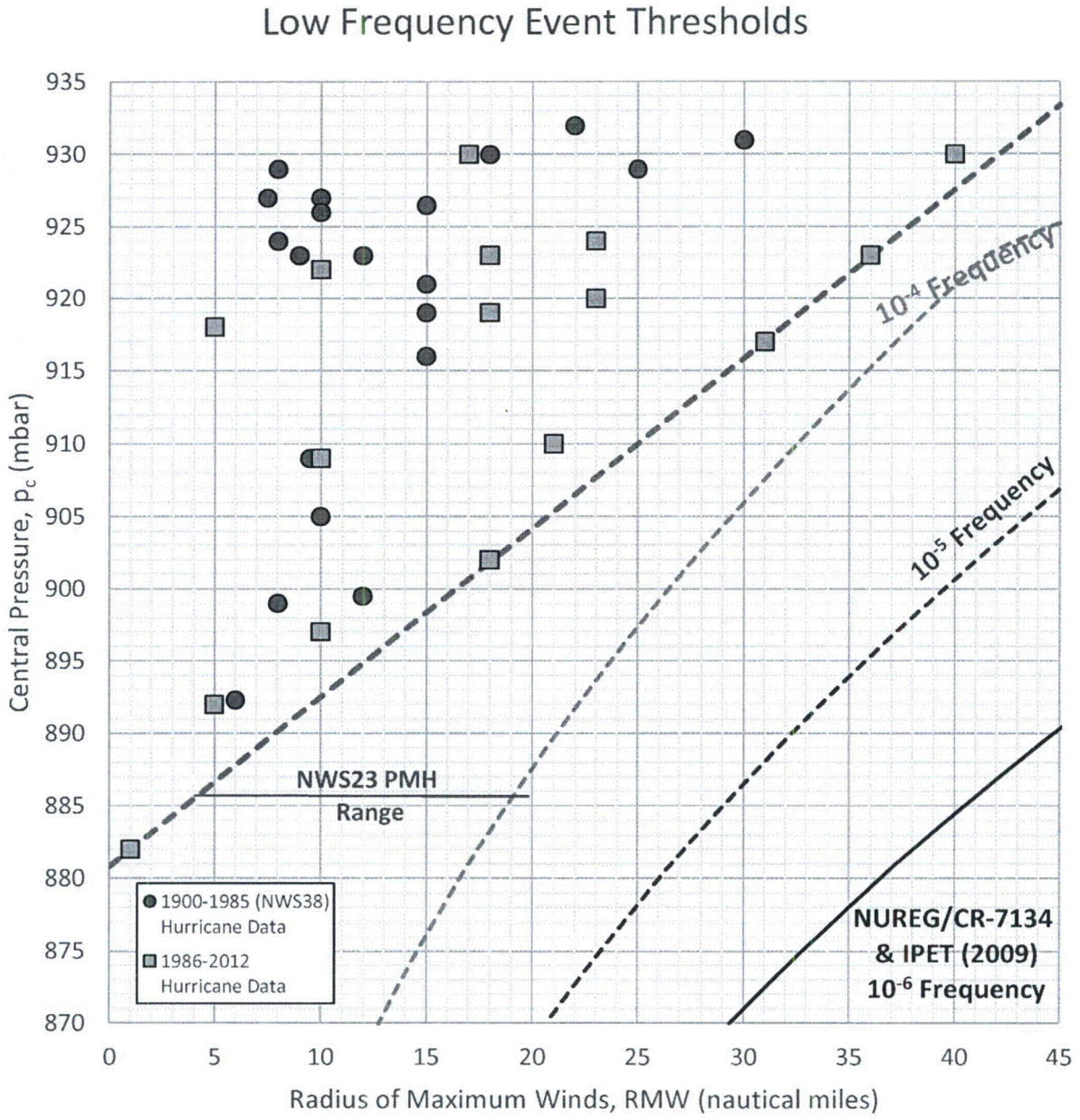
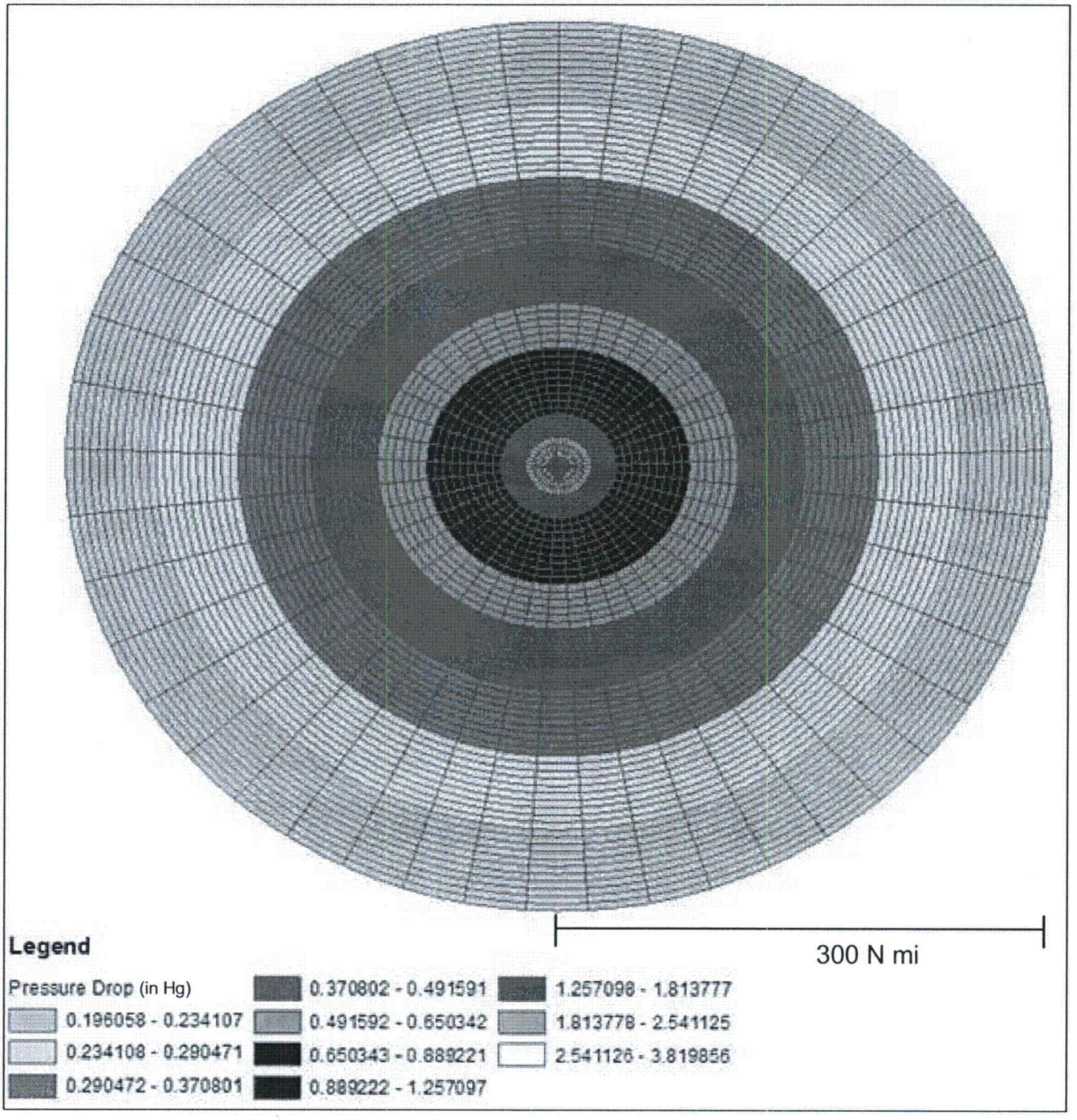
Figure 4-23
Recorded Major (H3 and Above) Hurricanes within 120 Nautical Miles of PSL since 1842

Reference: NOAA, 2013l



Note: The PMH RMW range from NWS (1979) is shown for reference, along with historical hurricane data.

NextEra Energy (NEE) St. Lucie Nuclear Power Plant Units 1 & 2 Flooding Hazards Reevaluation Report	ENERCON
References: NWS, 1979; NWS, 1987; IPET, 2009; NOAA, 2012; Willoughby et al., 1989; Rappaport, 2005; Mayfield, 1995; Guiney and Lawrence, 2000; Pasch, 2006b; Beven and Cobb, 2004; Stewart, 2005; Knabb, 2006a; Knabb, 2006b; Pash, 2006a; Franklin, 2008	**Figure 4-24** Low Probability Central Pressure-RMW Thresholds for Hurricanes Near St. Lucie Nuclear Power Plant (PSL)
	FPL-072-PR-002 REV. 0



NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-25** NWS23 PMH Pressure Drop Field (in Hg) Output Illustration
Reference: NWS, 1979	FPL-072-PR-002 REV. 0

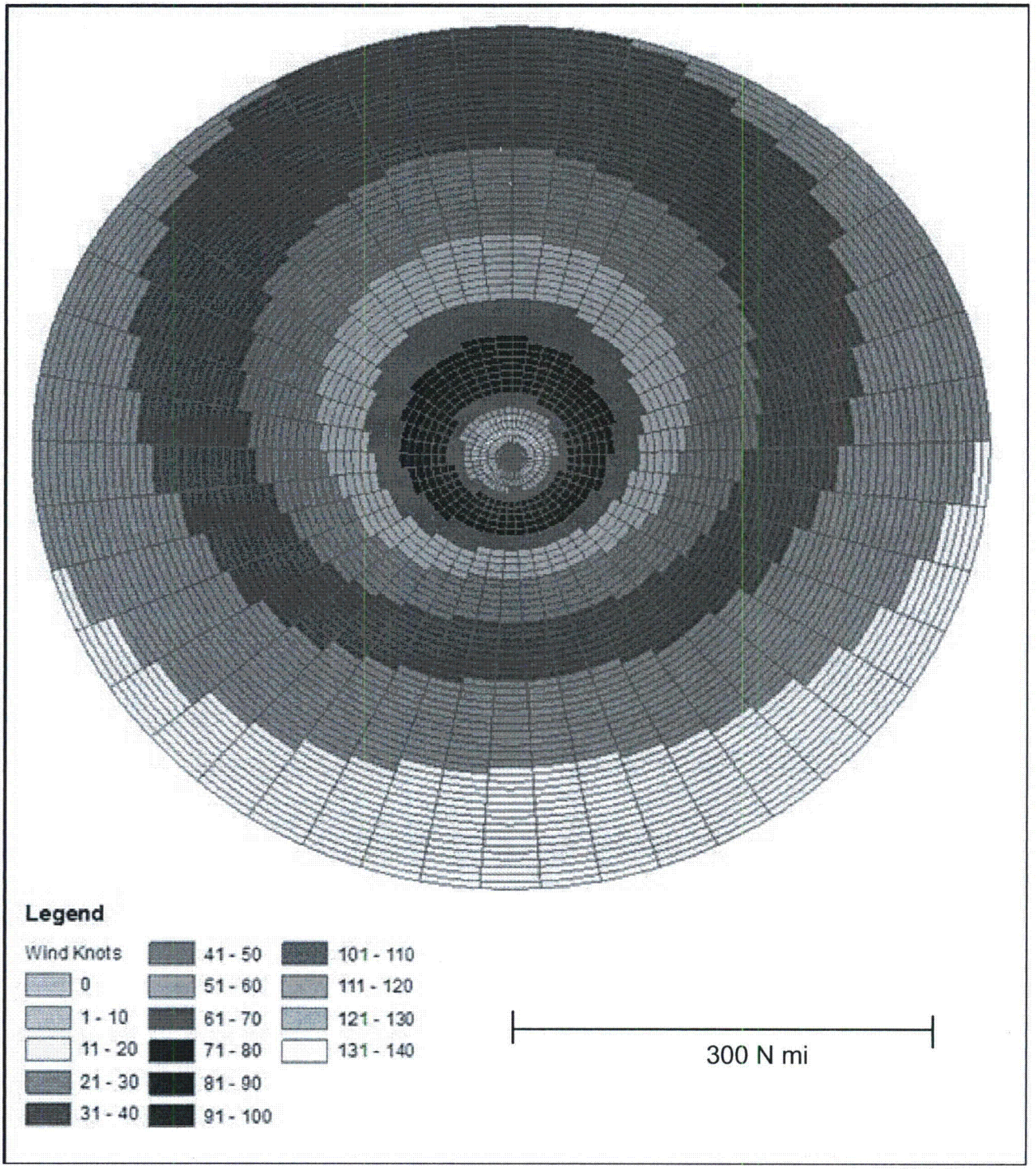


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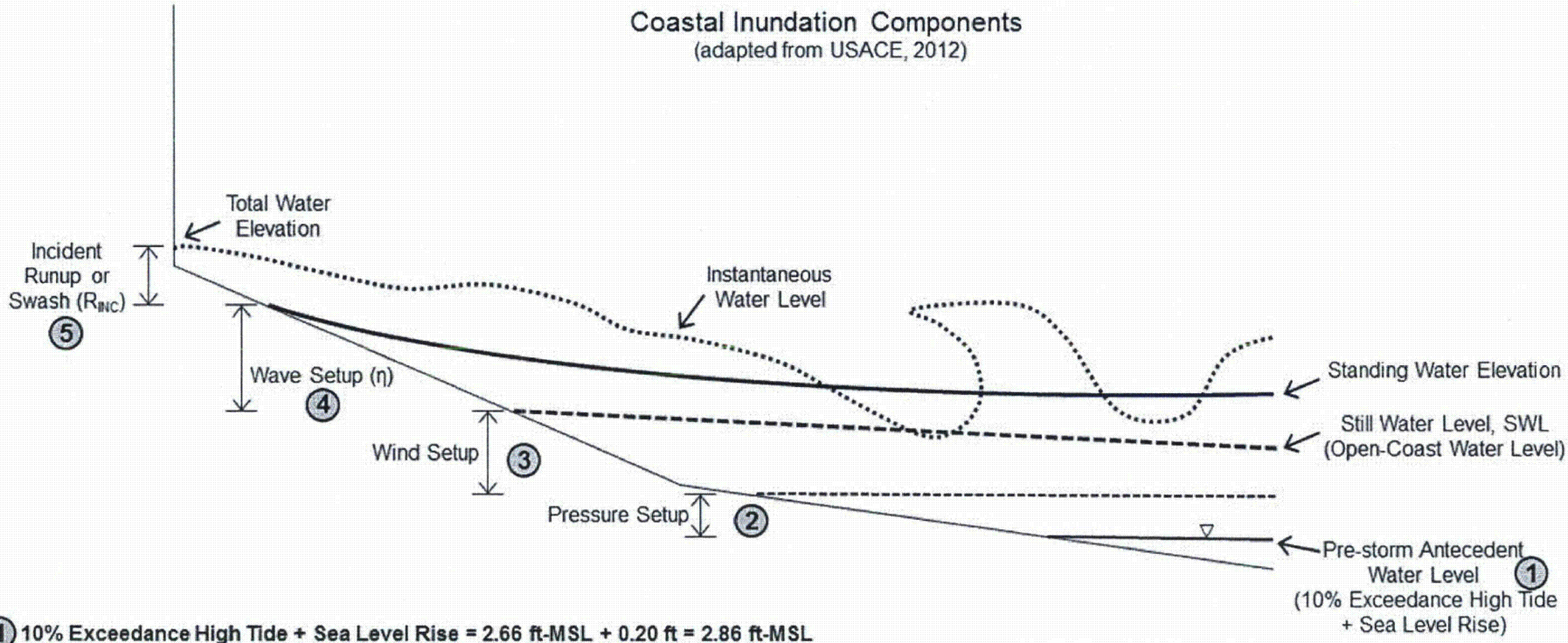
Figure 4-26
NWS23 PMH Wind Field (knots) Output Illustration

Reference: NWS, 1979



Note: Drawing not to scale

1. 10% Exceedance High Tide + Sea Level Rise = 2.66 ft-MSL + 0.20 ft = 2.86 ft-MSL
2. Calculated by Numerical Modeling (DELFT3D)
3. Calculated by Numerical Modeling (DELFT3D)

   = 12.36 ft
4. Calculated by Numerical Modeling (DELFT3D) = 0.66 ft
5. Hand-Calculated by Empirical Relationships = 0 ft at Power Block (Overtopping = 7.6 x 10-6 $ft^3/s/foot$)

Probable Maximum Storm Surge at PSL Powerblock With Wave Runup $= \left\{ \begin{matrix} +15.86\ ft - MSL \\ +18.3\ ft - PSL\ Datum \\ +14.9\ ft - NAVD88 \end{matrix} \right\}$

NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-27** Storm Surge Components
Reference: USACE, 2012	FPL-072-PR-002 REV. 0

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St. Lucie Nuclear Power Plant Units 1 & 2
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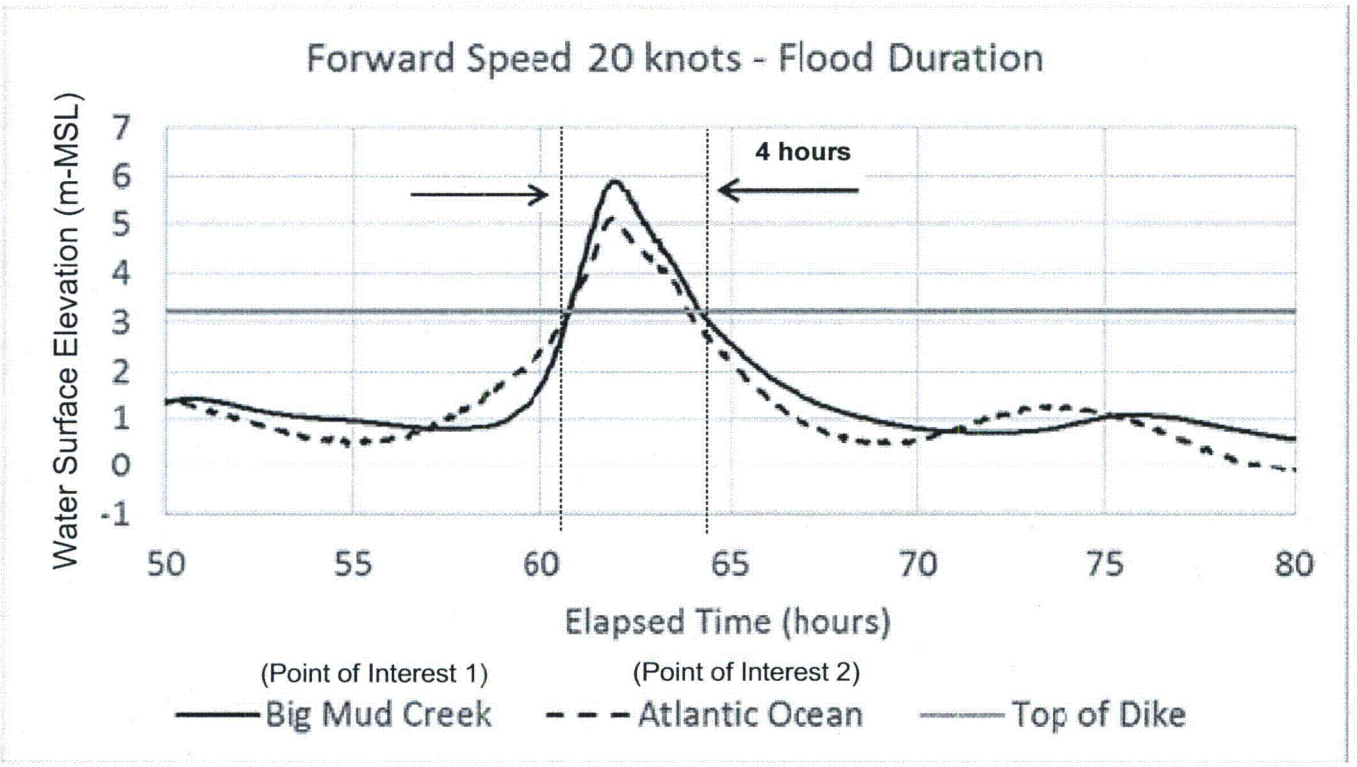
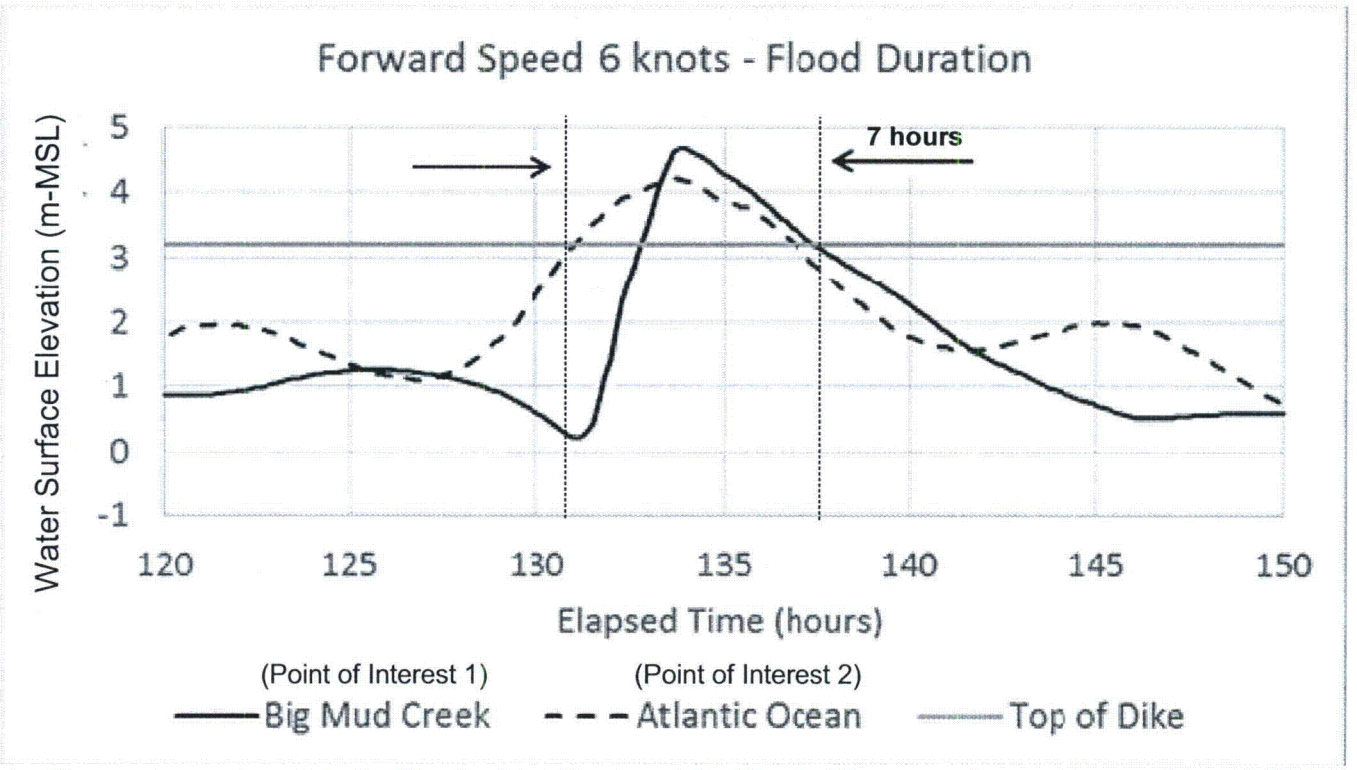
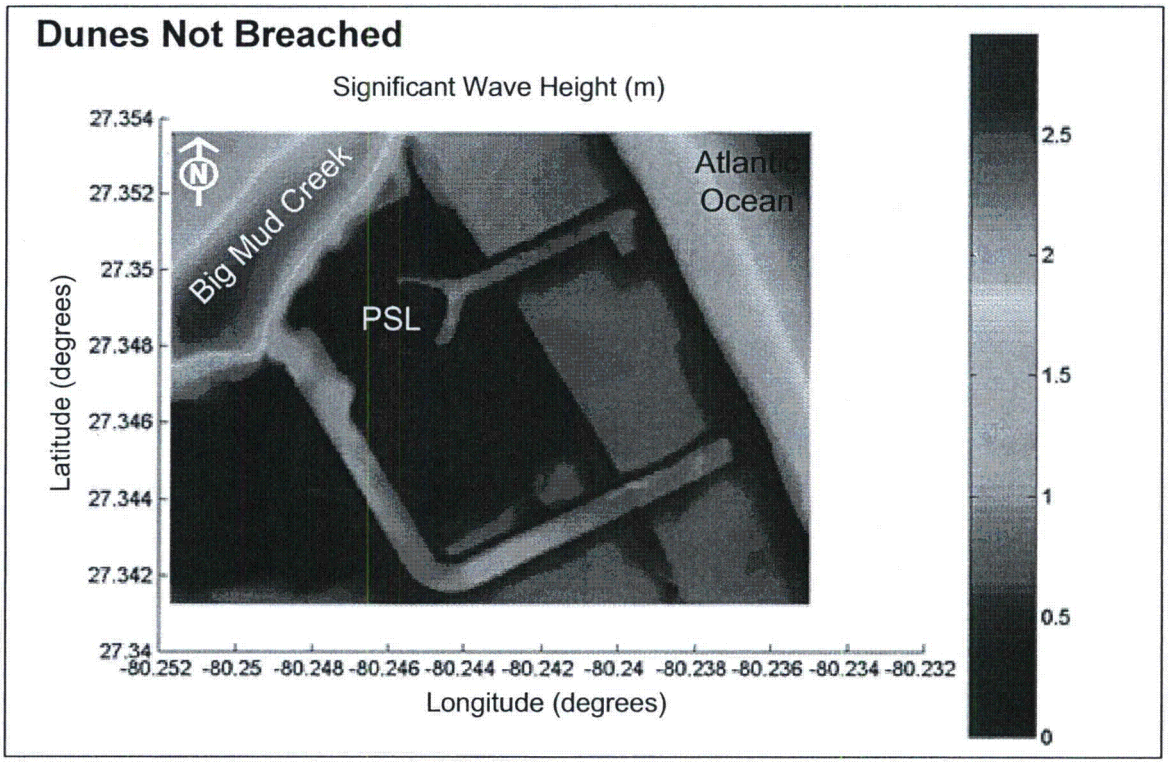
Figure 4-28
PMSS Inundation (Excluding Runup) at EL 14.9 ft-NAVD88

References: NEE, 2014d; Southern Resource Mapping, 2013; NEE, 2014b





Note: The points used to obtain the The Big Mud Creek and the Atlantic Ocean results are shown in Figure 4-31



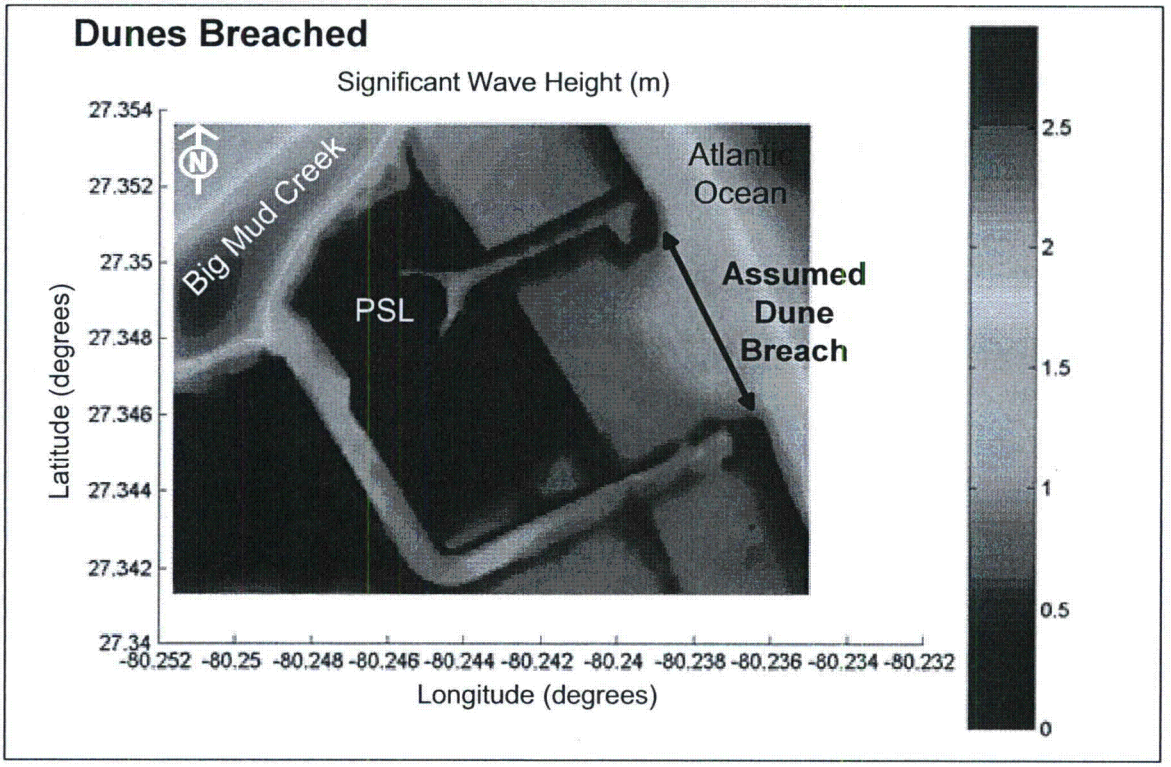


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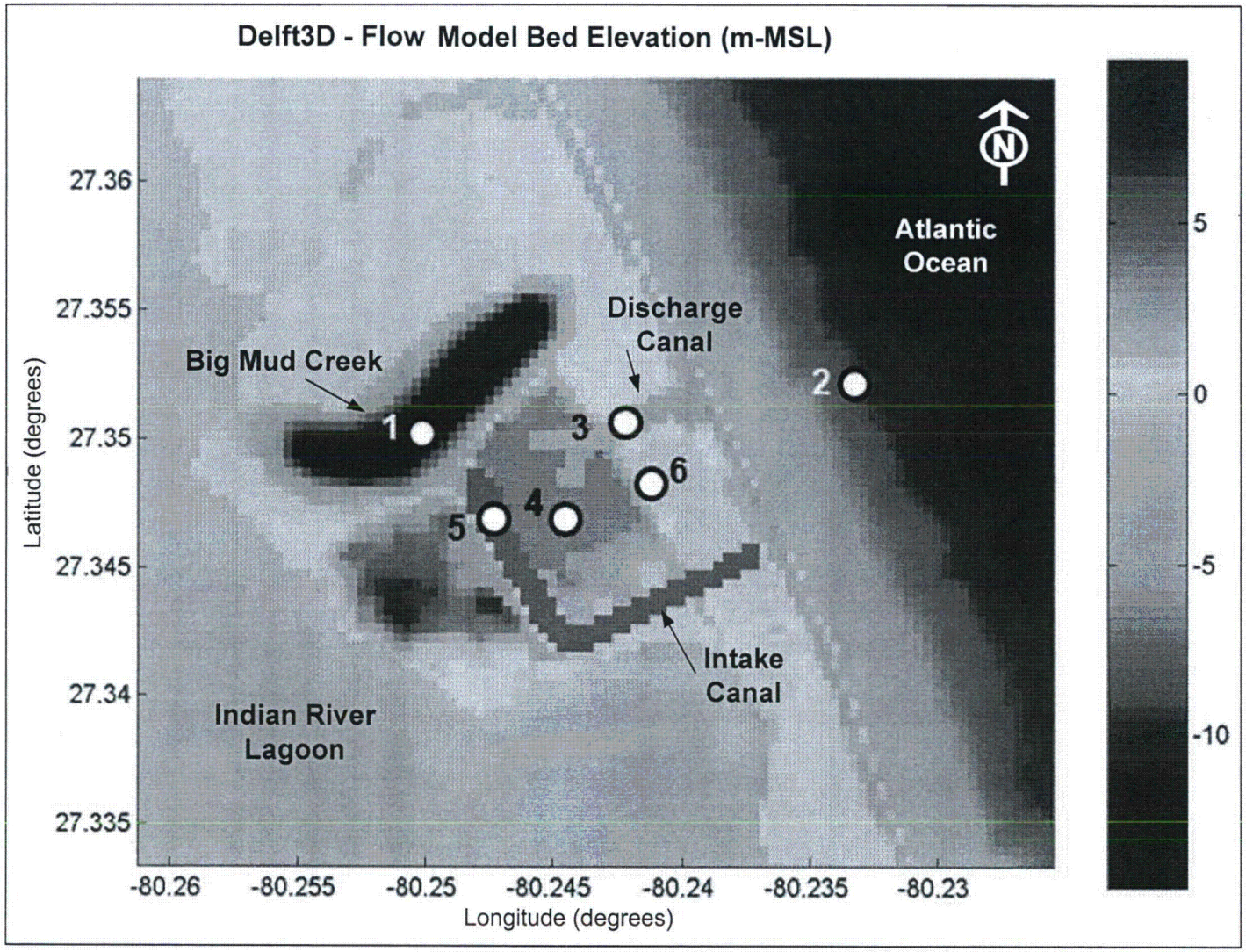
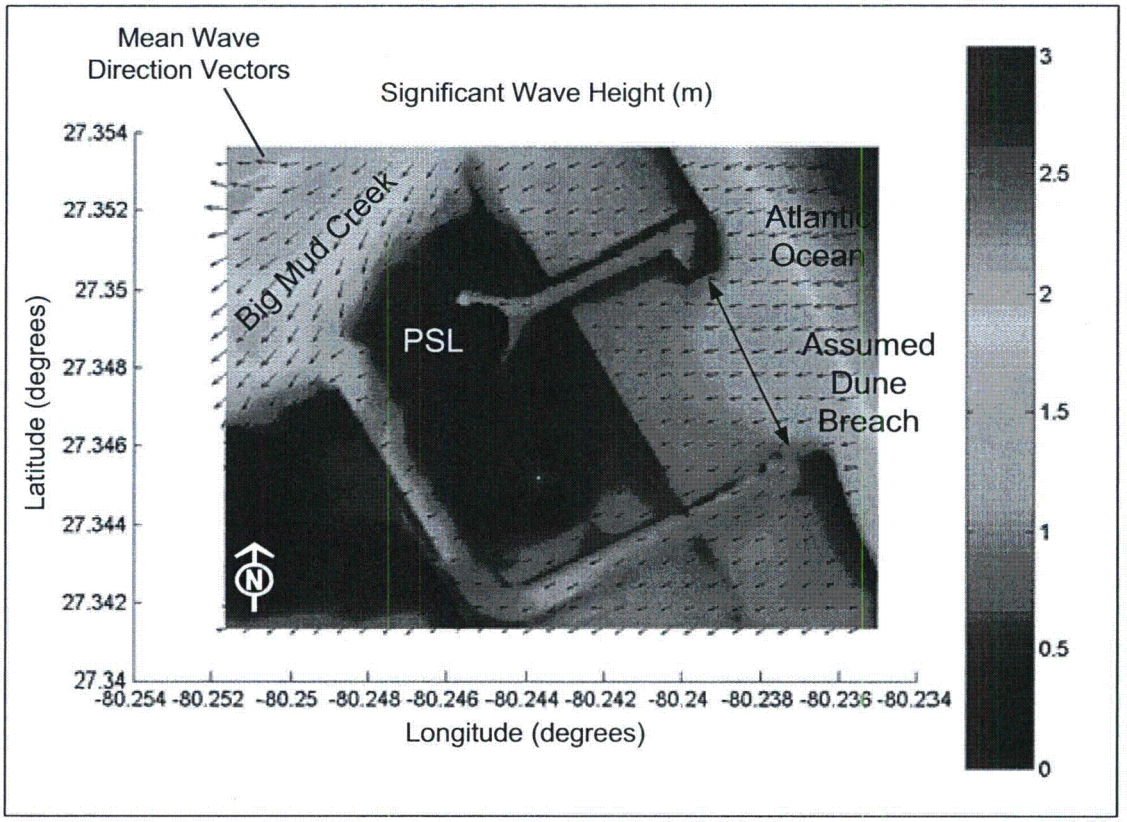
Figure 4-30
Significant Wave Height (m) at Time of Maximum Surge – Breached & Non Breached Sand Dunes



Point of Interest	Location
1	Big Mud Creek
2	Atlantic Ocean
3	Discharge Canal
4	Obs. Point 4
5	Intake Canal
6	Obs. Point 6



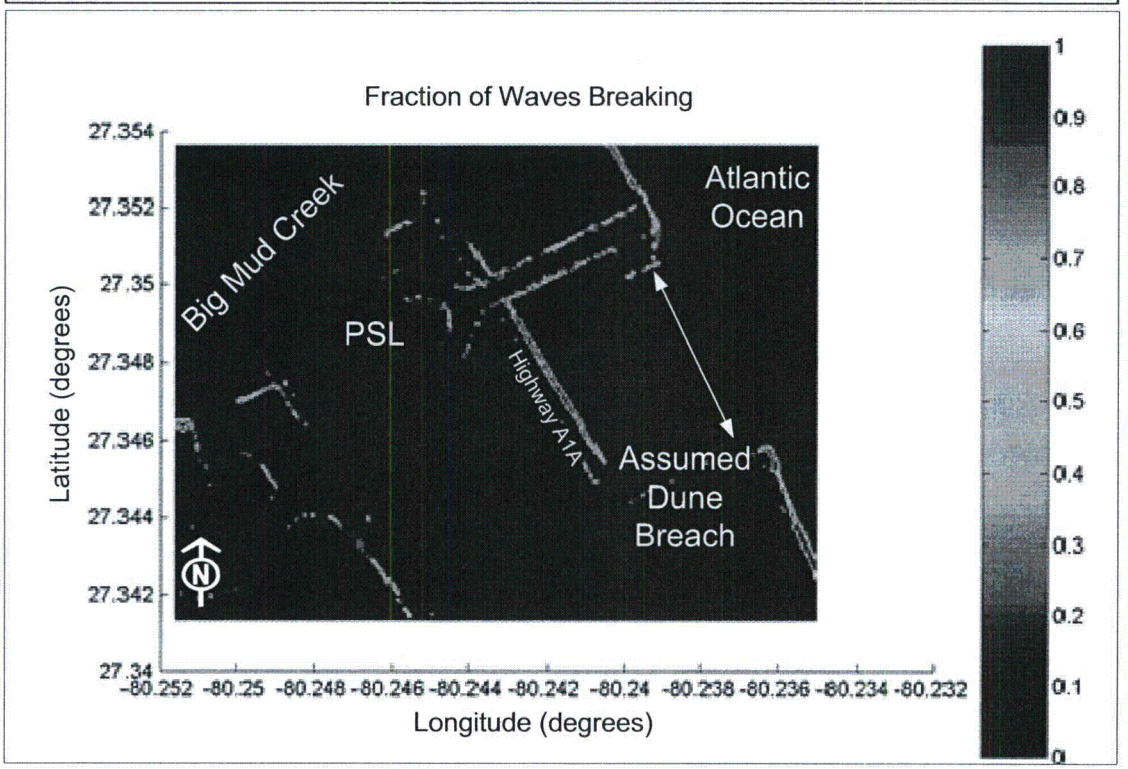


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Figure 4-32
PMSS Wave Results at Time of Maximum Surge

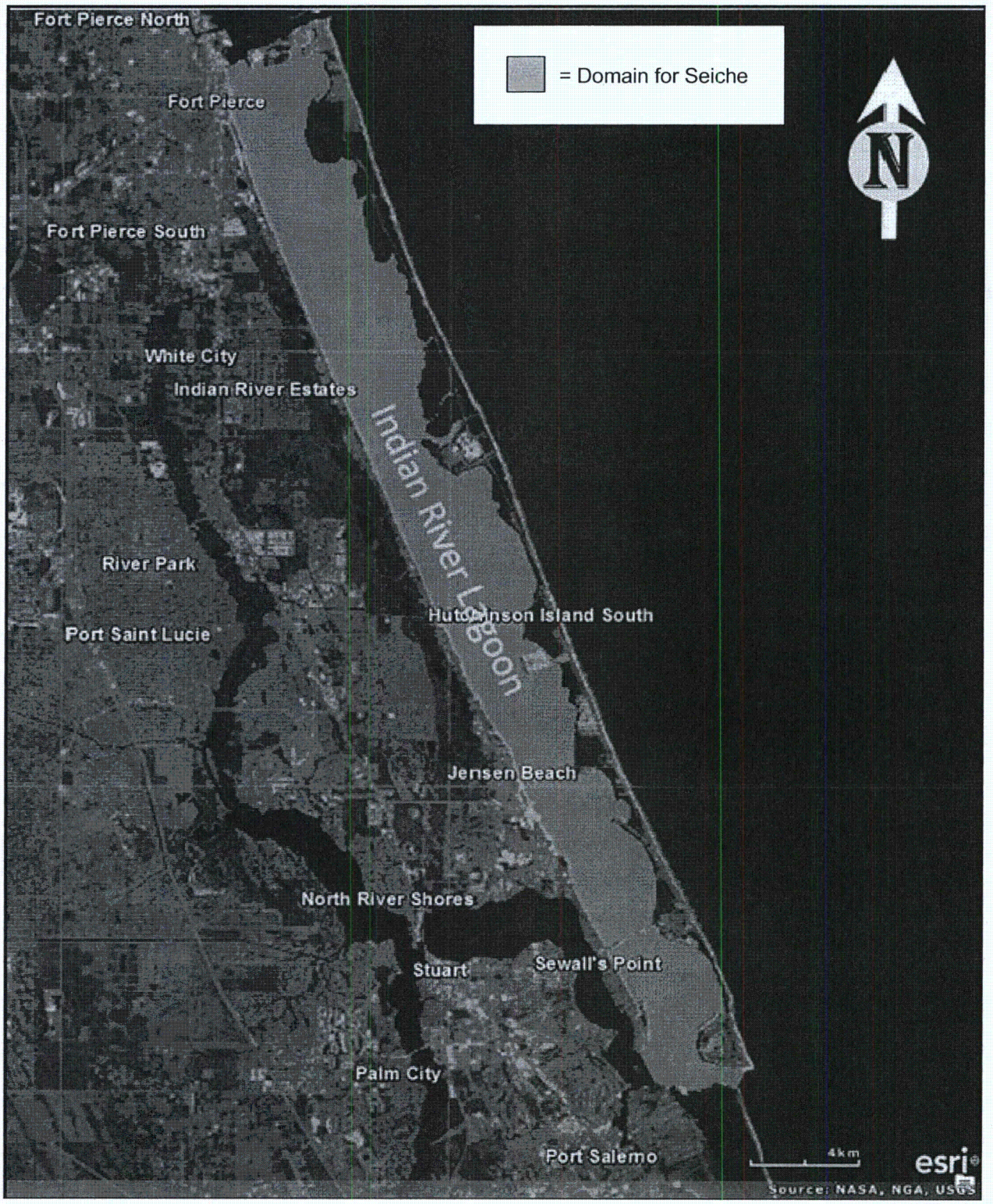

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Figure 4-33
Indian River Lagoon Domain for Seiche Analysis

Reference: ESRI, 2014a

FPL-072-PR-002 REV. 0

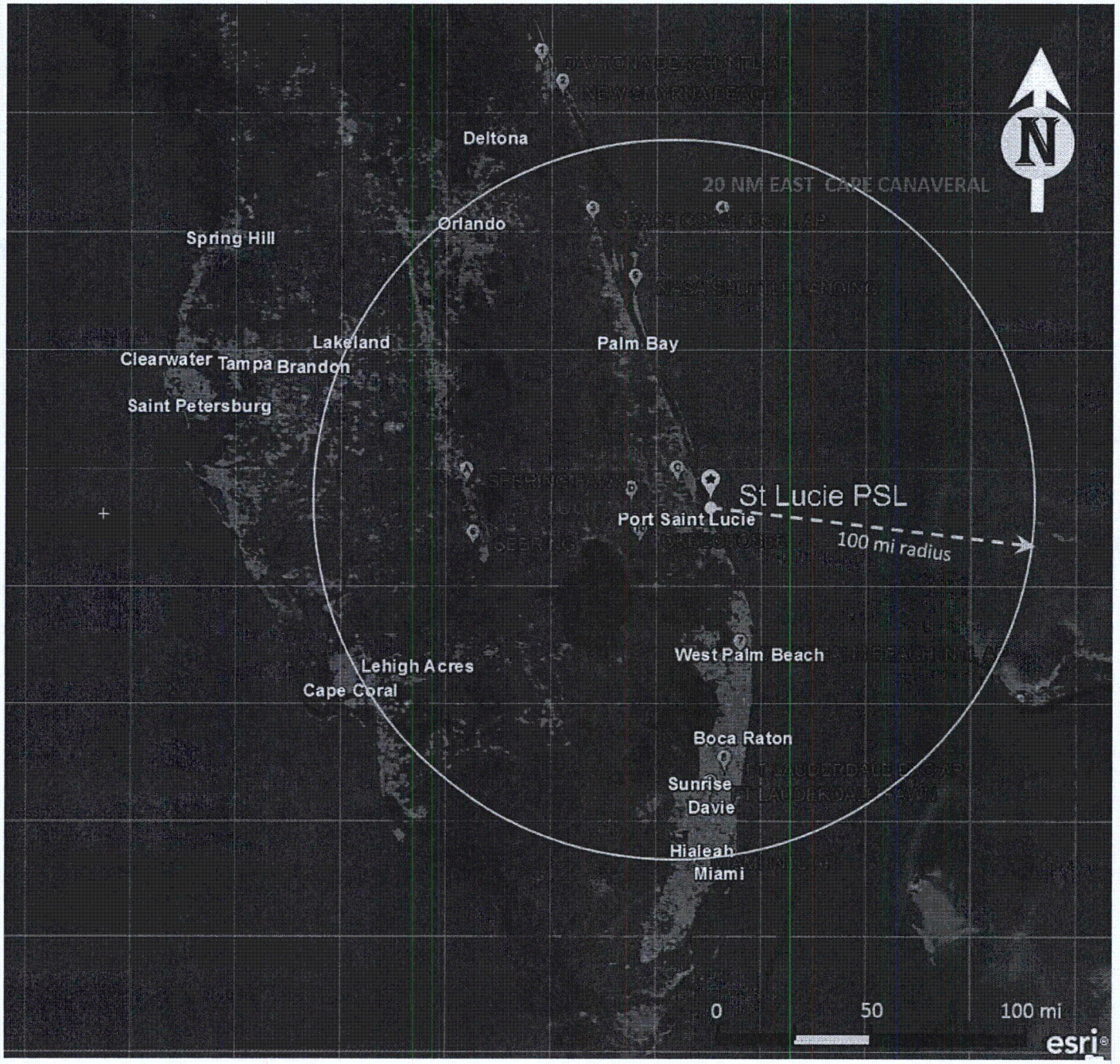

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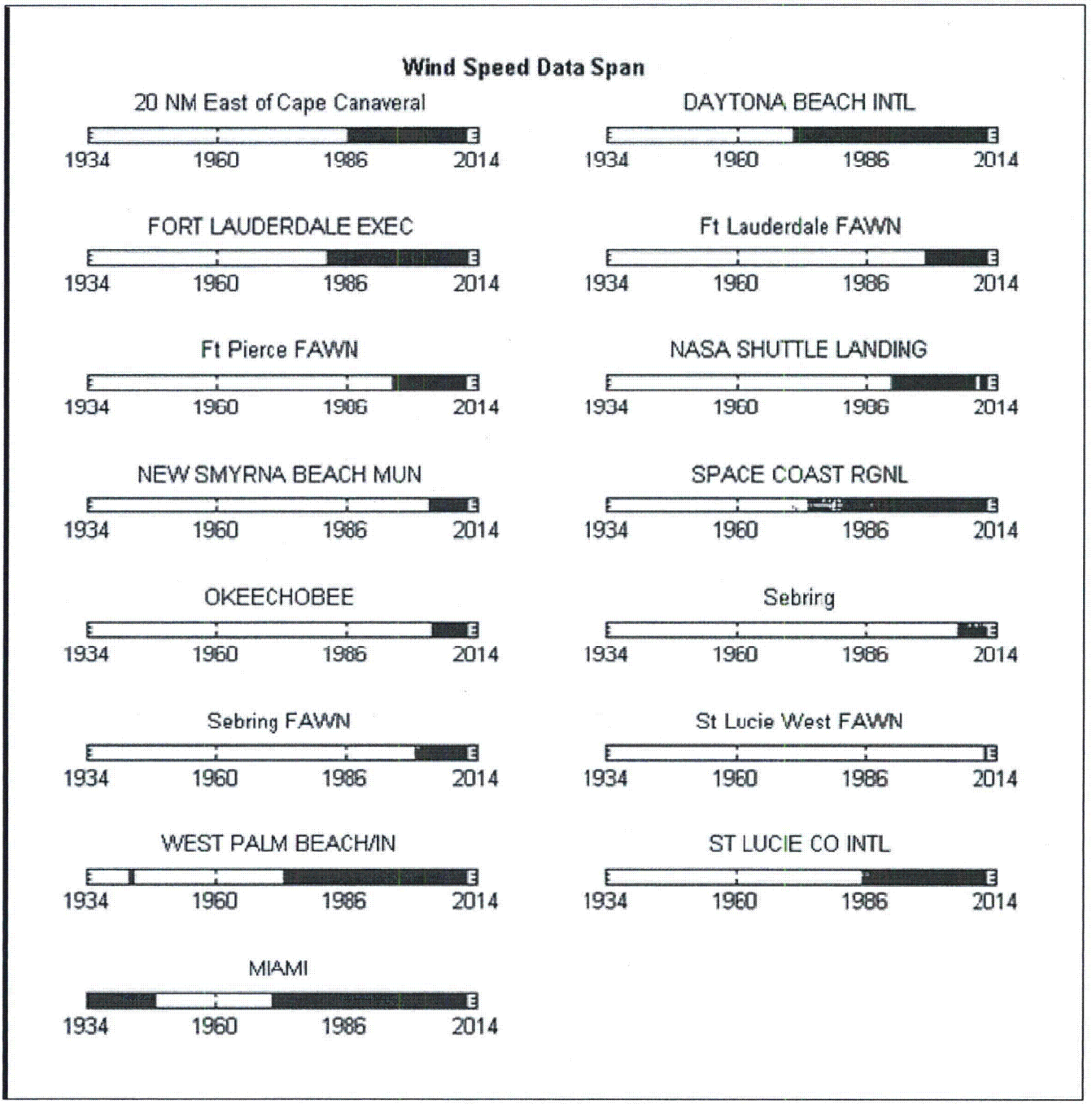
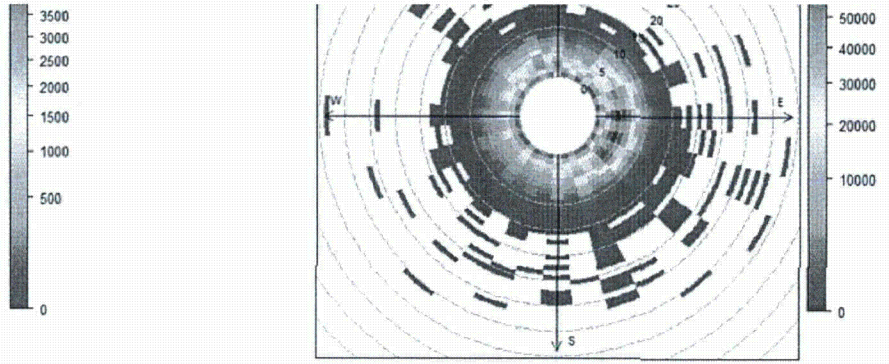
Figure 4-34
Meteorological Stations with Wind Data

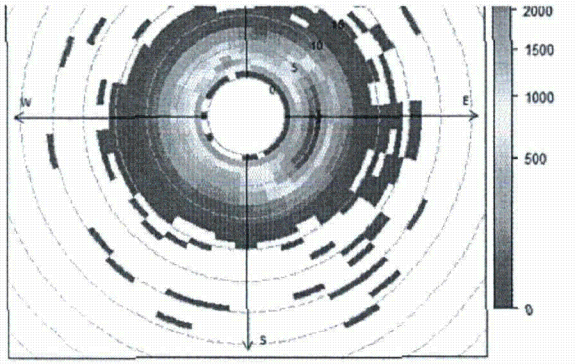
References: ESRI, 2014a; FAWN, 2014; NOAA, 2014a; NOAA, 2014b

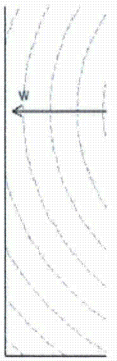
FPL-072-PR-002 REV. 0



Note: All of the stations have at least hourly information, the FAWN stations and buoy data have sub-hourly data

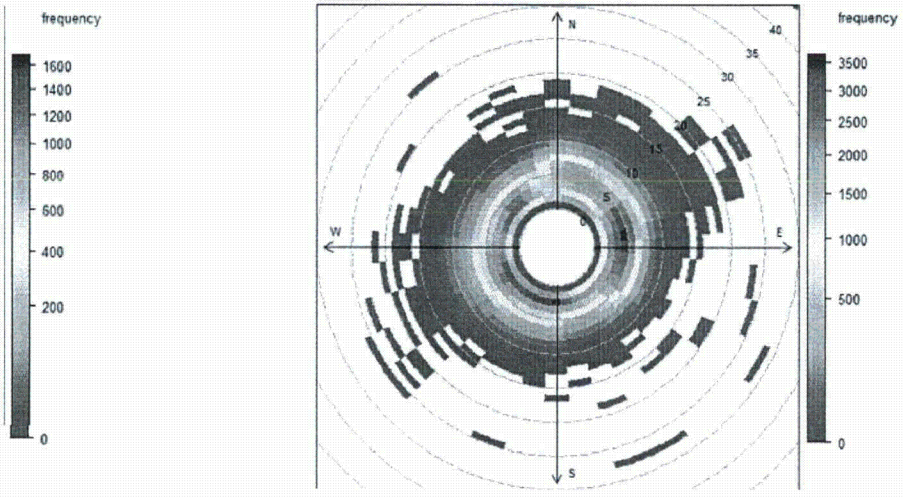


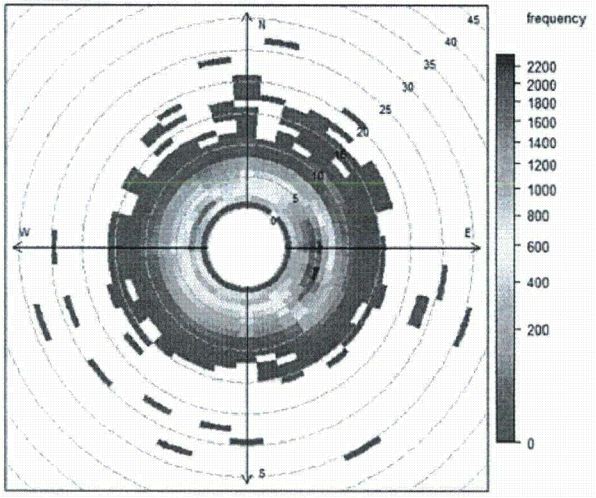


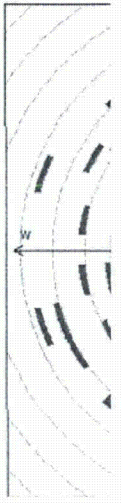


Station: Daytona Beach

Station: St Lucie

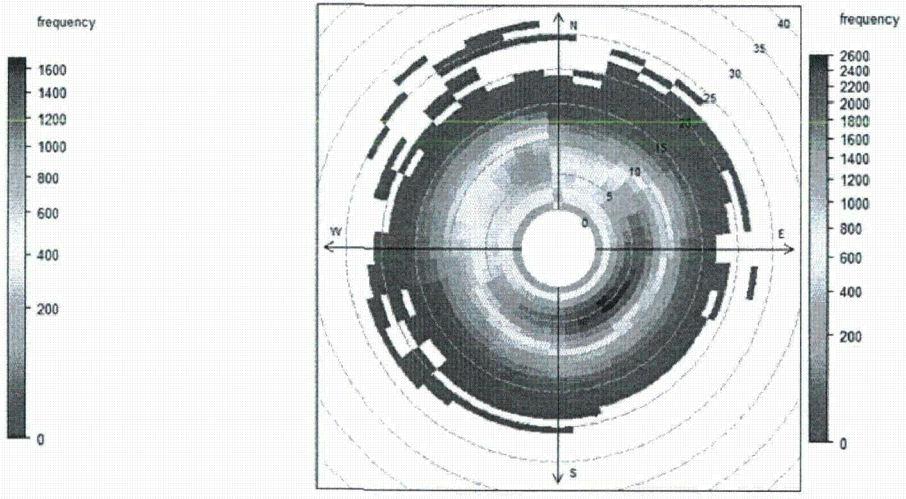


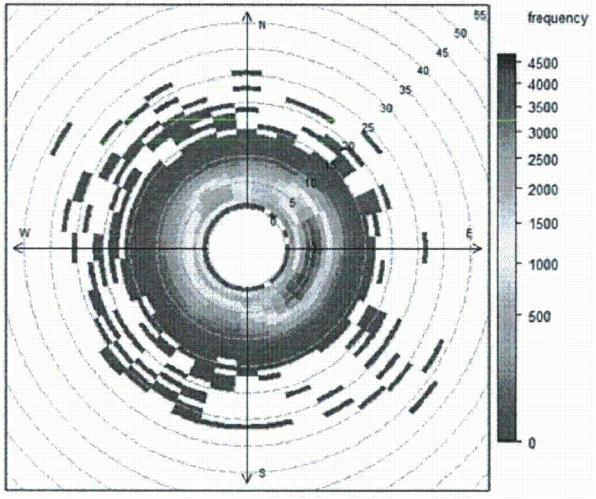


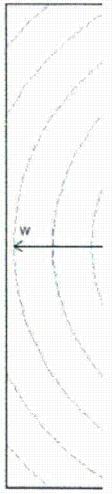


Station: 20 NM East of Cape Canaveral

Station: West Palm Beach







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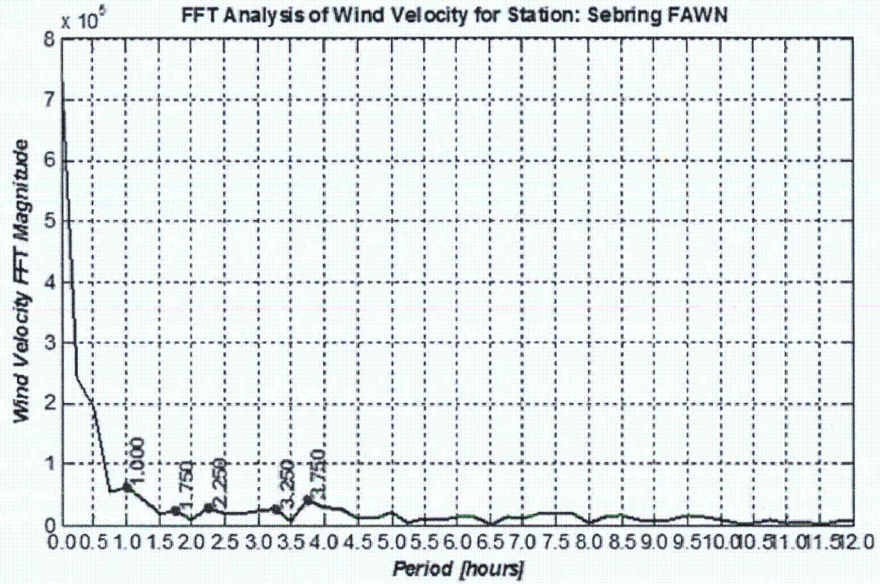

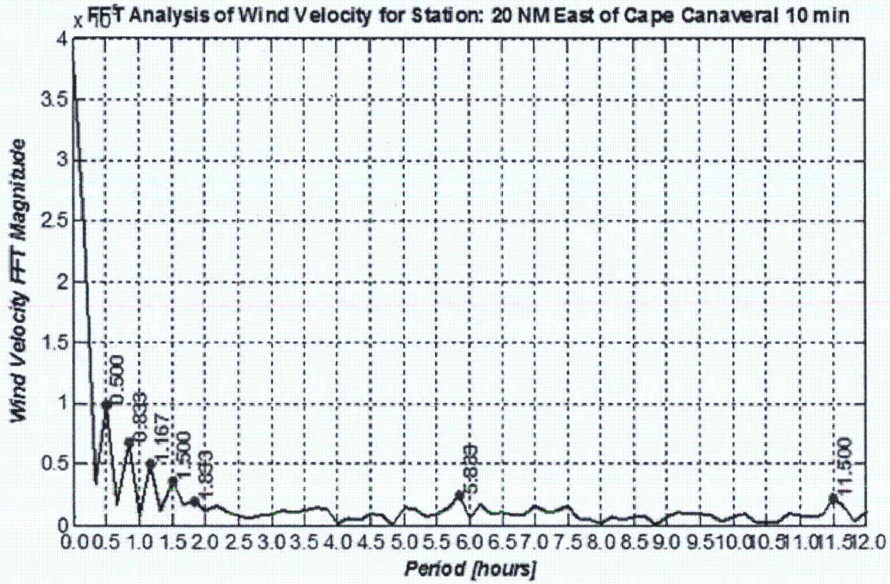

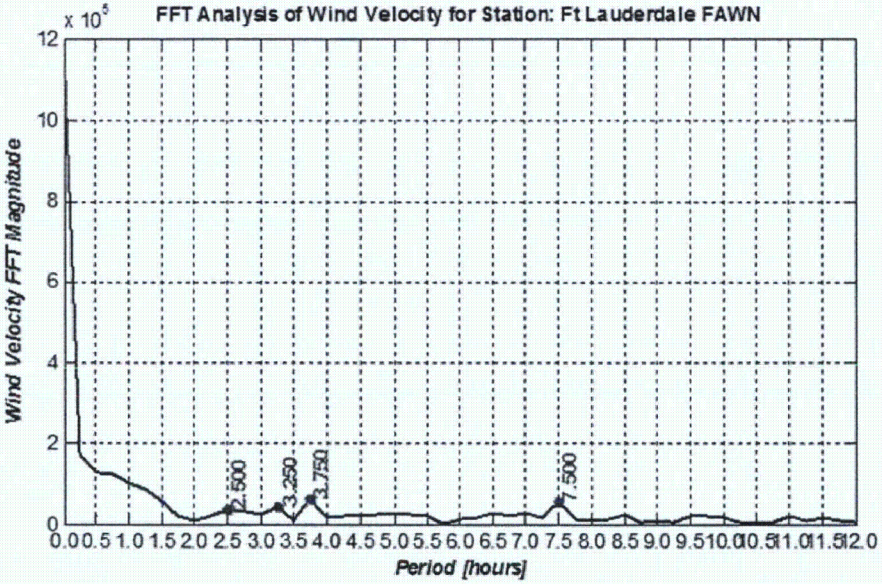

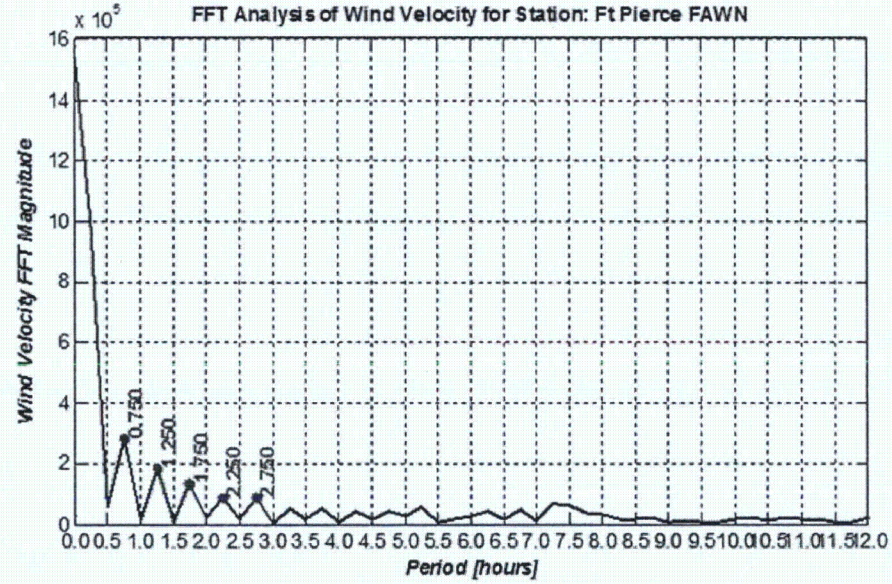

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St. Lucie Nuclear Power Plant Units 1 & 2
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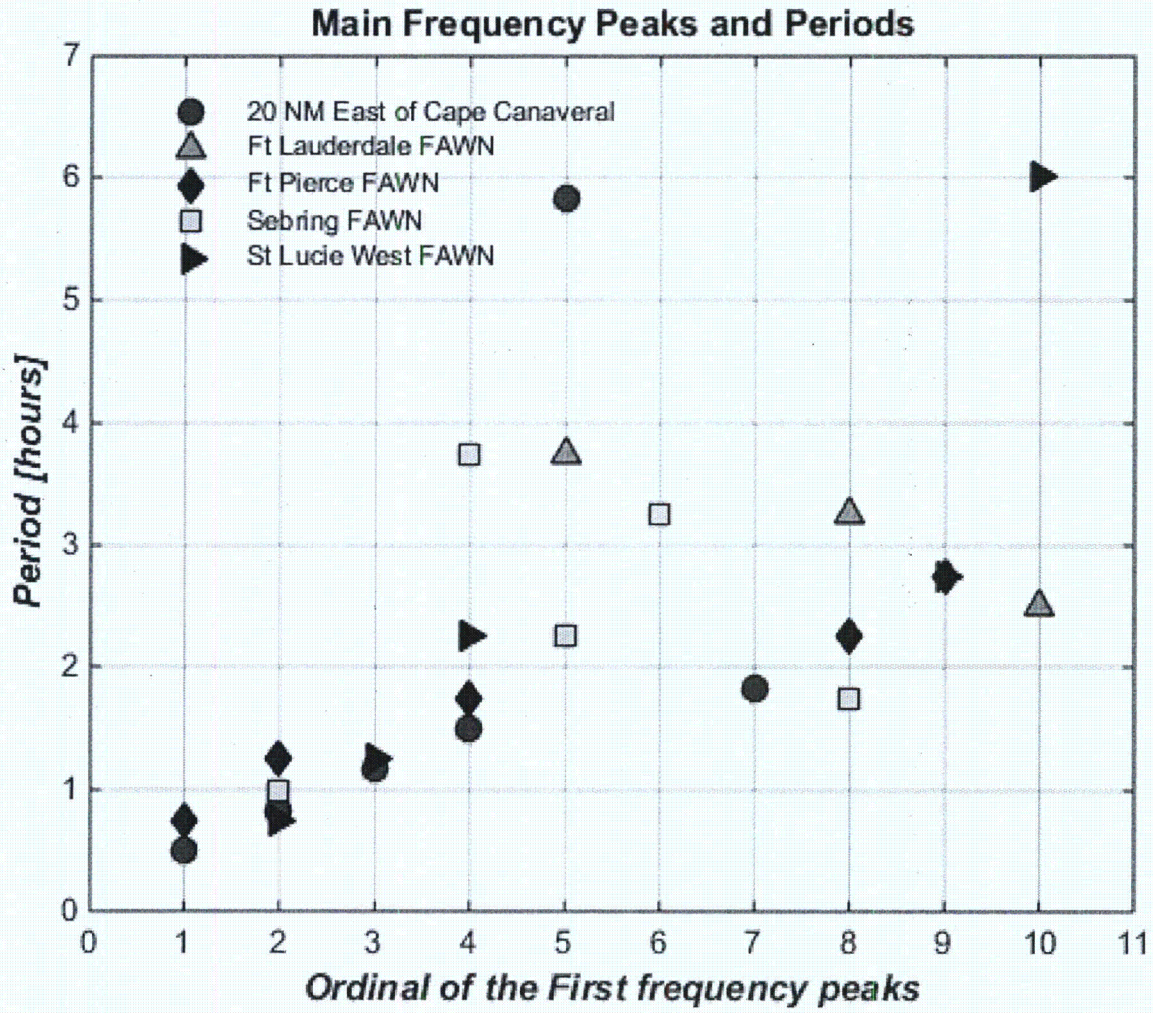
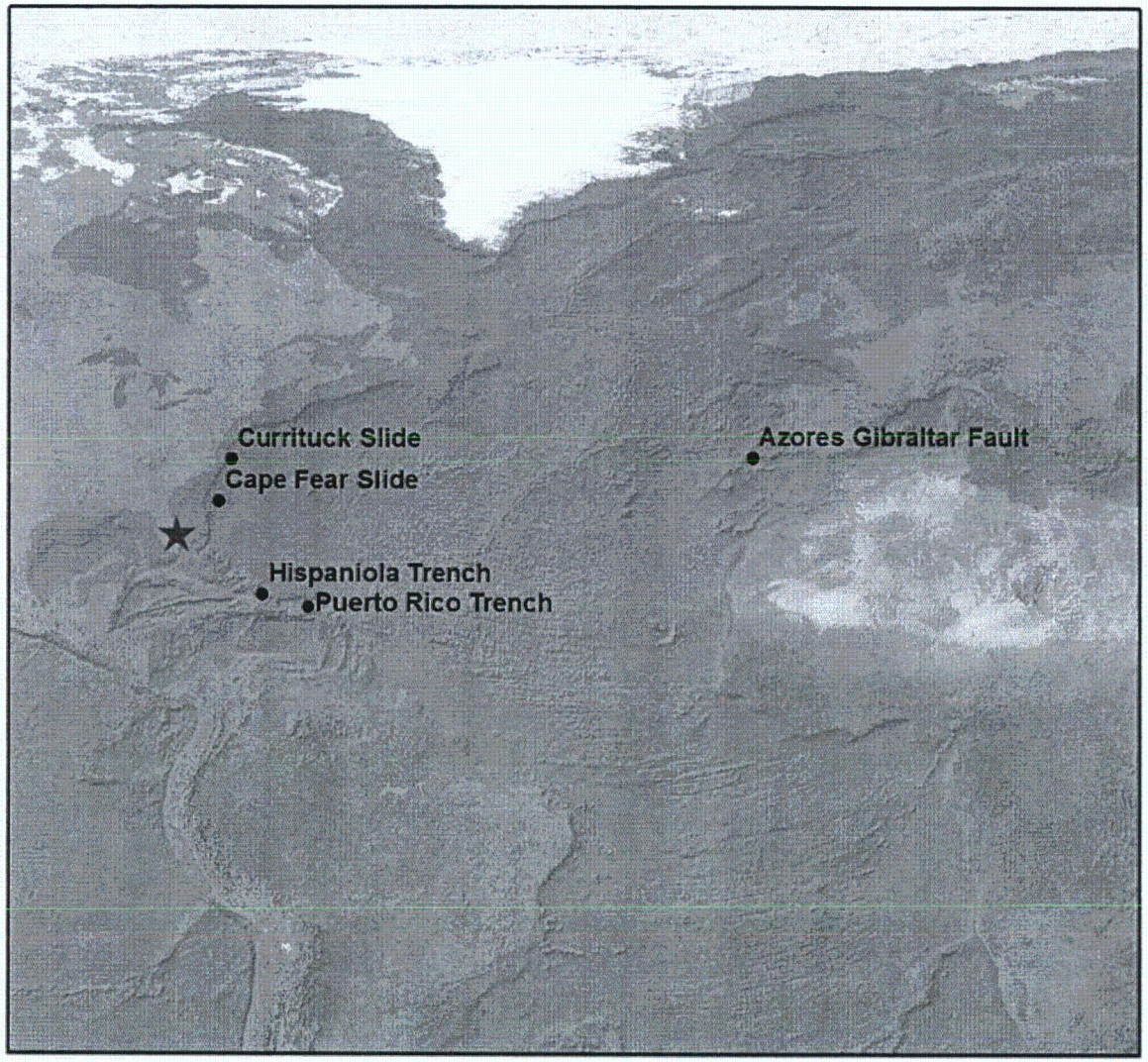
Figure 4-37
FFT Analysis of Wind Speed for Selected Stations

References: FAWN, 2014; NOAA, 2014a; NOAA, 2014b



Note: All of the stations have at least hourly information, the FAWN stations and buoy data have sub-hourly data

NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-38** Main Periods of the First Frequency Peaks for Selected Stations
References: FAWN, 2014; NOAA, 2014a; NOAA, 2014b	FPL-072-PR-002 REV. 0



• Tsunami Sources
★ PSL

N

0 1,000 2,000 4,000
Kilometers

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St. Lucie Nuclear Power Plant Units 1 & 2
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Figure 4-39
Tsunami Source Locations Evaluated

Reference: ESRI, 2014a

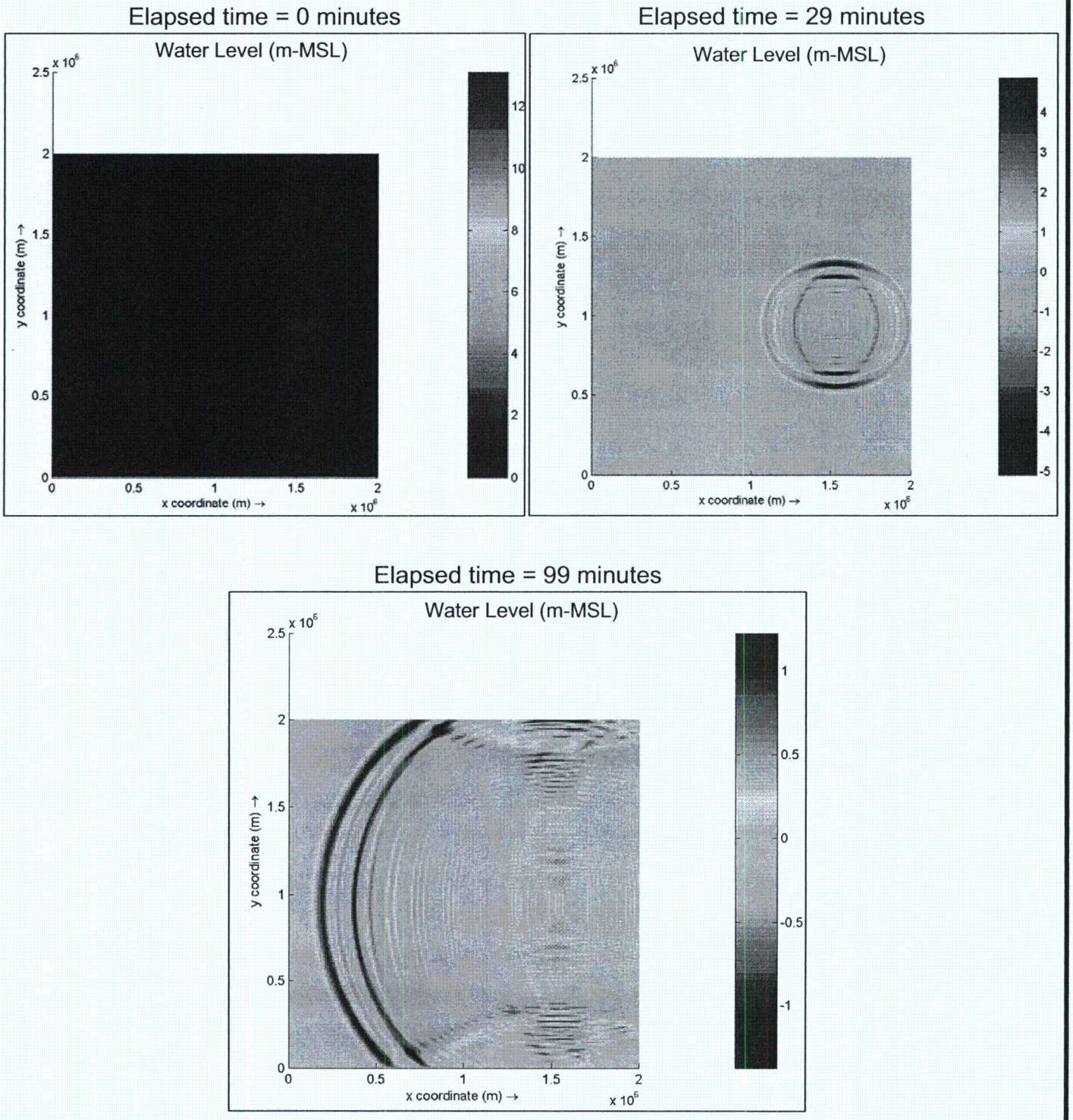

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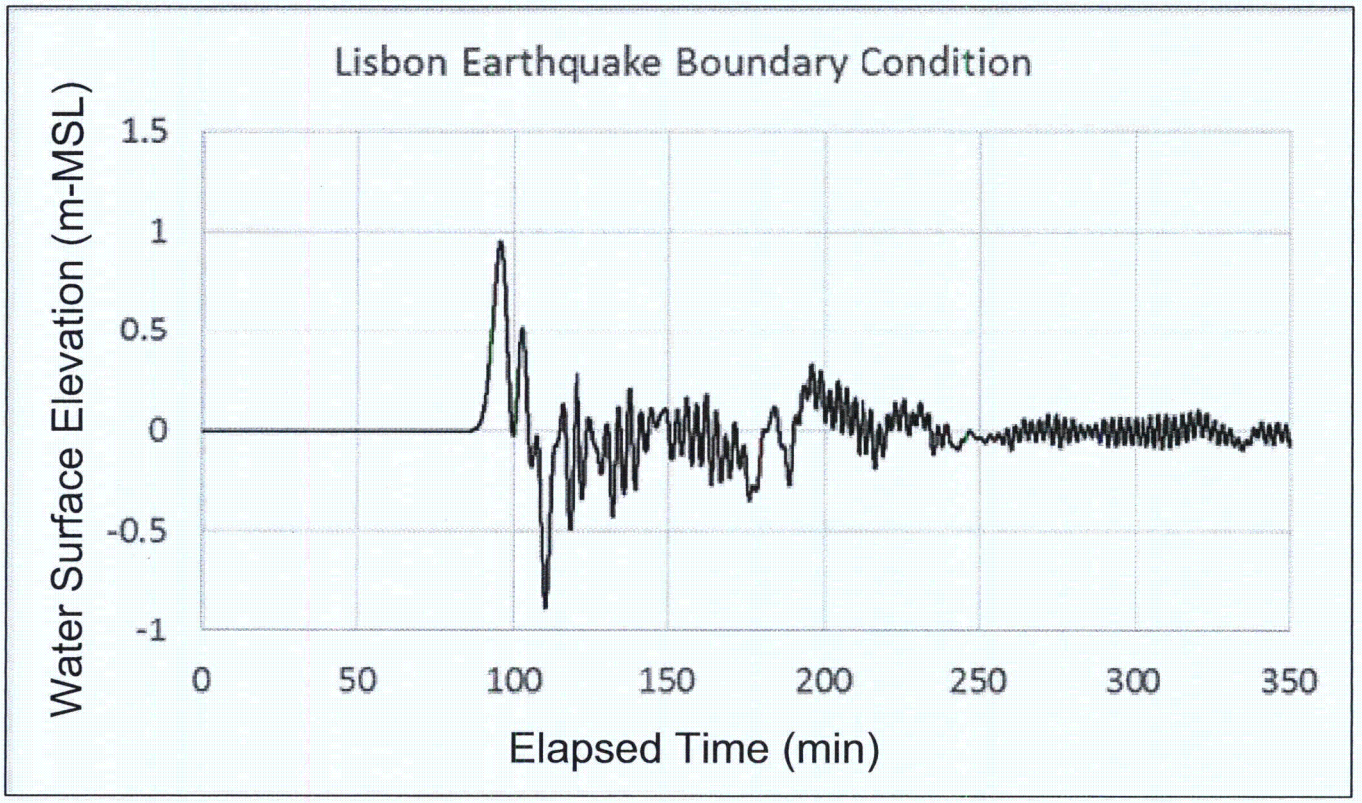
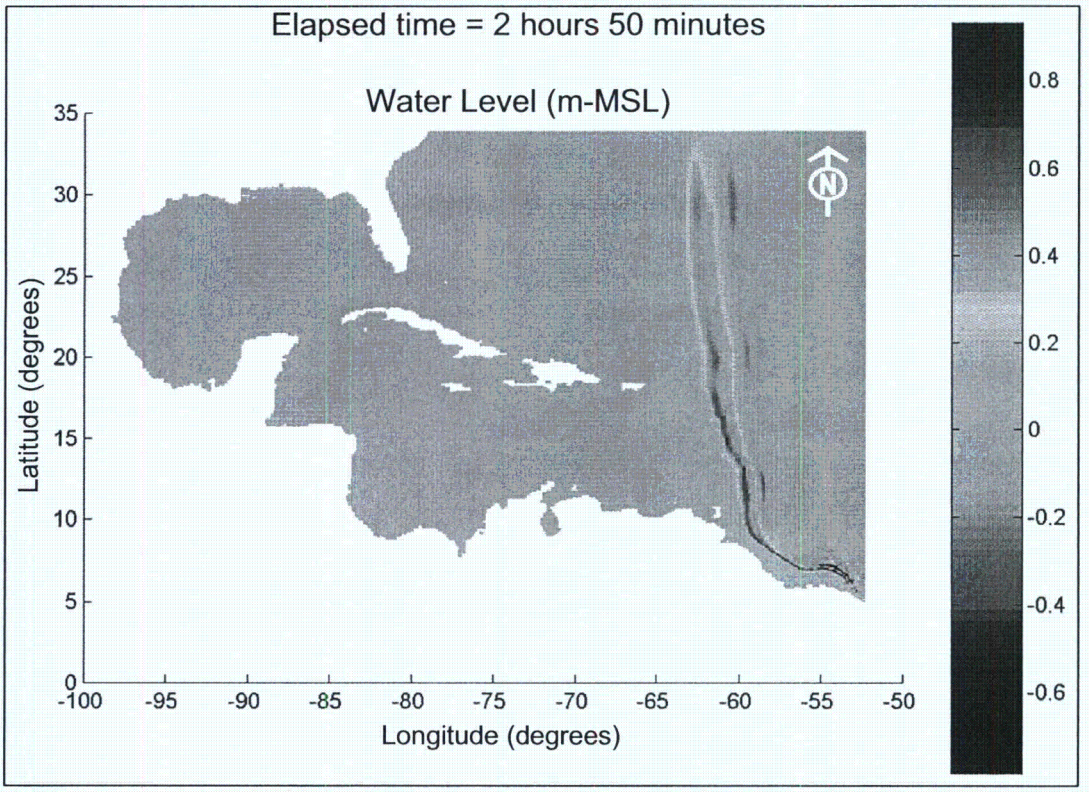
Figure 4-40
1755 Lisbon Earthquake Tsunami Elapsed Times;
Mw = 8.53 - Tsunami Origination Zone


Lisbon Earthquake Boundary Condition
Water Surface Elevation (m-MSL)
1.5
1
0.5
0
-0.5
-1
0
50
100
150
200
250
300
350
Elapsed Time (min)



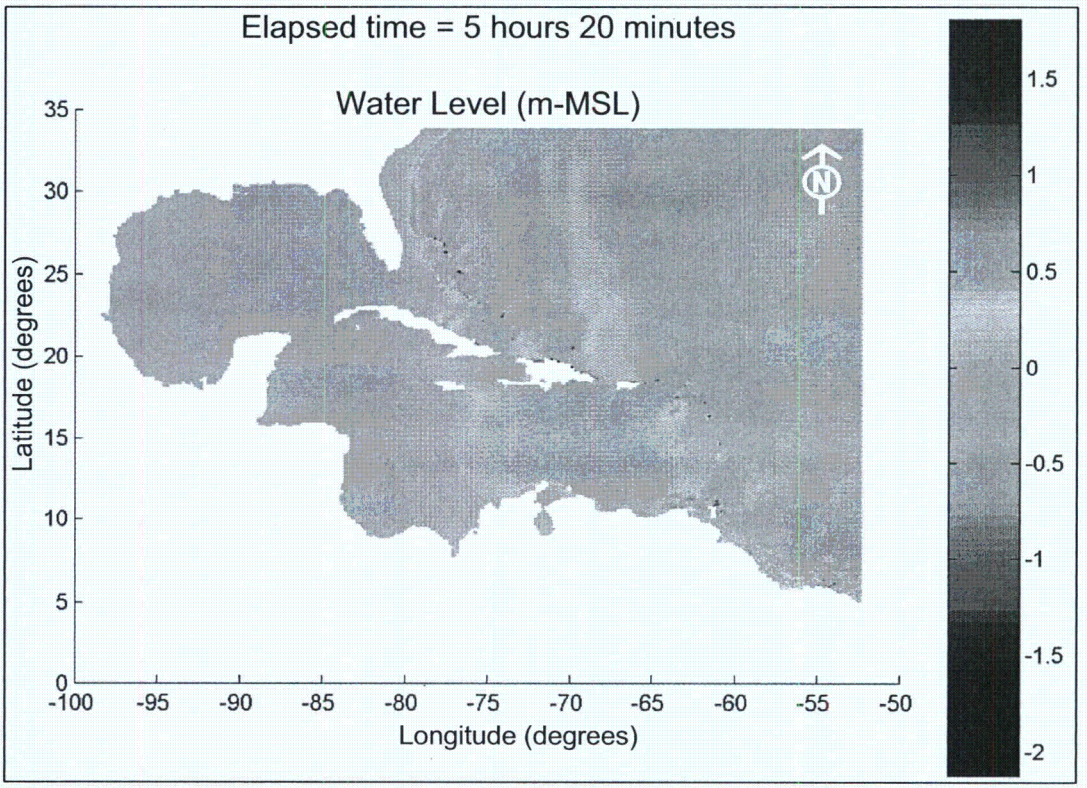


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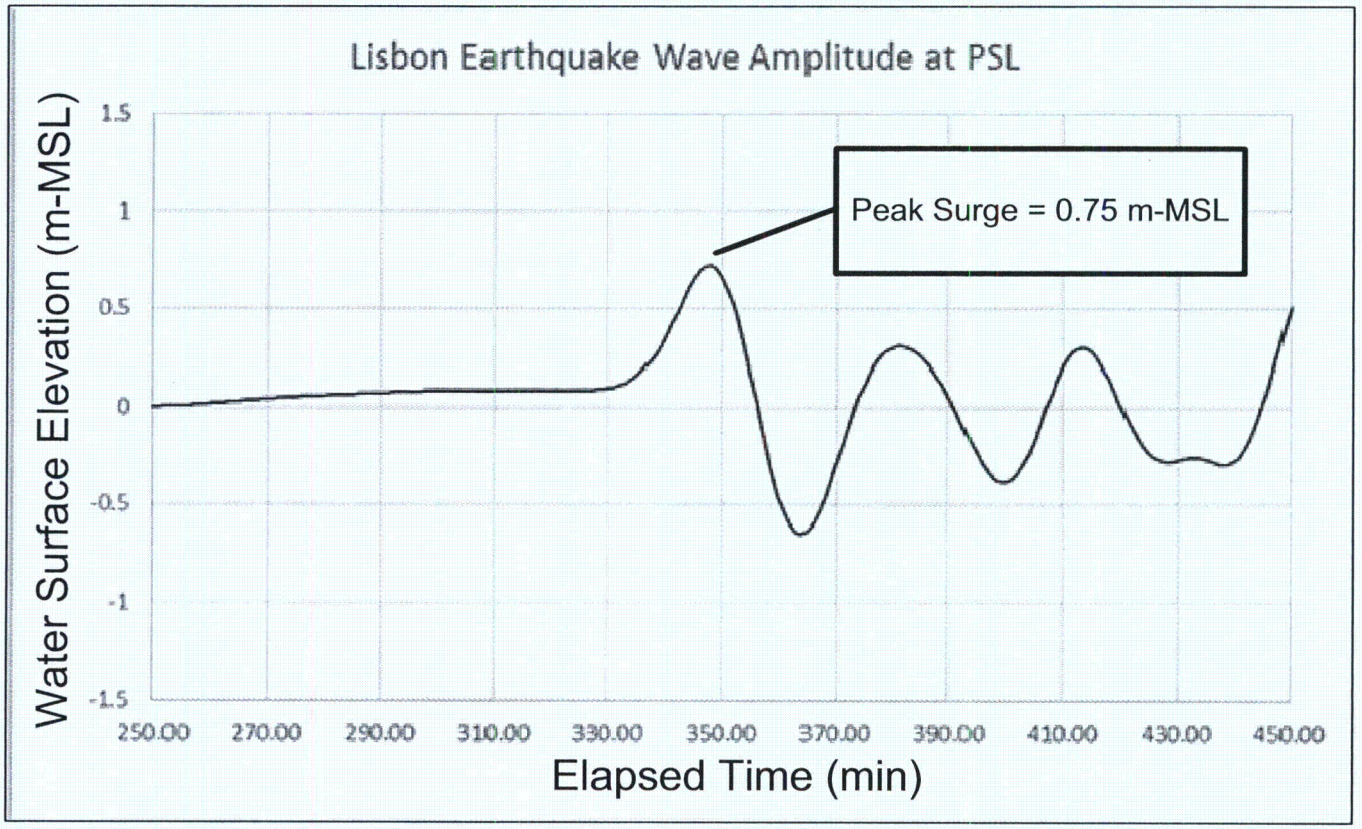
Figure 4-42
1755 Lisbon Earthquake Tsunami Elapsed Times;
Mw = 8.53 – Propagation to PSL


Lisbon Earthquake Wave Amplitude at PSL
Water Surface Elevation (m-MSL)
1.5
1
0.5
0
-0.5
-1
-1.5
Peak Surge = 0.75 m-MSL
250.00
270.00
290.00
310.00
330.00
350.00
370.00
390.00
410.00
430.00
450.00
Elapsed Time (min)

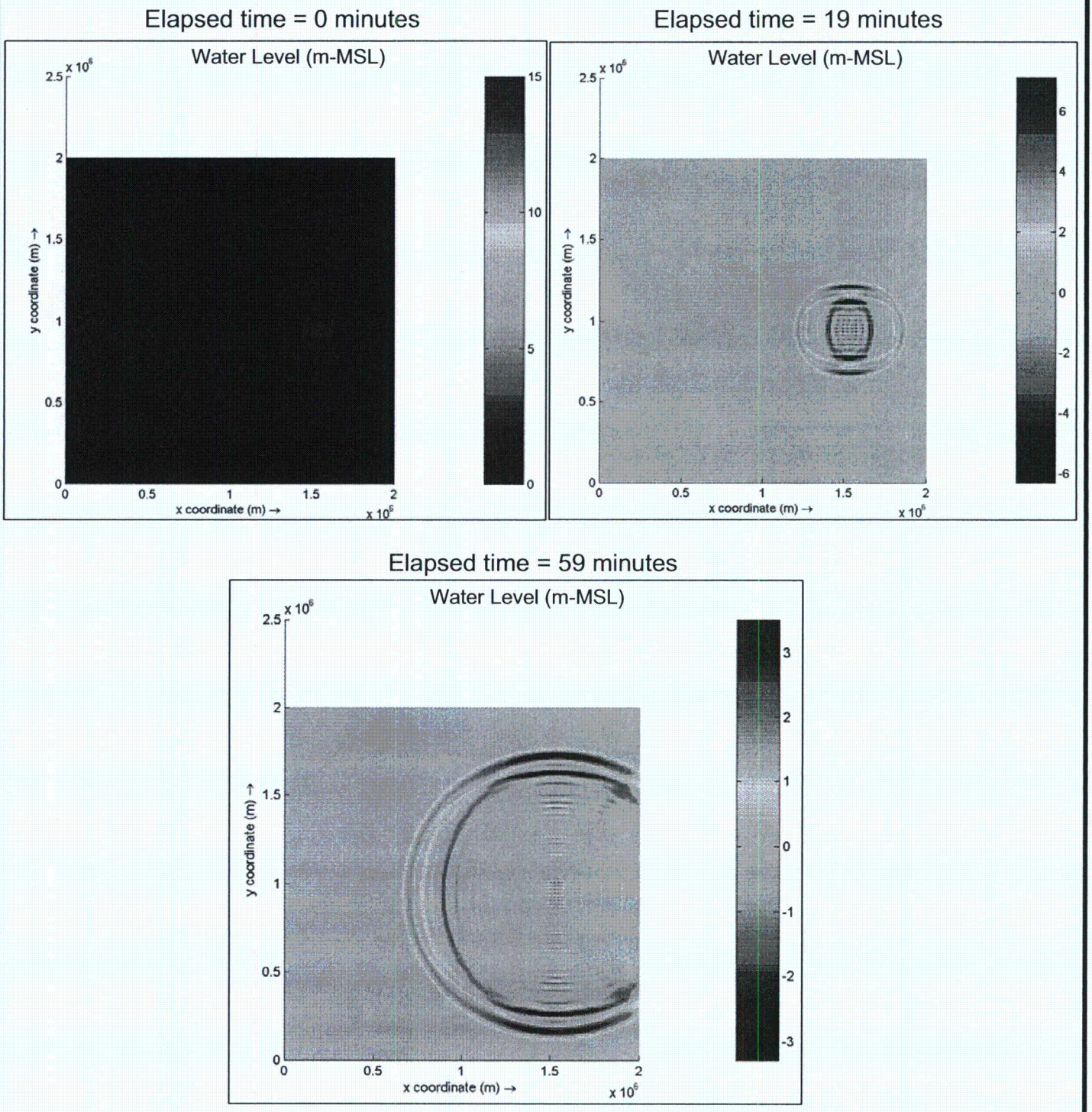


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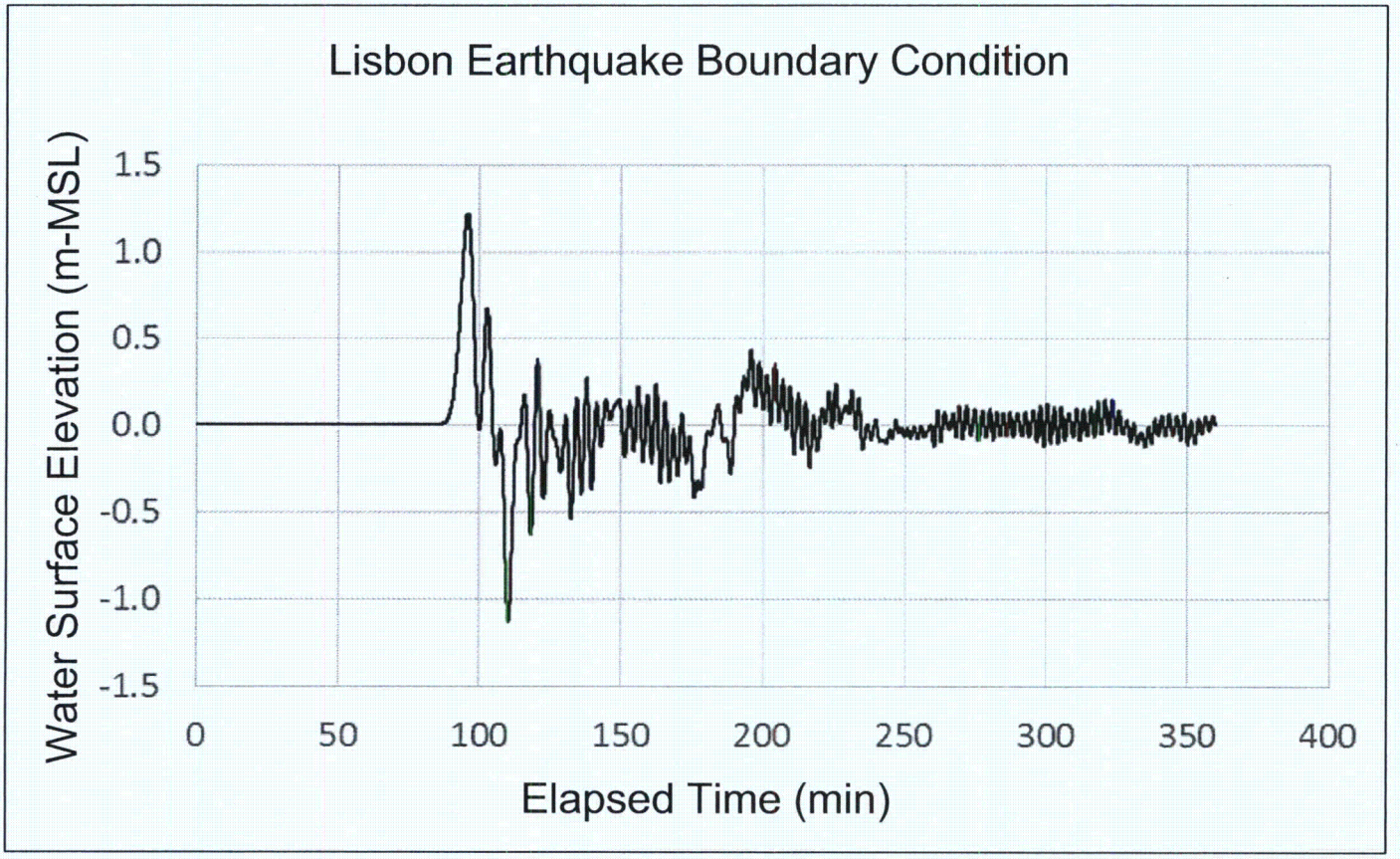
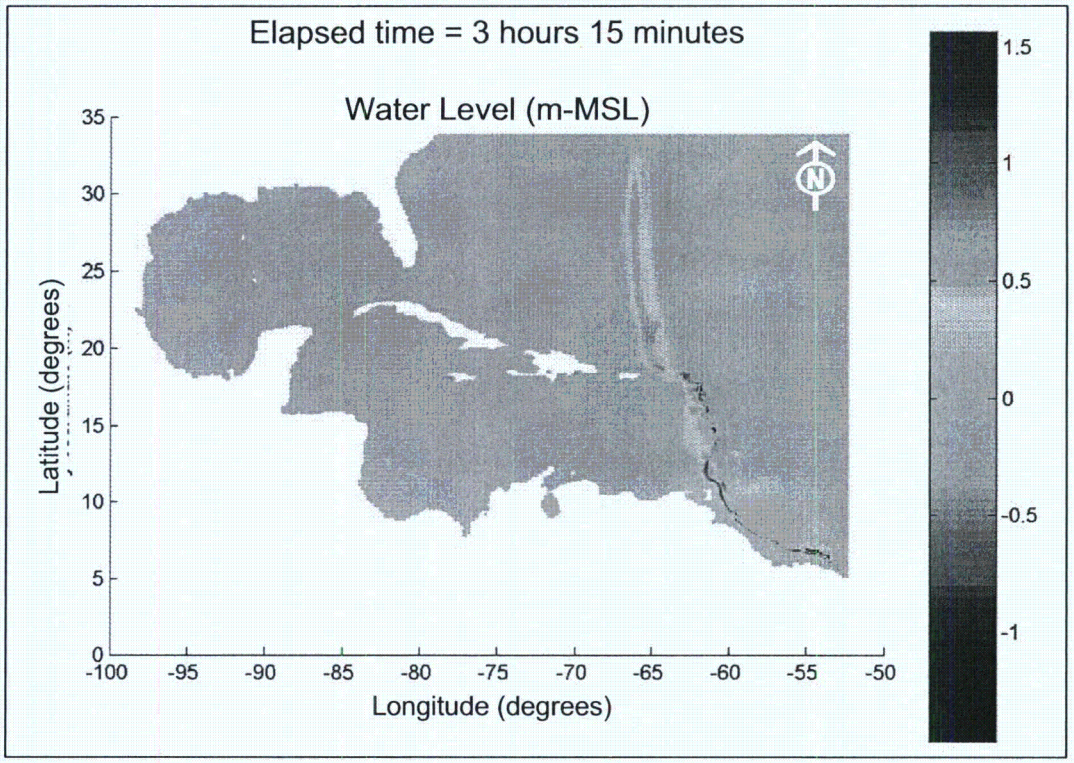
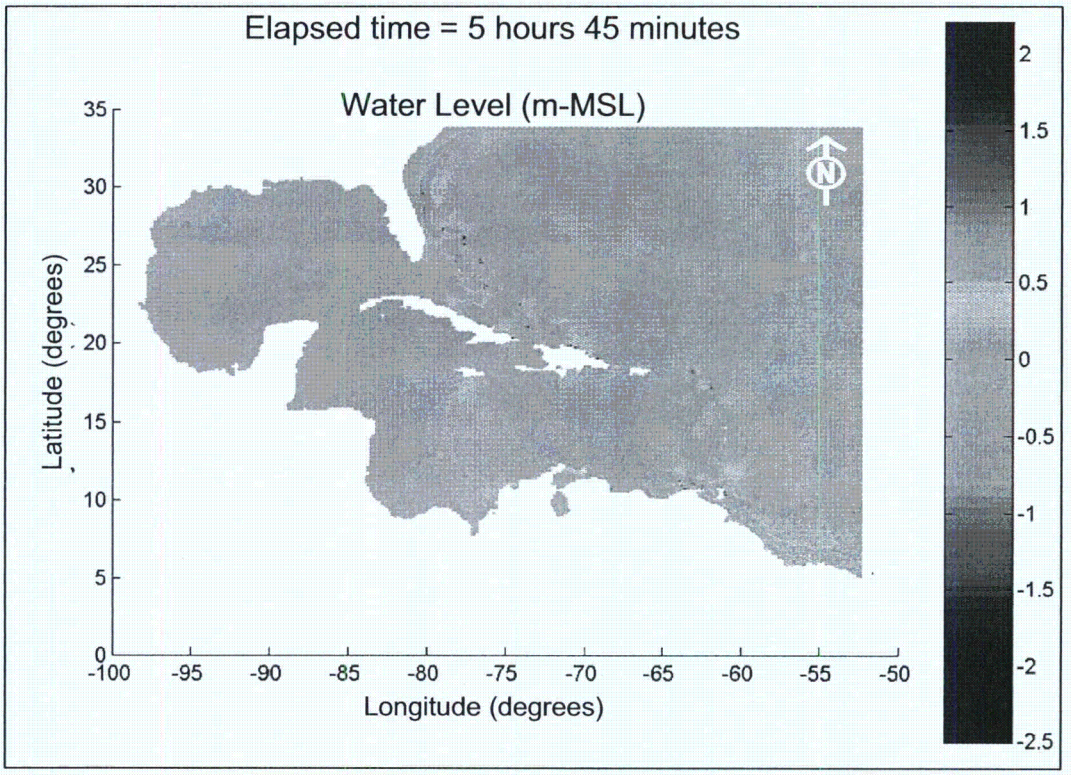
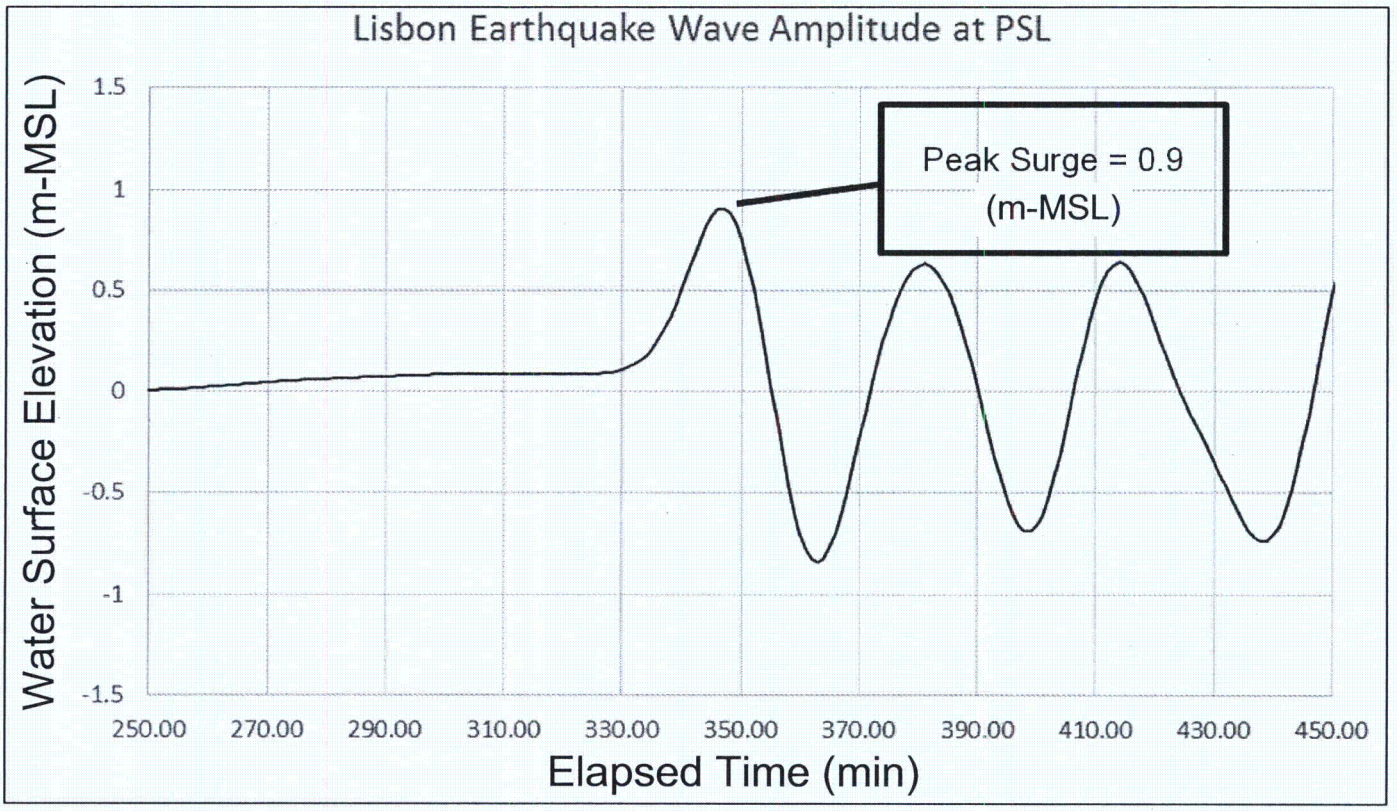
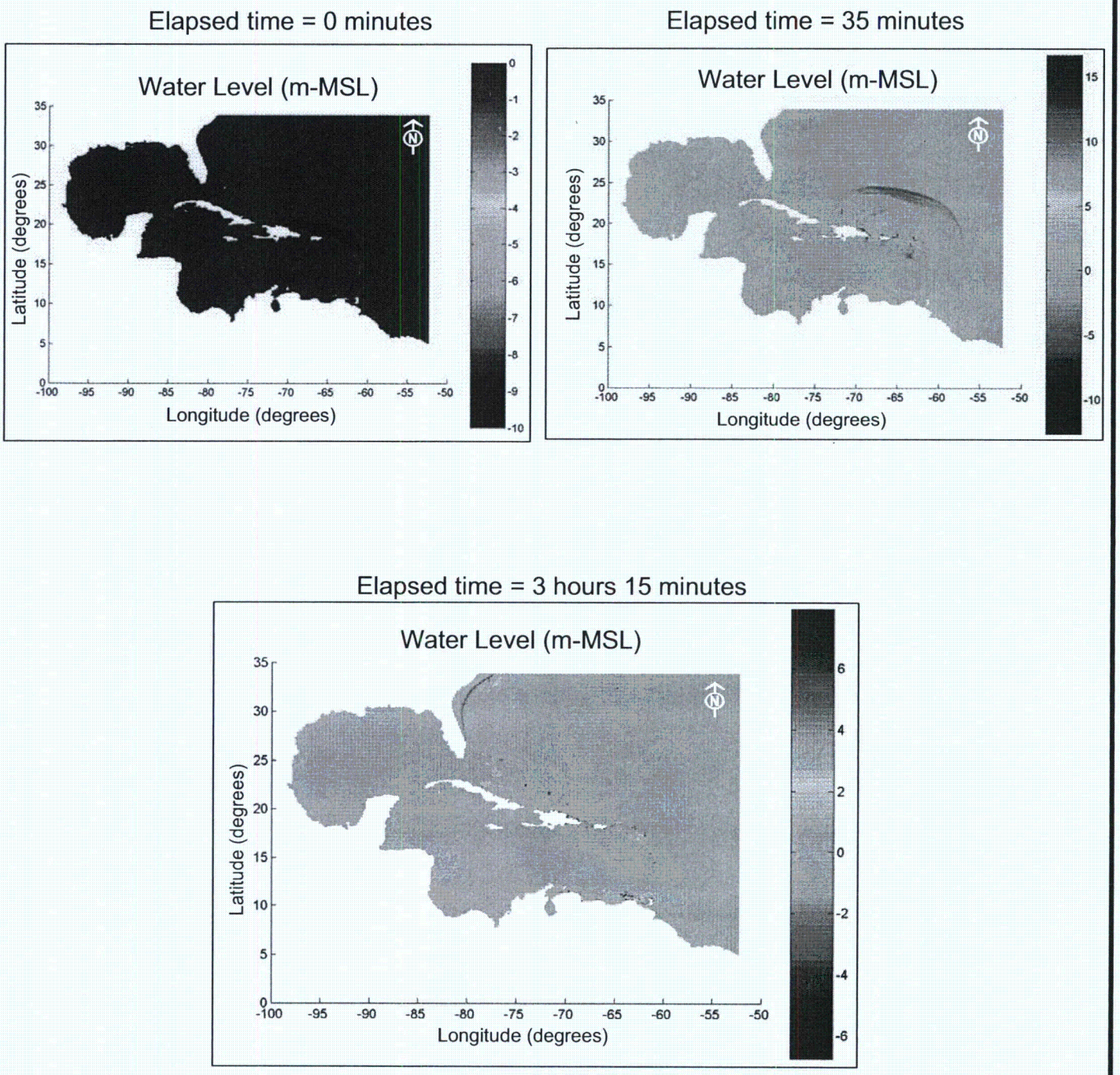
Figure 4-44
1755 Lisbon Earthquake Tsunami Elapsed Times;
Mw = 8.61 – Origination Zone


Lisbon Earthquake Boundary Condition
Water Surface Elevation (m-MSL)
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
0
50
100
150
200
250
300
350
400
Elapsed Time (min)

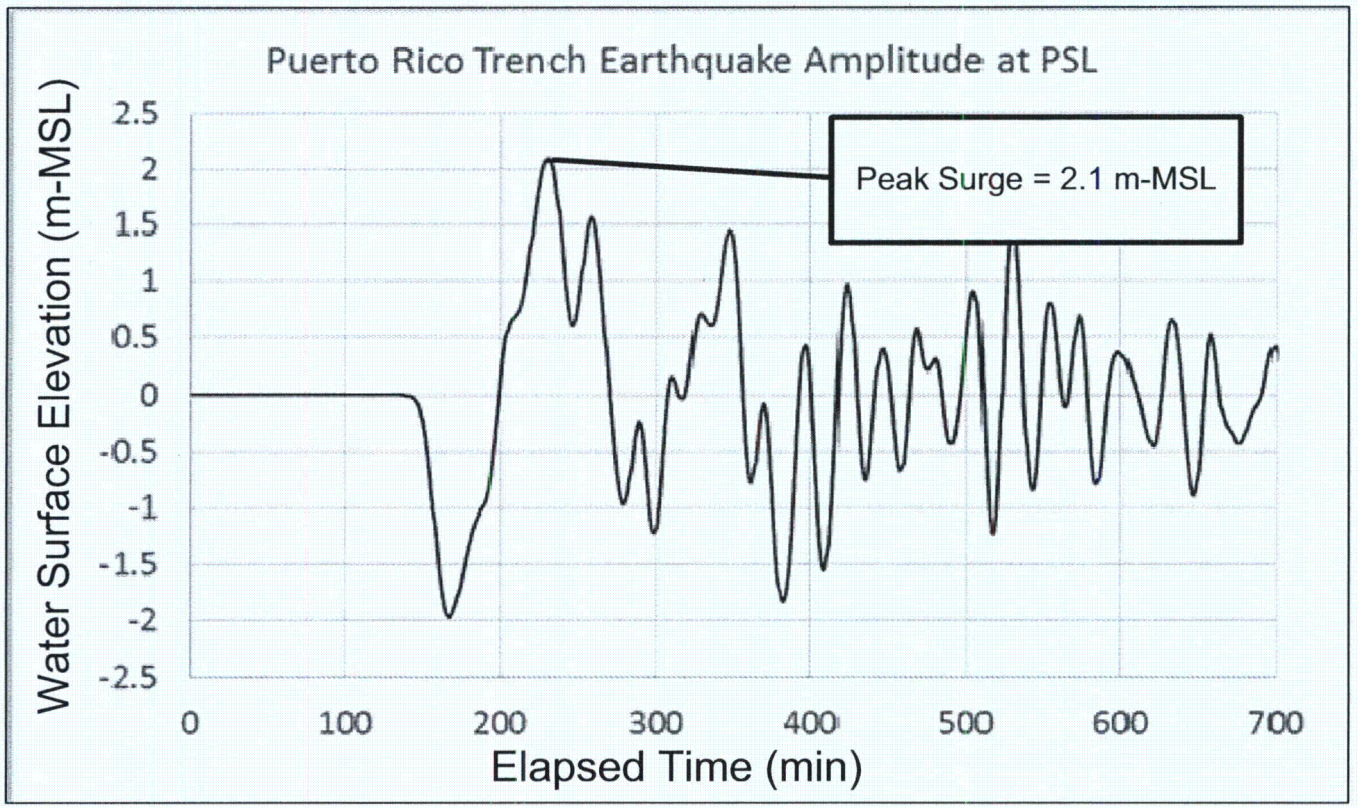

Elapsed time = 3 hours 15 minutes
Water Level (m-MSL)
Latitude (degrees)
Longitude (degrees)
35
30
25
20
15
10
5
0
-100
-95
-90
-85
-80
-75
-70
-65
-60
-55
-50
1.5
1
0.5
0
-0.5
-1
N

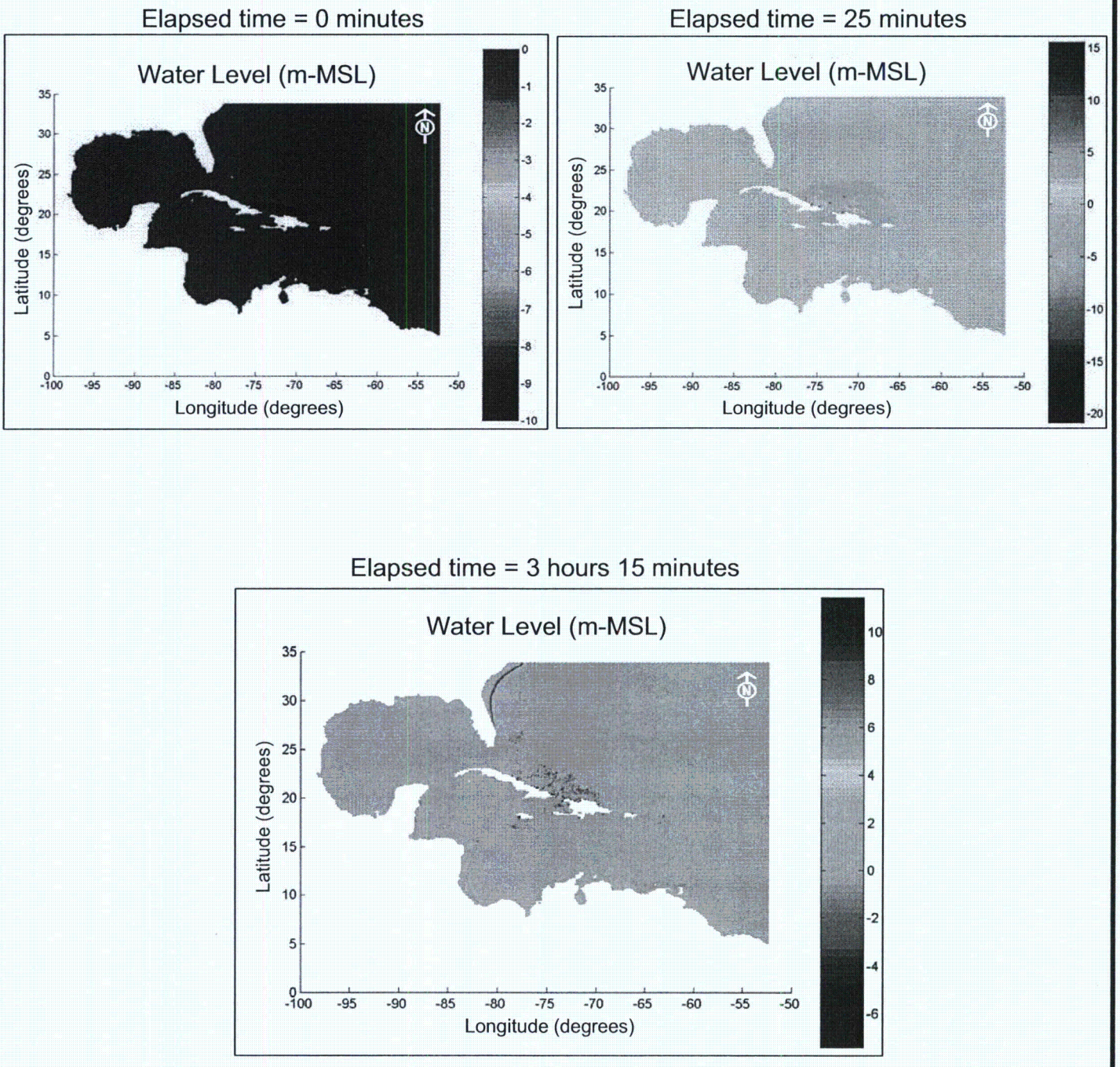

Elapsed time = 5 hours 45 minutes
Water Level (m-MSL)
Latitude (degrees)
Longitude (degrees)
35
30
25
20
15
10
5
0
-100
-95
-90
-85
-80
-75
-70
-65
-60
-55
-50
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
N

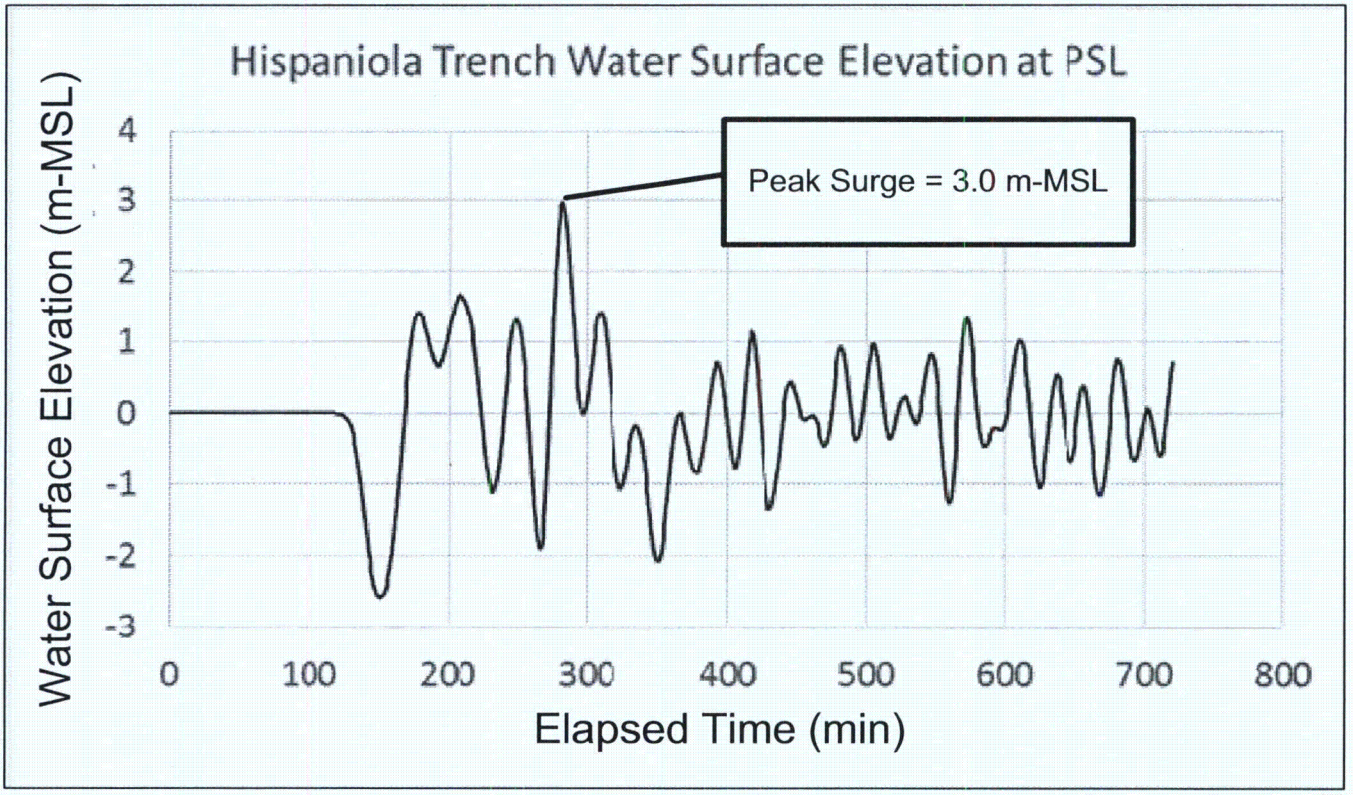

Lisbon Earthquake Wave Amplitude at PSL
Water Surface Elevation (m-MSL)
1.5
1
0.5
0
-0.5
-1
-1.5
Peak Surge = 0.9
(m-MSL)
250.00
270.00
290.00
310.00
330.00
350.00
370.00
390.00
410.00
430.00
450.00
Elapsed Time (min)

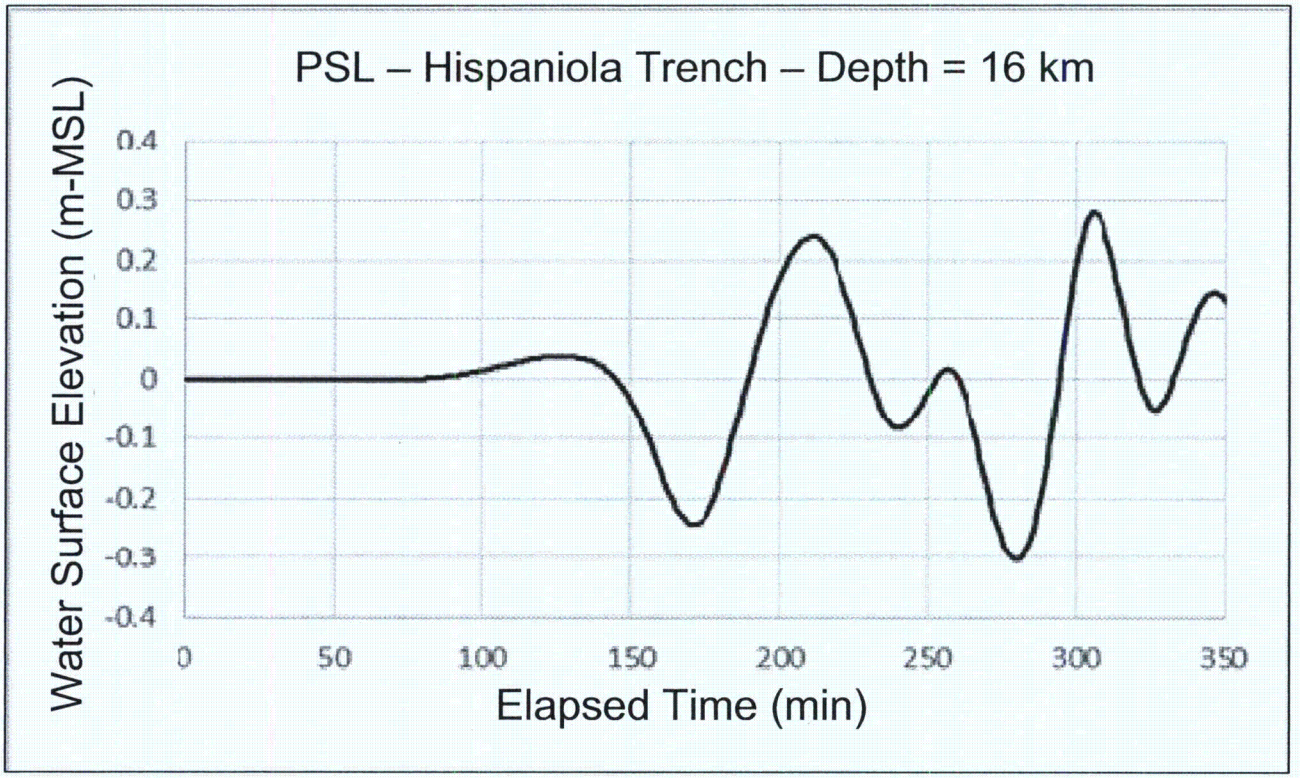


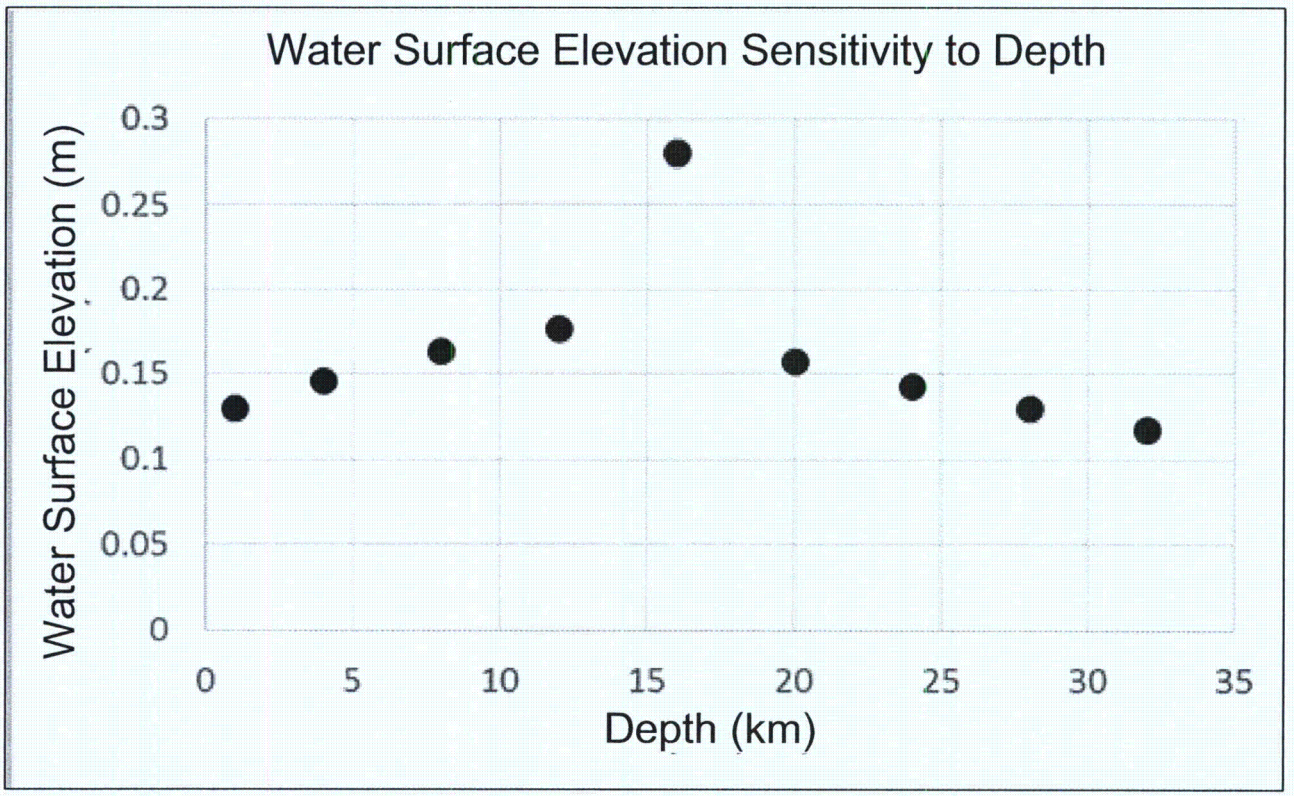
NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-48** Puerto Rico Trench Earthquake Tsunami
	FPL-072-PR-002 REV. 0


Puerto Rico Trench Earthquake Amplitude at PSL
Water Surface Elevation (m-MSL)
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
Peak Surge = 2.1 m-MSL
0
100
200
300
400
500
600
700
Elapsed Time (min)

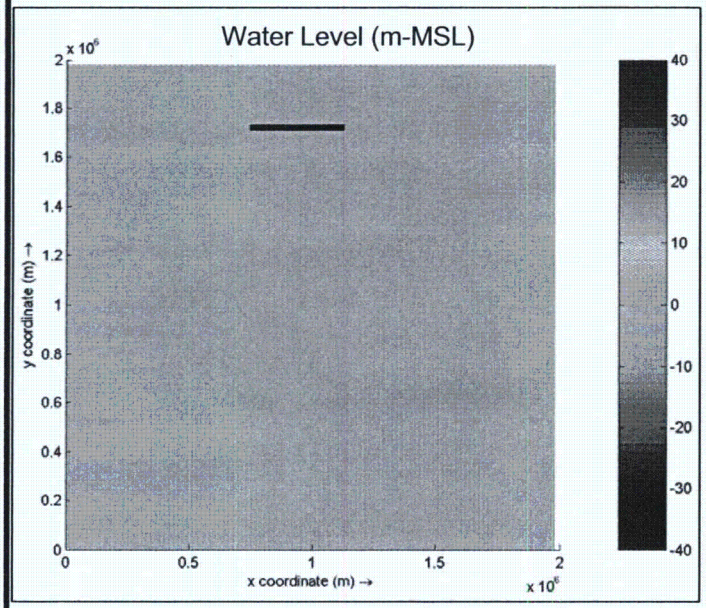

Elapsed time = 0 minutes
Water Level (m-MSL)
Latitude (degrees)
Longitude (degrees)
Elapsed time = 25 minutes
Water Level (m-MSL)
Latitude (degrees)
Longitude (degrees)
Elapsed time = 3 hours 15 minutes
Water Level (m-MSL)
Latitude (degrees)
Longitude (degrees)


Hispaniola Trench Water Surface Elevation at PSL
Peak Surge = 3.0 m-MSL
Water Surface Elevation (m-MSL)
4
3
2
1
0
-1
-2
-3
0
100
200
300
400
500
600
700
800
Elapsed Time (min)

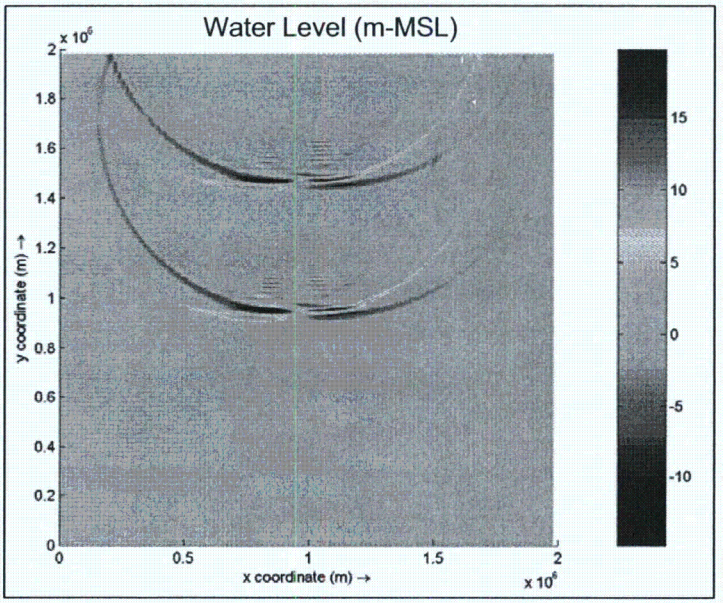

PSL – Hispaniola Trench – Depth = 16 km
Water Surface Elevation (m-MSL)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
0
50
100
150
200
250
300
350
Elapsed Time (min)


Water Surface Elevation Sensitivity to Depth
Water Surface Elevation (m)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5
10
15
20
25
30
35
Depth (km)

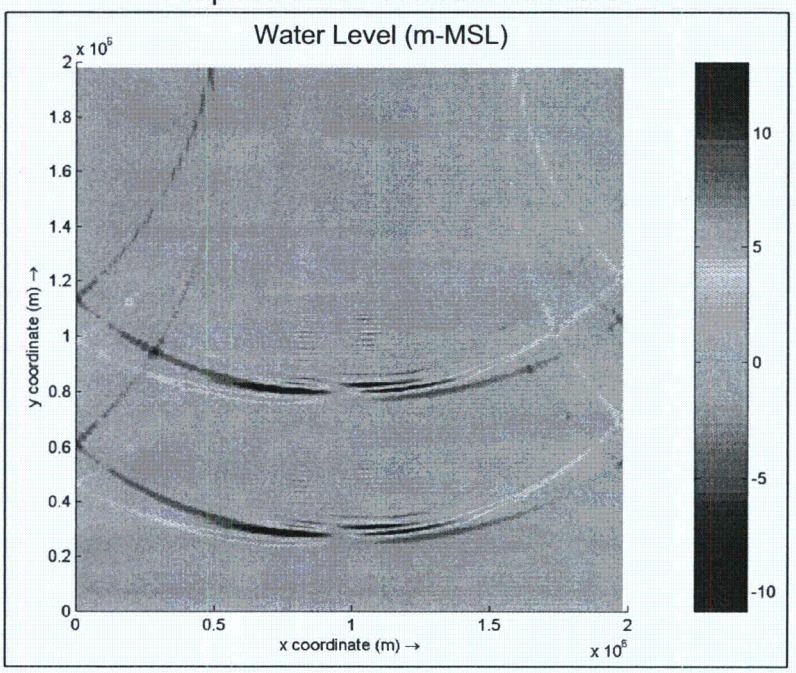
Elapsed time = 0 minutes



Elapsed time = 1 hour 35 minutes



Elapsed time = 2 hours 55 minutes



NextEra Energy (NEE)
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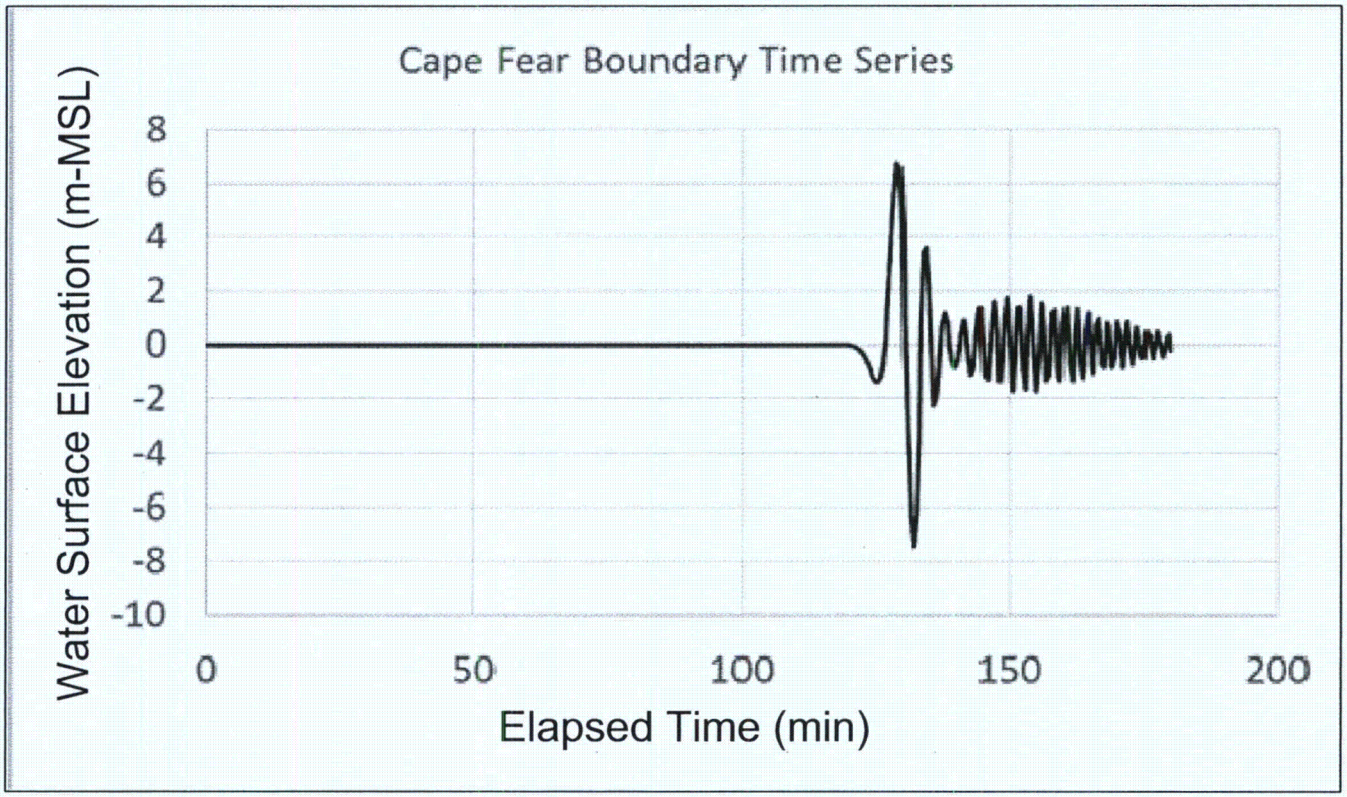
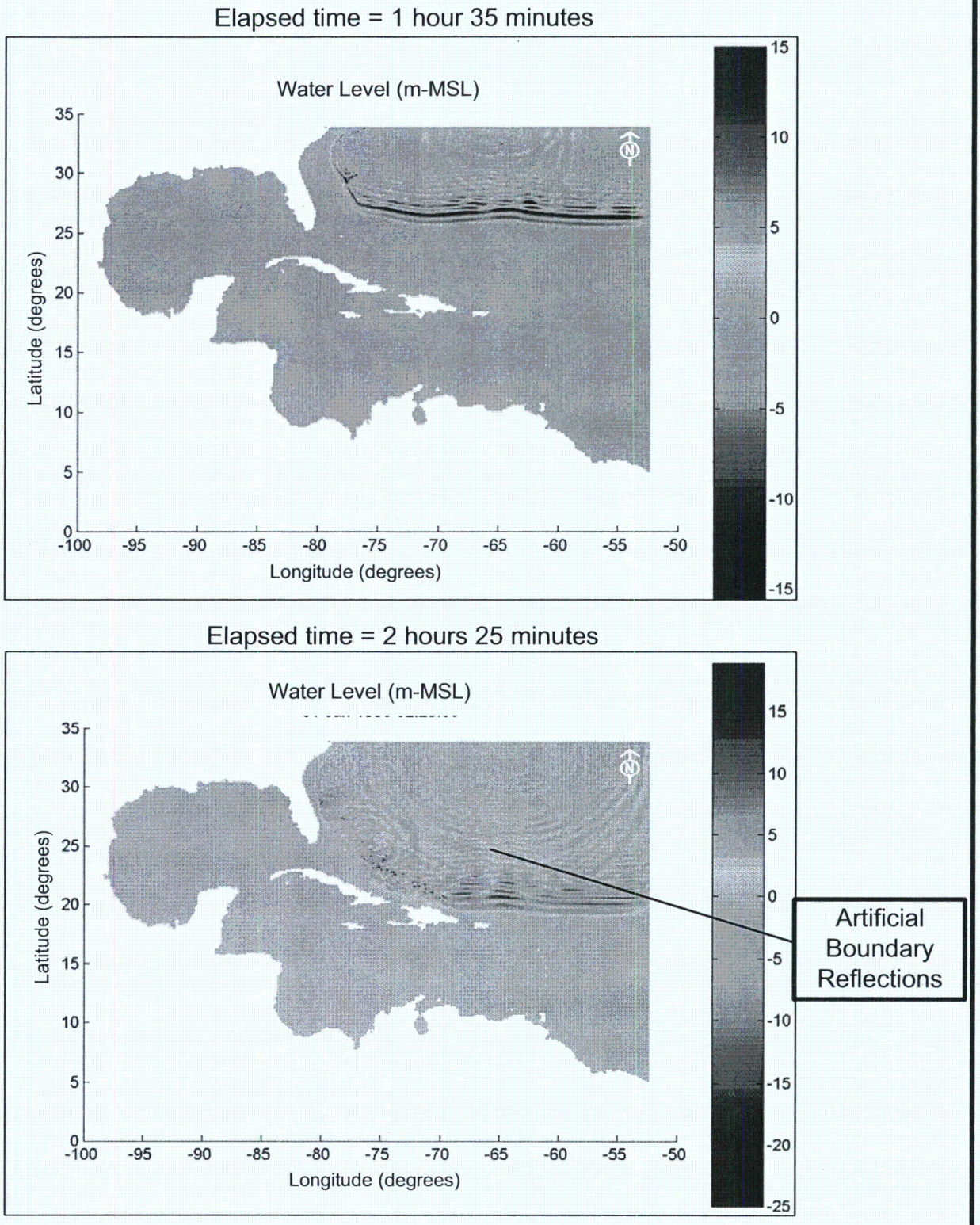
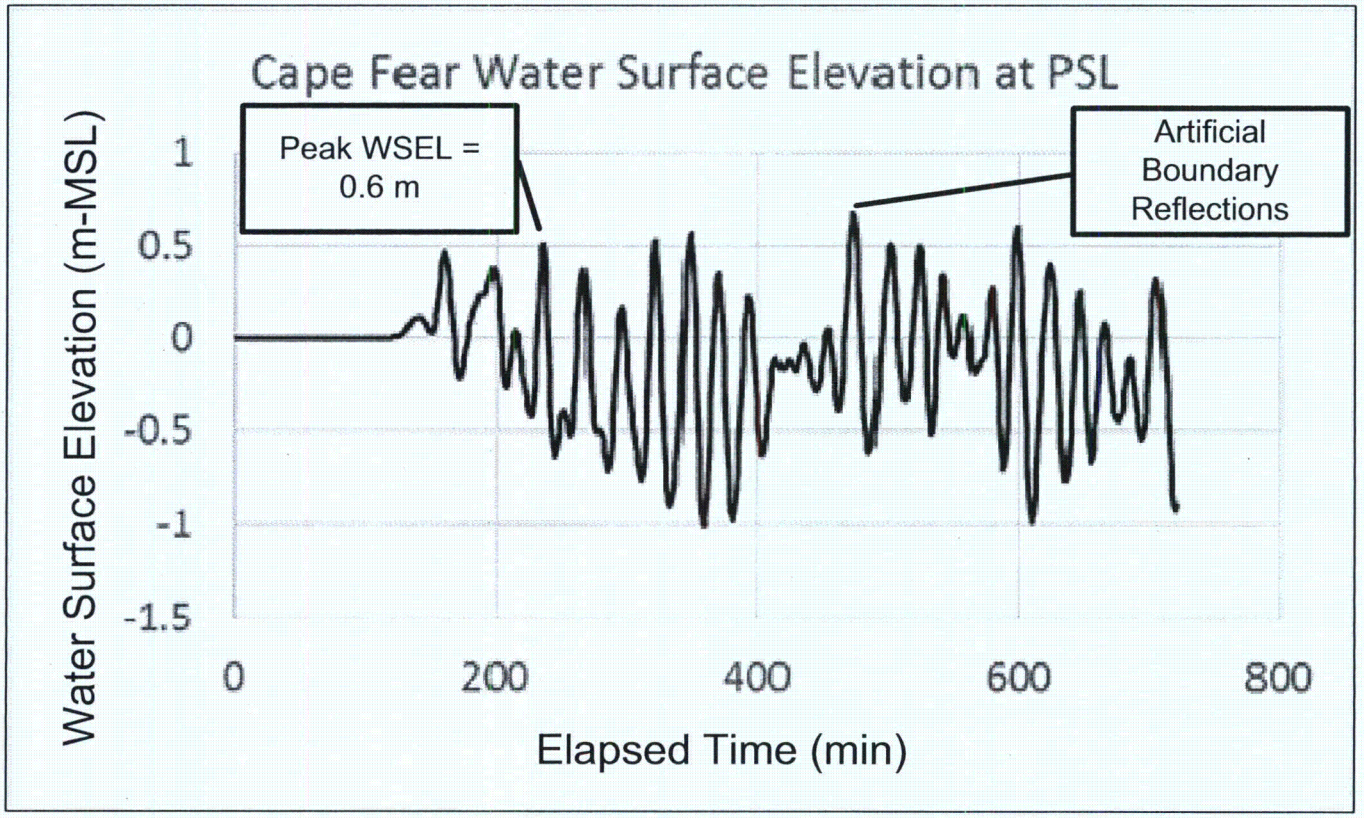
ENERCON

Figure 4-53
Cape Fear Landslide Source

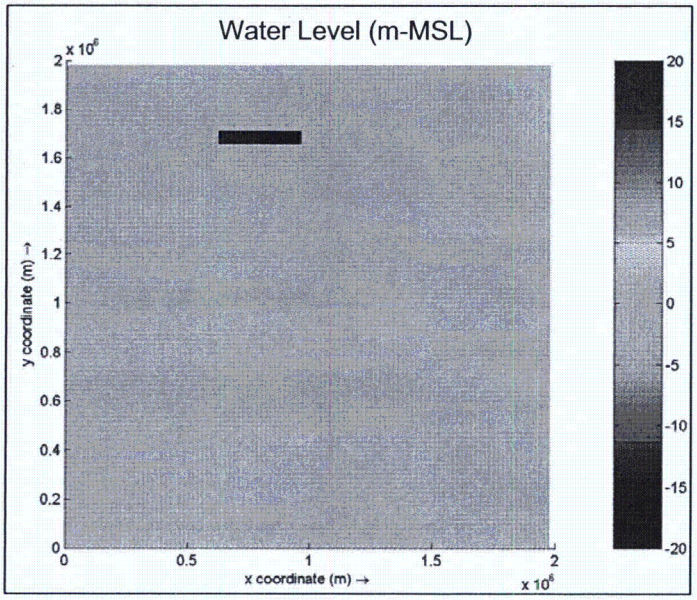

Cape Fear Boundary Time Series
Water Surface Elevation (m-MSL)
8
6
4
2
0
-2
-4
-6
-8
-10
0
50
100
150
200
Elapsed Time (min)



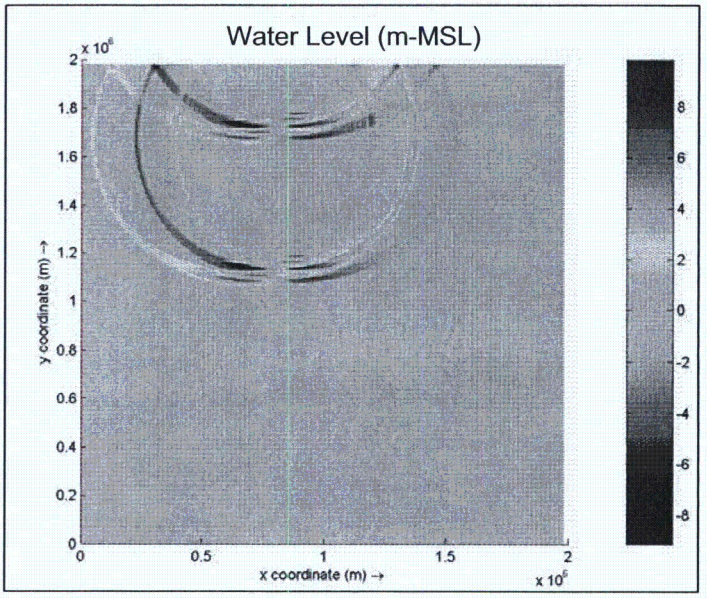
NextEra Energy (NEE) **St. Lucie Nuclear Power Plant Units 1 & 2** **Flooding Hazards Reevaluation Report**	ENERCON **Figure 4-55** Cape Fear Landslide
	FPL-072-PR-002 REV. 0


Cape Fear Water Surface Elevation at PSL
Peak WSEL = 0.6 m
Artificial Boundary Reflections
Water Surface Elevation (m-MSL)
1
0.5
0
-0.5
-1
-1.5
0
200
400
600
800
Elapsed Time (min)

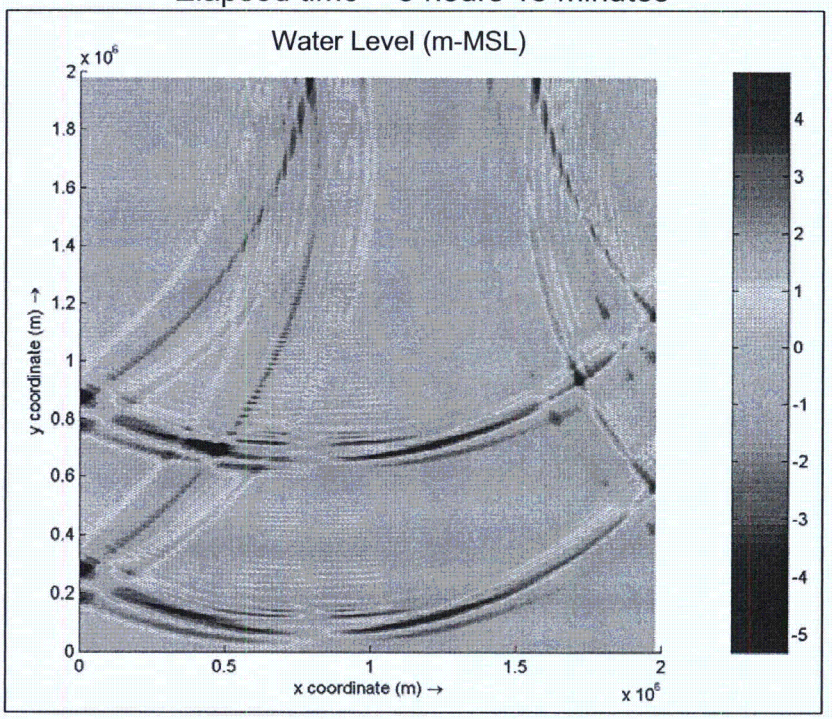
Elapsed time = 0 minutes



Elapsed time = 1 hour 10 minutes



Elapsed time = 3 hours 15 minutes



NextEra Energy (NEE)
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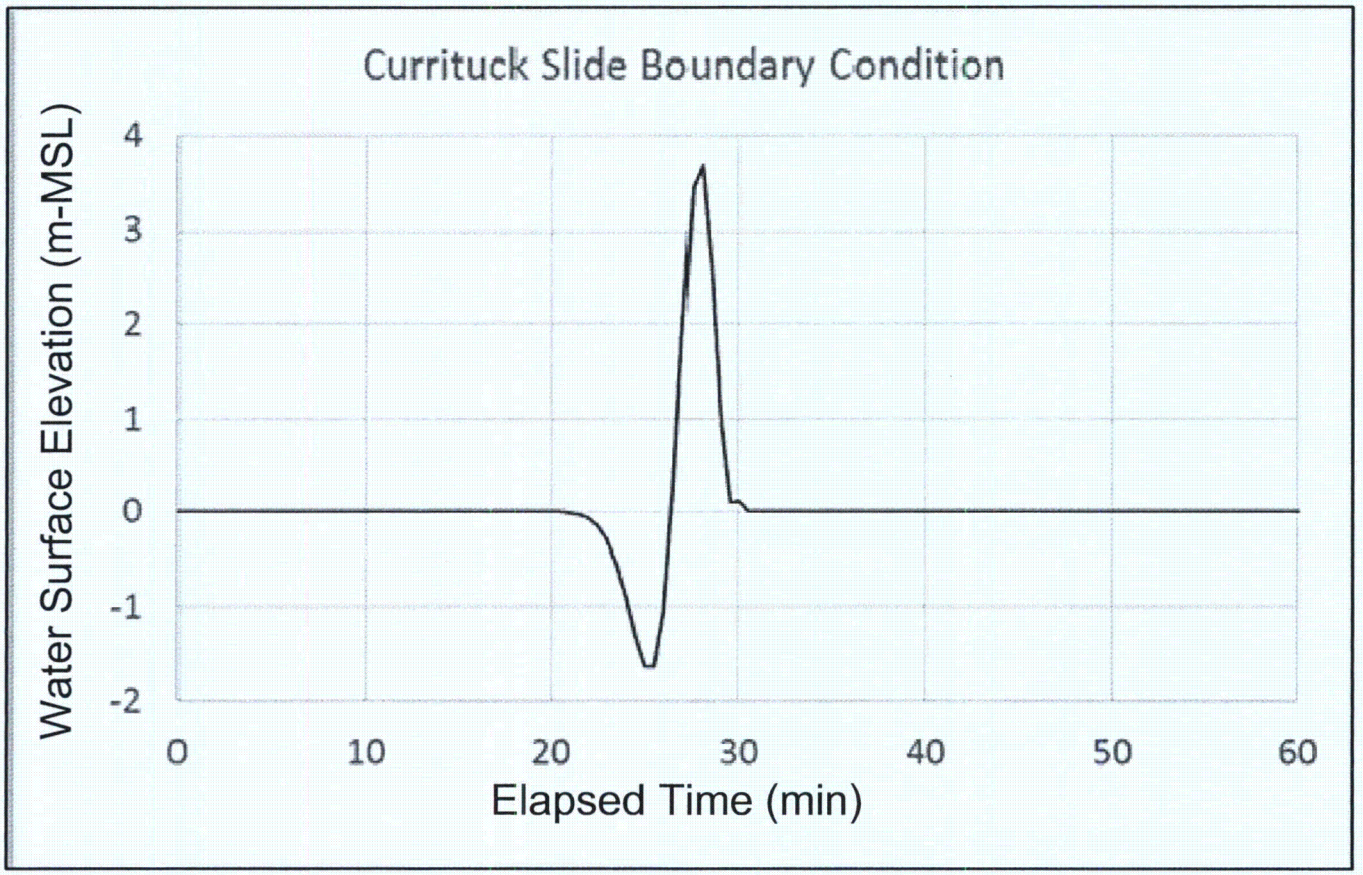
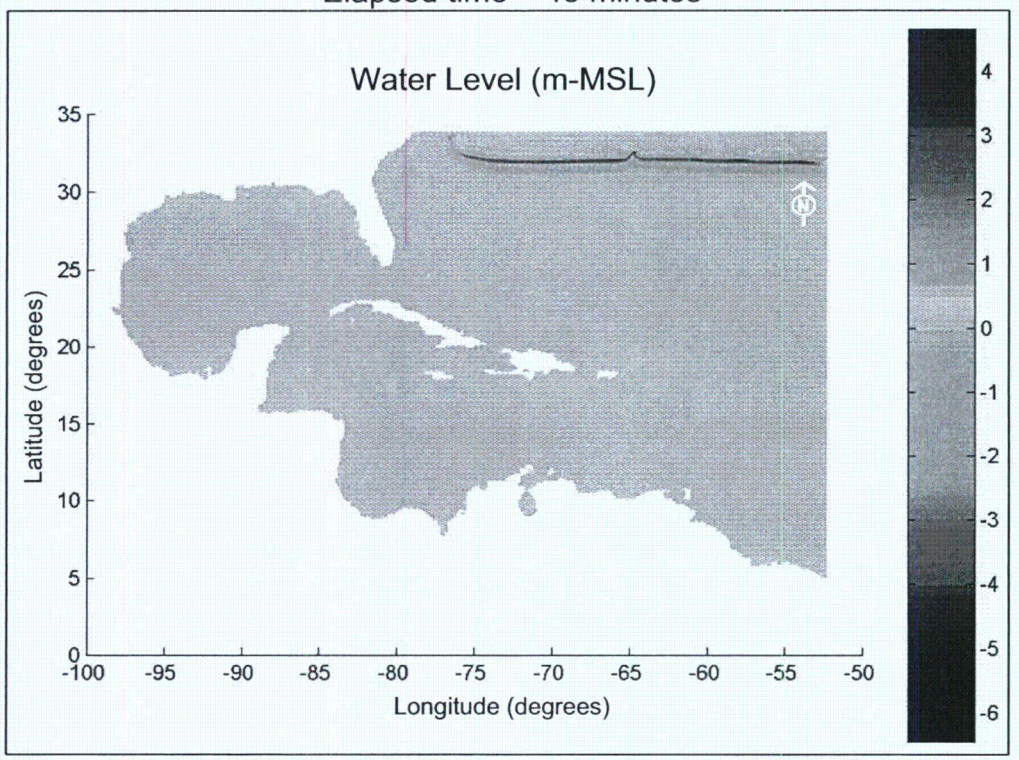
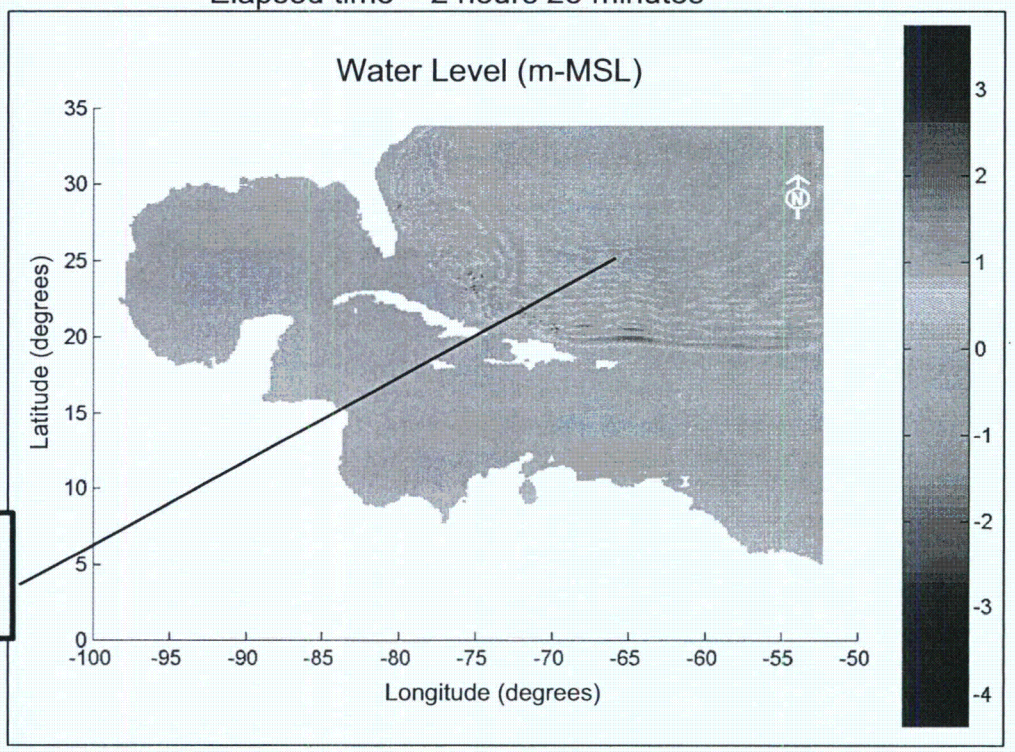
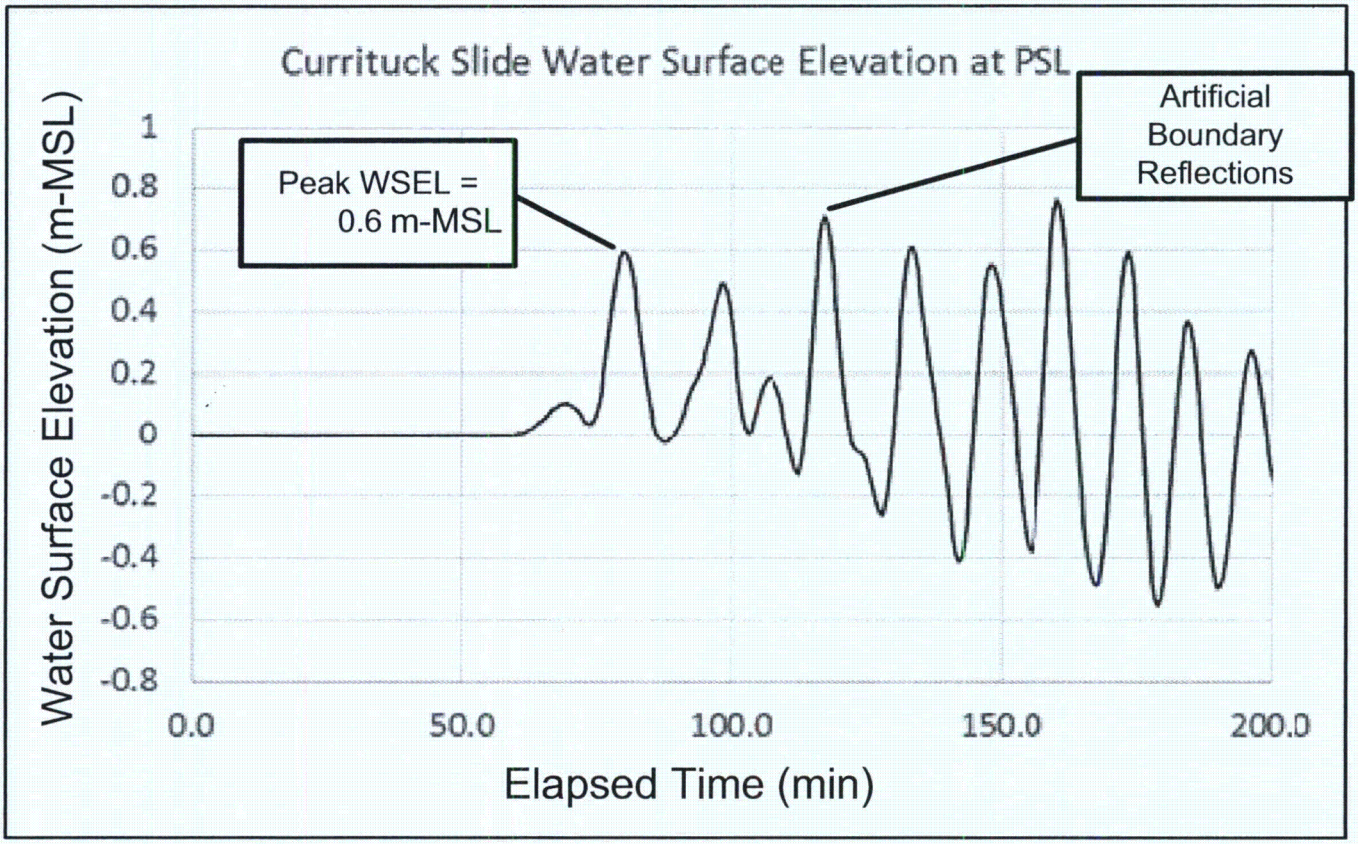
Figure 4-57
Currituck Slide Source

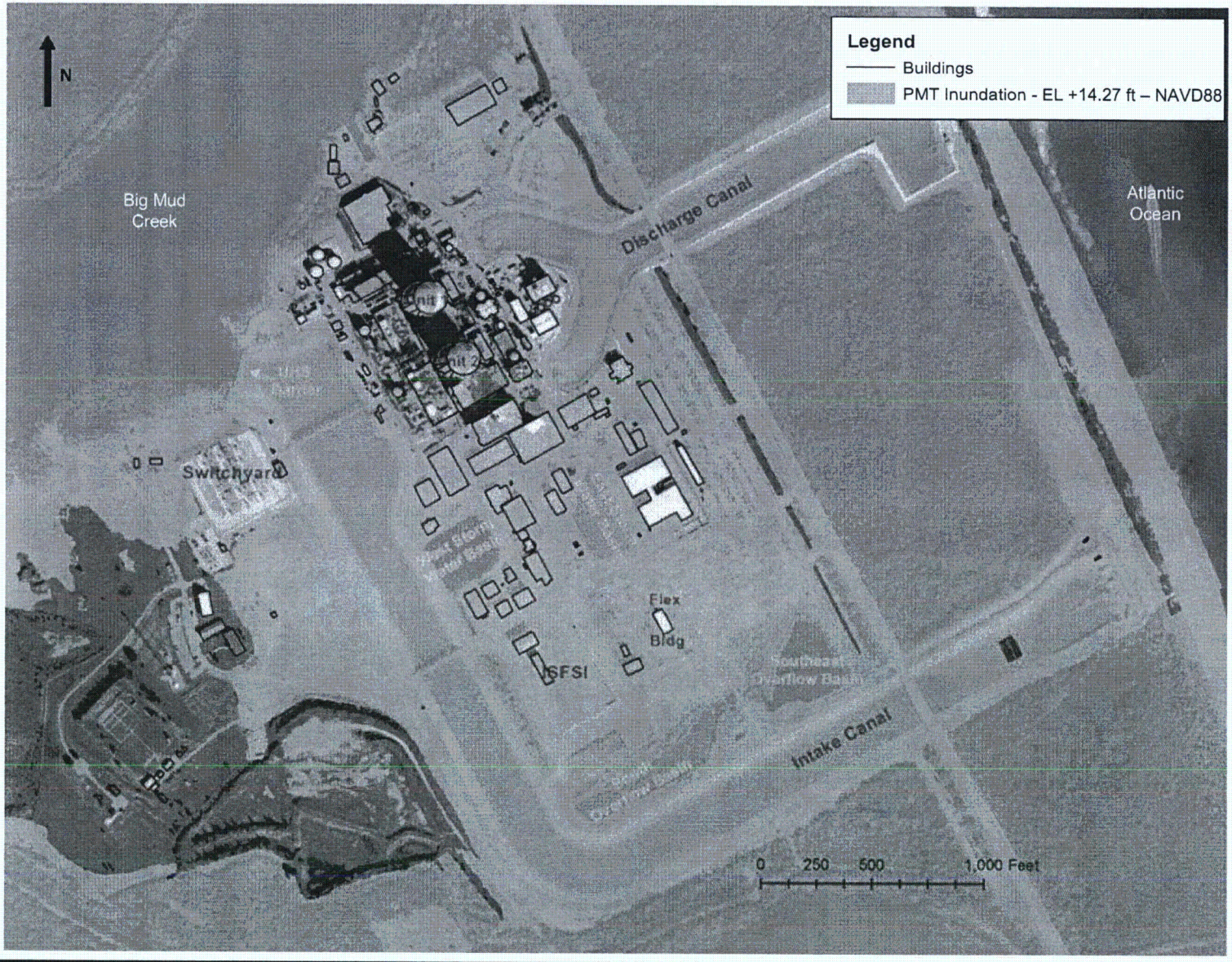

Currituck Slide Boundary Condition
Water Surface Elevation (m-MSL)
4
3
2
1
0
-1
-2
0
10
20
30
40
50
60
Elapsed Time (min)





Artificial Boundary Reflections


Currituck Slide Water Surface Elevation at PSL
Peak WSEL = 0.6 m-MSL
Artificial Boundary Reflections
Water Surface Elevation (m-MSL)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
0.0
50.0
100.0
150.0
200.0
Elapsed Time (min)



NextEra Energy (NEE)
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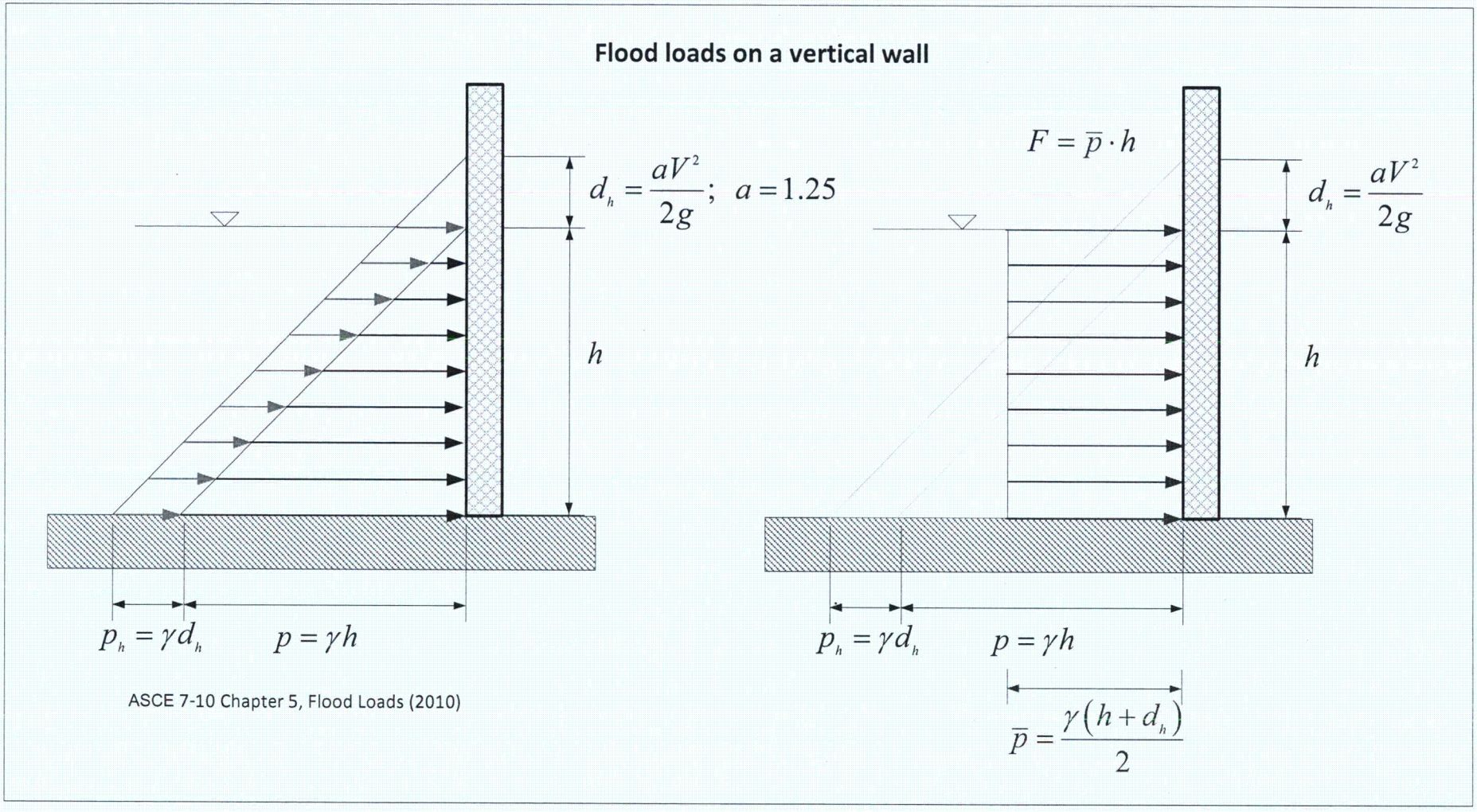
Figure 4-61
PMT Inundation at EL 14.27 ft-NAVD88

Reference: ESRI, 2014a



NextEra Energy (NEE)
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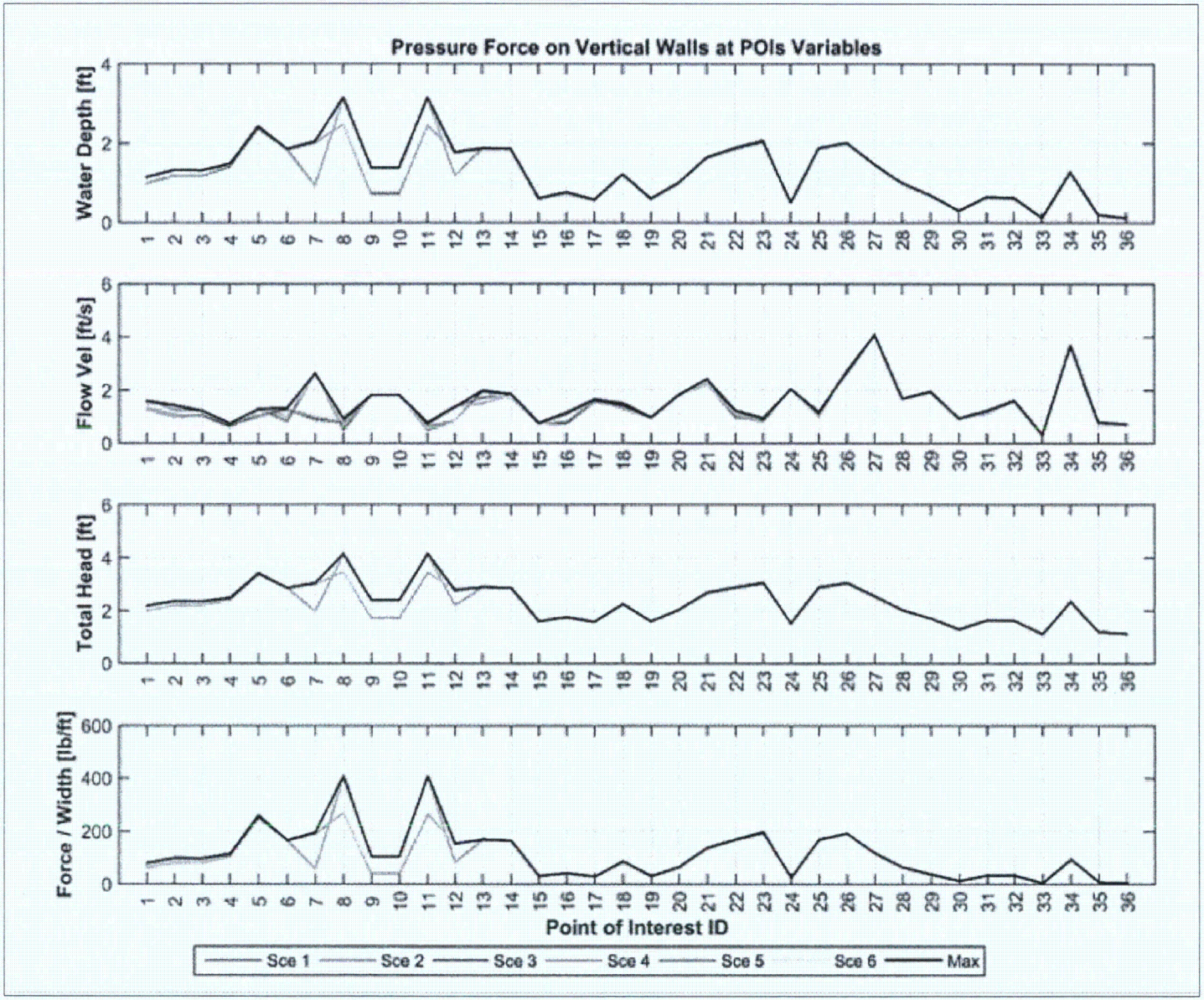
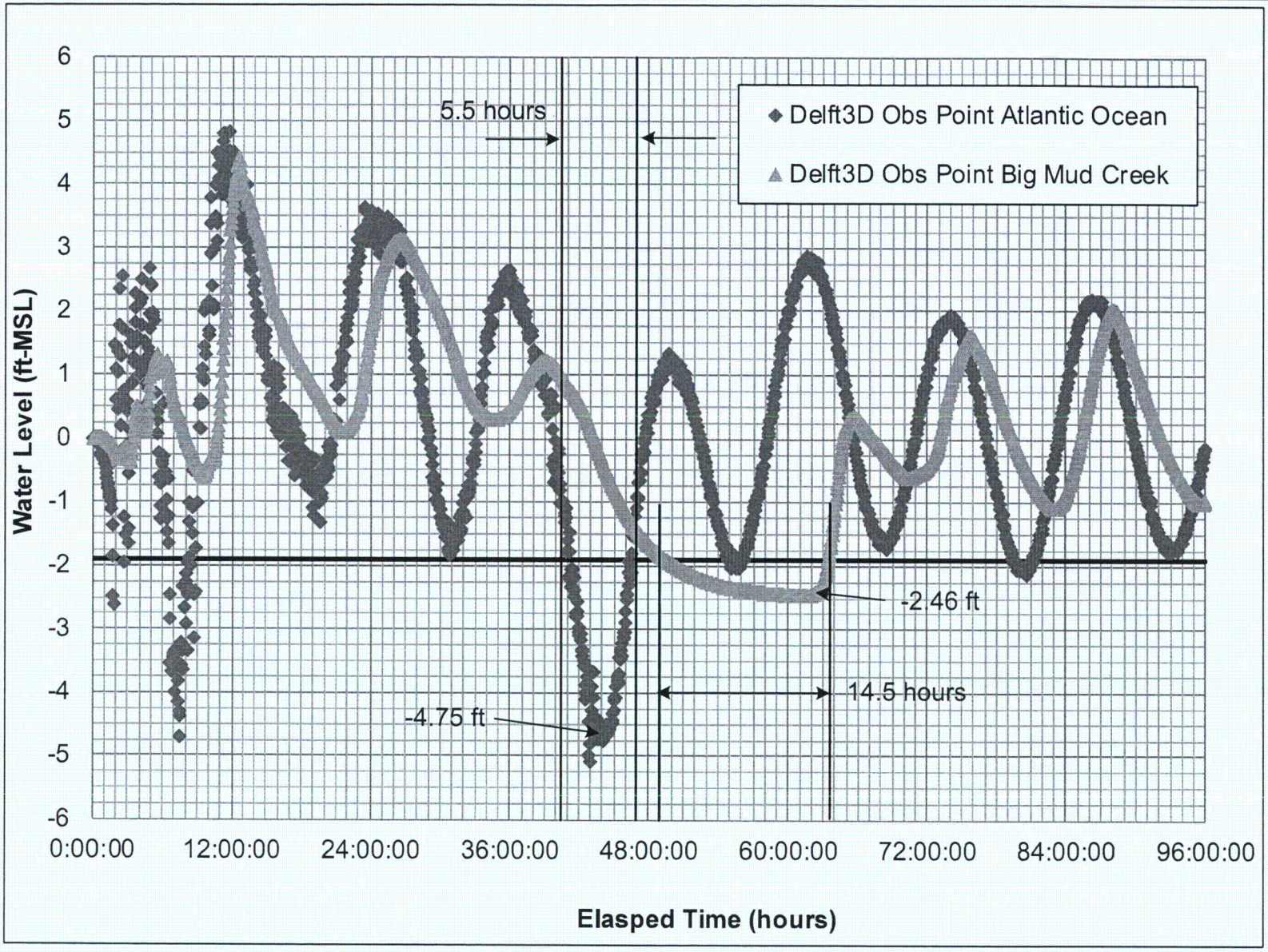
Figure 4-62
LIP Loading Diagram

Reference: ASCE, 2010


Pressure Force on Vertical Walls at POIs Variables
Water Depth [ft]
Flow Vel [ft/s]
Total Head [ft]
Force / Width [lb/ft]
Point of Interest ID
Sce 1
Sce 2
Sce 3
Sce 4
Sce 5
Sce 6
Max



NextEra Energy (NEE)
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Figure 4-64
Time Series of PMS Low Water