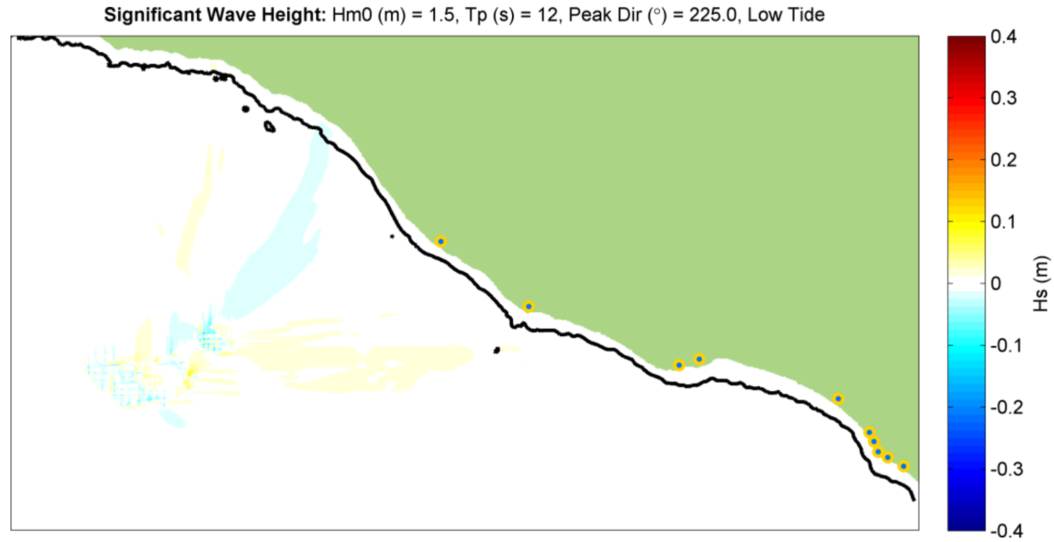
Potential Effects of Trans-Tasman Resources Mining Operations on Surfing Breaks in the Southern Taranaki Bight.



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Potential Effects of Trans-Tasman Resources Mining Operations on Surfing Breaks in the Southern Taranaki Bight.

Report Status

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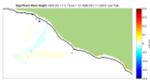
V 2	15 October 2013	Rev. 1	TH
V 3	16 October 2013	Rev 2	RM

It is the responsibility of the reader to verify the currency of the version number of this report.

Shaw Mead *BSc, MSc (Hons), PhD*



Cover page: Difference plot of wave height with and without dredge holes and mounds.

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1 Background

eCoast Marine Consulting and Research was commissioned by NIWA to investigate the impacts of Trans Tasman Resources (TTR) proposed offshore mining operations on surfing breaks in the Southern Taranaki Bight. For the extraction of minerals from seabed sediments, the sediment is first removed from the seabed (leaving a pit), and then after extraction of the mineral components from the load, a large proportion will be returned to the seabed (creating a mound). In both cases, there is potential to change the seabed (both local deepening and raising of the seabed), which can potentially affect waves by refraction (bending the wave path) and diffraction (lateral dispersion of wave energy) and locally by shoaling (changing the wave height) them as they pass over the modified seabed. This in turn could then potentially impact on surfing breaks on the coast. Seabed features of various scales, distances offshore and depths are well known to be instrumental in the formation of surfing breaks (Battalio, 1994; Beamsley, and Black, 2003; Mead *et al*., 2003; Mead and Frazerhurst, 2003; Mead *et al*., 2011), and so it follows that changes to the seabed offshore of surfing breaks have the potential to change wave characteristics at those breaks.

The two main parameters that could potentially be impacted, and so were the focus of the assessment, are the wave height and direction – these in turn can impact on wave peel angles and breaking intensity (Hutt *et al*., 2001; Mead and Black, 2001). In order to determine potential effects of seabed mining operations on wave characteristics at the shore, refraction/diffraction modelling of waves over the offshore sand extraction areas was undertaken. By comparing wave heights and directions of model outputs with and without the bathymetry modifications, nearshore changes to wave heights and directions at surfing breaks in the area were assessed.

Section 2 details the methods undertaken to assess changes to wave height and direction at Southern Taranaki surfing breaks due to the proposed mining operations. Section 3 presents the results, with the graphical outputs provided in Appendices 1, 2 and 3. Section 4 summarises and discusses the results and provides conclusions on the potential impacts of TTR mining operations on surfing breaks in the Southern Taranaki Bight.

This investigation is only directed at how changes to offshore bathymetry would potentially impact on surfing breaks and does not consider impacts on the nearshore sediment supply and transport regimes of the mining operation. The impacts on nearshore sediment supply and transport regimes have been investigated in other parts of the wider project; this assumption should be considered within the context of the results of those investigations.

2 Methodology

In order to determine the impacts on surfing breaks in the Southern Taranaki Bight inshore of the proposed mining operations, the following was undertaken:

1. Identification and description of surf breaks that could potentially be impacted.
2. Determination of the range of wave and wind conditions that result in good surfable conditions at each site.
3. Development of wave scenarios for modelling.
4. Development of bathymetry scenarios for mounds and holes generated during mining and incorporation into existing bathymetry (undertaken by TTR/NIWA).
5. Transformation modelling of the identified wave conditions using the existing and modified bathymetries for each case (undertaken by TTR/NIWA).
6. Development of difference plots and analysis of wave parameters (height and direction) at each of the surfing breaks.
7. Assessment of impacts on the 10 surfing breaks.

Figure 2.1 presents the location of the proposed mining operations. In Figure 2.2 it can be seen that there are 10 surfing breaks in the region – listed in Table 2.1. These 10 surfing breaks that could potentially be affected are listed in the New Zealand Surfing Guide[1] and are between Patea and Whanganui – there are few publicised breaks between Patea and Opunake to the north and Whanganui and Otaki to the south.

Surf breaks are rated between 1 and 10 in the New Zealand Surfing Guide; 1 low grade to 10 nationally significant. The 10 breaks of interest are rated between 3 (Kai-iwi) and 8 (The Point/Fences and South Break) (Figure 2.1 and Table 2.1). The primary tool utilised for this investigation is numerical modelling. In order to investigate the impacts on the breaks, the boundary conditions of the waves (height, period and direction), the winds (speed and direction) and tidal elevation for which the surfing breaks work best needed first to be determined – e.g. there would be no point in

[1] The NZ Surfing Guide and its classification scheme were used to select the 17 Surfing Breaks of National Significance listed in the NZCPS 2010 (Policy 16), and so it was applied for this investigation.

modelling 0.5 m high short period waves with a 30 knot SW wind, since the surf quality would likely be unsurfable.

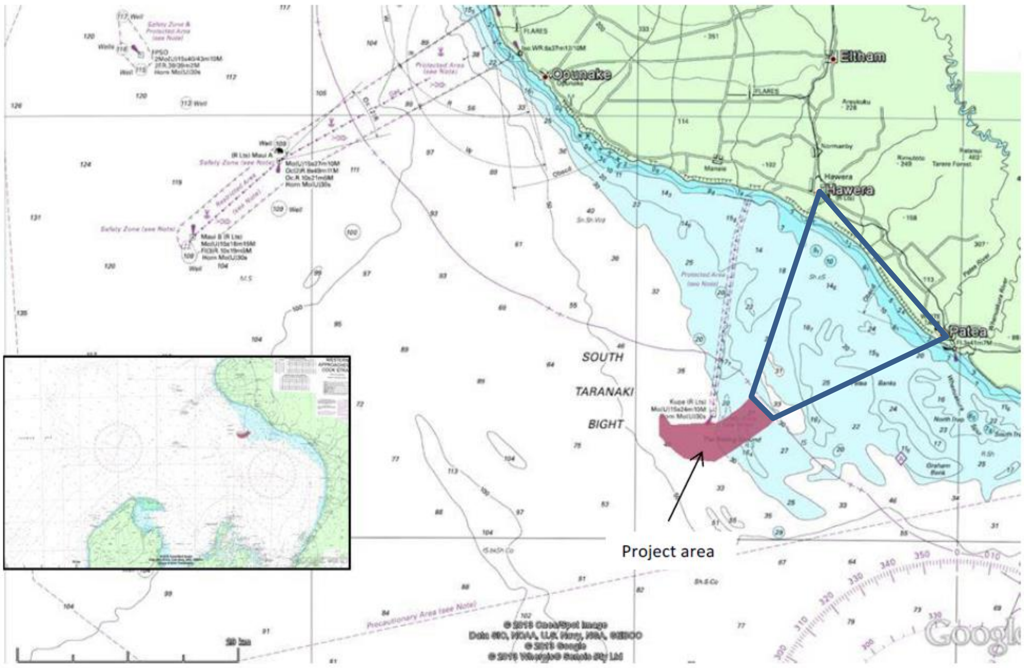


Figure 2.1. Location map of proposed mining operations between 22 and 36 km offshore of in the Southern Taranaki Bight, comprising some 65.76 km^2 of seabed area.

Figure 2.2. The locations of the 10 surf breaks in the Taranaki Bight inshore of the proposed mining operations. See Table 2.1 for the names of the breaks.

2.1 Surfing Parameter Evaluation

To determine the conditions most conducive to surfing for the 10 breaks, the NZ Surf Guide and conversations/communications with long-time local surfers were used. It was found that the optimum wave conditions were longer period (>12 sec), clean swells from the south west to west-southwest with light offshore (NE) winds, or no winds. A variety of wave heights and tidal levels were found to be the best for the different breaks, which along with the NZ Surf Guide rating and comments from local surfers, are summarised in Table 2.1. Local surfers also noted that periodic changes in sediment supply at the breaks is an important factor for all of them with respect to surfing wave quality.

From the investigation into the best waves/conditions for surfing at the 10 breaks, a set of wave conditions were developed to represent the best conditions that could be used to determine impacts on the breaks due to proposed seabed modification. Those conditions are summarised in Table 2.2, which comprise wave heights that the breaks work best on, two wave directions that represent the available and common swell corridor (SW to WSW)[2], and low, mid and high tides. Modelling of long-period monochromatic waves is considered the worst case scenario when considering the impacts of offshore seabed modification (Black, 2006).

To determine the impacts on wave conditions due to the offshore seabed modifications (8 cases), the wave conditions were modelled over the undisturbed/existing seabed and the 8 modified seabeds, then differences of wave height and directions were calculated by subtracting values obtained with modified bathymetry from values obtained with undisturbed seabed – i.e. 24 x 9 conditions, a total of 216.

The 8 cases of proposed seabed modification are presented in Appendix 1. It is important to note that these bathymetry scenarios are extreme worst case scenarios. The represent holes and columns of sand up to 8 m high, which in reality could not

[2] The long-period swell corridor is very restricted for the part of the Southern Taranaki Bight where the 10 surfing breaks area located – Farewell Spit restricts southwest swells and Tasmania restricts western swells. However, long-period southwest swells can refract into these breaks due to the relatively wide and shallow continental shelf.

exist to these exact dimensions even a short period of time in still water conditions, i.e. the sides of these holes would slump and they would fill and the mounds would slump to the natural angle of repose. Even so, the potential mounds are 150-200 m wide, and so they could potentially reach the maximum heights and depths over much of the areas depicted in the scenario bathymetries. In addition, large areas of smaller (~1 m) seabed change are also represented and modelled (Appendix 1).

Table 2.1. Surfing parameters of the 10 surf breaks in the Taranaki Bight inshore of the proposed mining operations. See Figure 2.2 for locations.

	Break	Swell Direction	Wind	Best Tides	Surfing Level	Rating	Comment NZ Guide	Comments by local surfers
1	Patea River Mouth	SW	NE	All	All	7	Serious currents	<2 m swell best
2	Waverley	SW	NE	MTH	All	6	Little known	Not very good, no-one surfs here
3	Waiinu	SW	NE	All	All + learners	6	Good on small days	Popular with tourist >3 m
4	The Point/Fences	SW	NE	MTH	Experts	8	Fickle	Popular with tourist >3 m
5	Kai-iwi	SW	NE	MT	All	3	Generally inconsistent/Shifty	1.5-2.5 m
6	Longbeach Dr.	SW	NE	HT	All	4	Difficult to catch on	1.5-2.5 m
7	Rangiora St.	SW	NE	HT	All	4	Shifty	1.5-2.5 m
8	North Mole	SW	NE	LTM	Competent	6	Shifty	1.5-2.5 m
9	Wanganui River Mouth	SW	NE	LT	Competent	5	Needs huge swells	No longer inside the river
10	South Break	SW	NE	LTM	Competent	8	Outfall focus	Focusses well on lower tide and long period

Table 2.2. Wave conditions modelled for the 10 surfing breaks.

	Wave Type Condition			
	Tide	Hs (m)	Tp (s)	Dir (°T)
1	Low	1.5	12	225
2	Mid	1.5	12	225
3	High	1.5	12	225
4	Low	1.5	12	247
5	Mid	1.5	12	247
6	High	1.5	12	247
7	Low	1.5	16	225
8	Mid	1.5	16	225
9	High	1.5	16	225
10	Low	1.5	16	247
11	Mid	1.5	16	247
12	High	1.5	16	247
13	Low	3	12	225
14	Mid	3	12	225
15	High	3	12	225
16	Low	3	12	247
17	Mid	3	12	247
18	High	3	12	247
19	Low	3	16	225
20	Mid	3	16	225
21	High	3	16	225
22	Low	3	16	247
23	Mid	3	16	247
24	High	3	16	247

While an extensive coincident wind and wave data analysis has not been undertaken to determine the yearly average that good surfing conditions occur at the breaks, some understanding can be gained by considering the available long-term wave and wind data for the Southern Taranaki Bight[3]. Figure 2.3 to Figure 2.5 present long-term wind and wave data for the Bight, and from these data it was found that:

1. Calm winds or winds from the NE occur ~17% of the time, and;

[3] Wave and wind data for the location were extracted from the global database of WaveWatch3 (WW3) 3-hourly wave data and the Global Forecast System (GFS) winds.

2. Waves from the SW to WSW with heights of 1-3 m and periods >12 sec occur ~22% of the time.

Additional surfable conditions will occur during light winds from other directions, and during shorter period events with conducive winds.

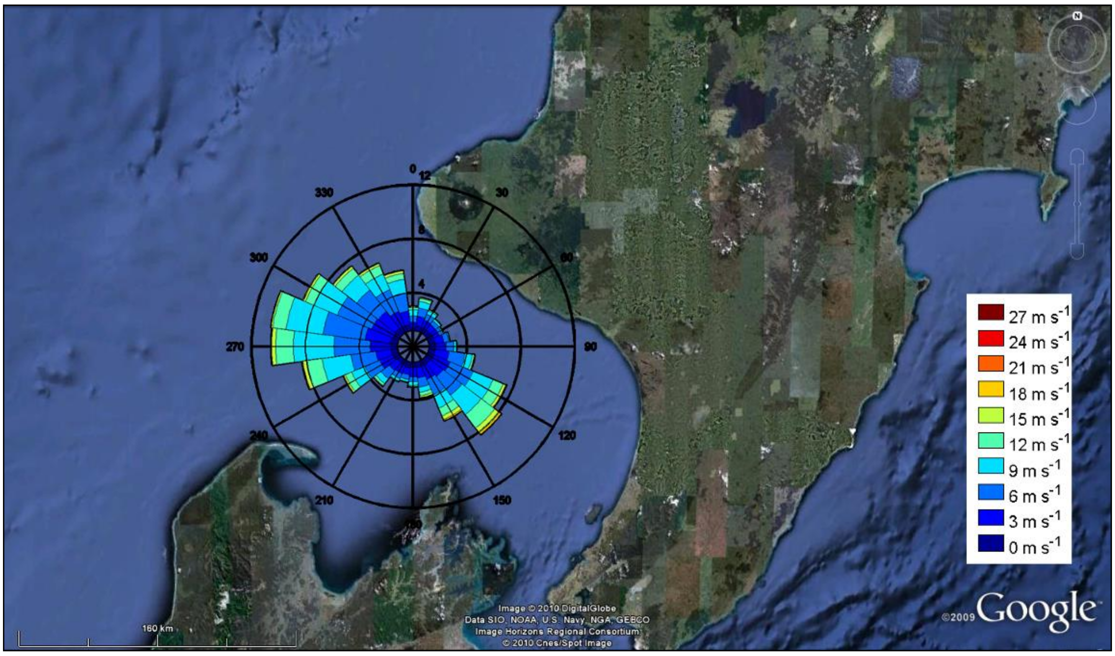


Figure 2.3. Rose plot of long-term (1997-2009) wind speed and direction at a location southwest of the southern tenement at latitude longitude -40° 173.5°.

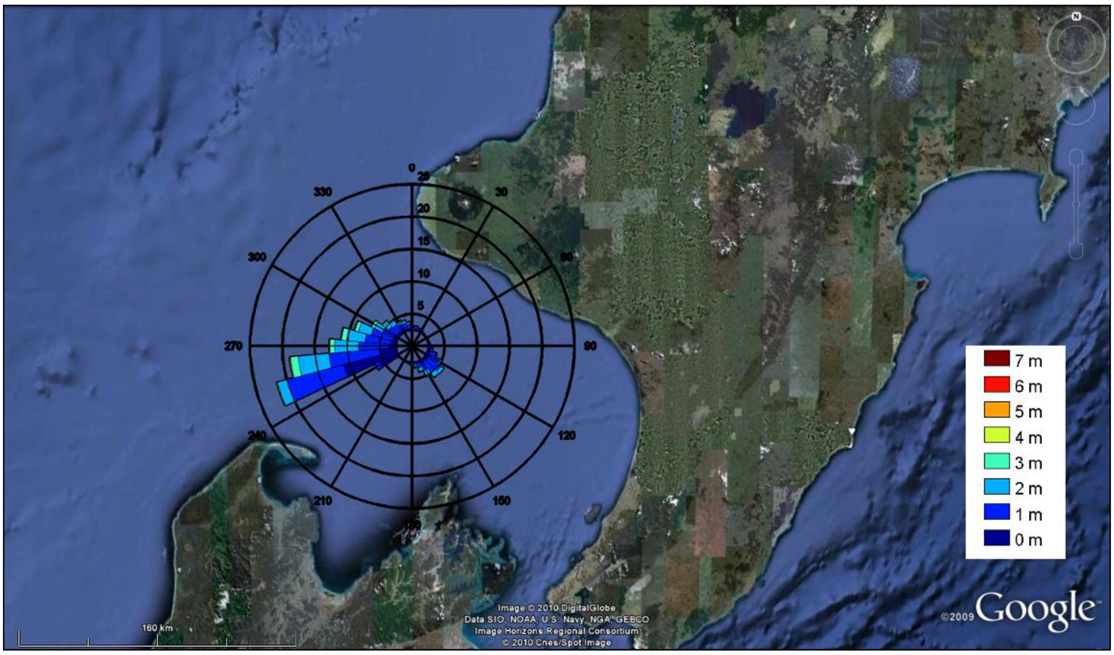


Figure 2.4. Rose plot of long-term (1997-2009) wave height and direction at a location southwest of the southern tenement at latitude longitude -40° 173.5°.

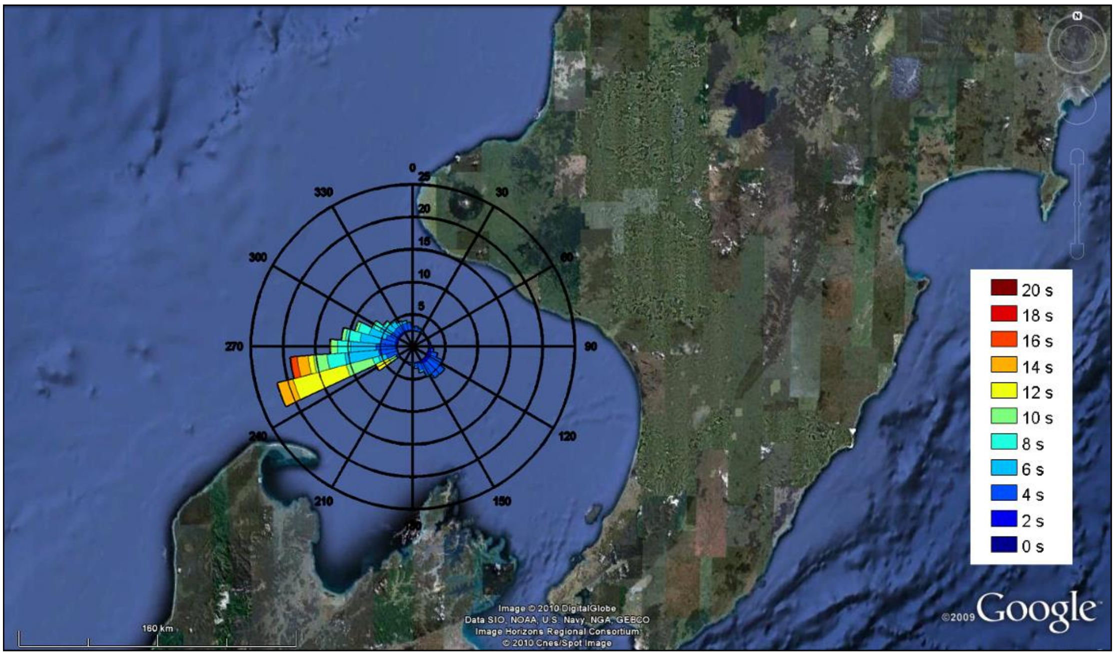


Figure 2.5. Rose plot of long-term (1997-2009) wave period and direction at a location southwest of the southern tenement at latitude longitude 40°S 173.5°W.

2.2 Transformation Modelling

Transformation modelling into these breaks and comparison of the results with and without seabed changes due to sand-mining allowed for the consideration of the potential effects on these breaks in terms of changes to wave height and direction.

The potential impacts of these modifications to the seabed are due to changes in wave height and direction at the breaks due to refraction/diffraction over the mounds and holes offshore of the surfing breaks. The effects of bathymetric variations on gravity wave propagation are well documented and are fundamental models of marine science (e.g. Komar, 1976). The refraction of gravity waves occurs once the water depth is approximately equal to or less than half the wavelength; wave speed becomes a function of depth as wave speed over group speed tends to unity, with wave celerity (speed) reducing with reducing depth. As a result of the changing wave speed with respect to water depth, waves refract, or bend, resulting in changes in both wave direction and wave height.

The refraction of waves is simply described by Snell's Law, where the incident angle decreases with decreasing water depth (and speed). Refraction tends to align wave fronts to bathymetric contours. Where wavelengths are large, the refraction of waves can occur at a significant distance from the coast (Mead *et al.,* 2003, 2011). For example, a 16 second period wave has a wave length of ~400 m, so will start to 'feel' the seabed at depths of half this wave length, 200 m (i.e. the edge of the continental shelf).

Refraction can result in a shift in wave energy, manifested as wave height, focussing or de-focussing to increase or decrease wave height, respectively. As the breaking of waves is primarily a function of wave height the consequent effects of refraction are displayed in the breaking patterns at the coast, and overtime the nearshore topography. Thus, modifications of the seabed (i.e. creating pits and mounds) offshore of surfing breaks has the potential to modify wave breaking patterns at the inshore surfing sites.

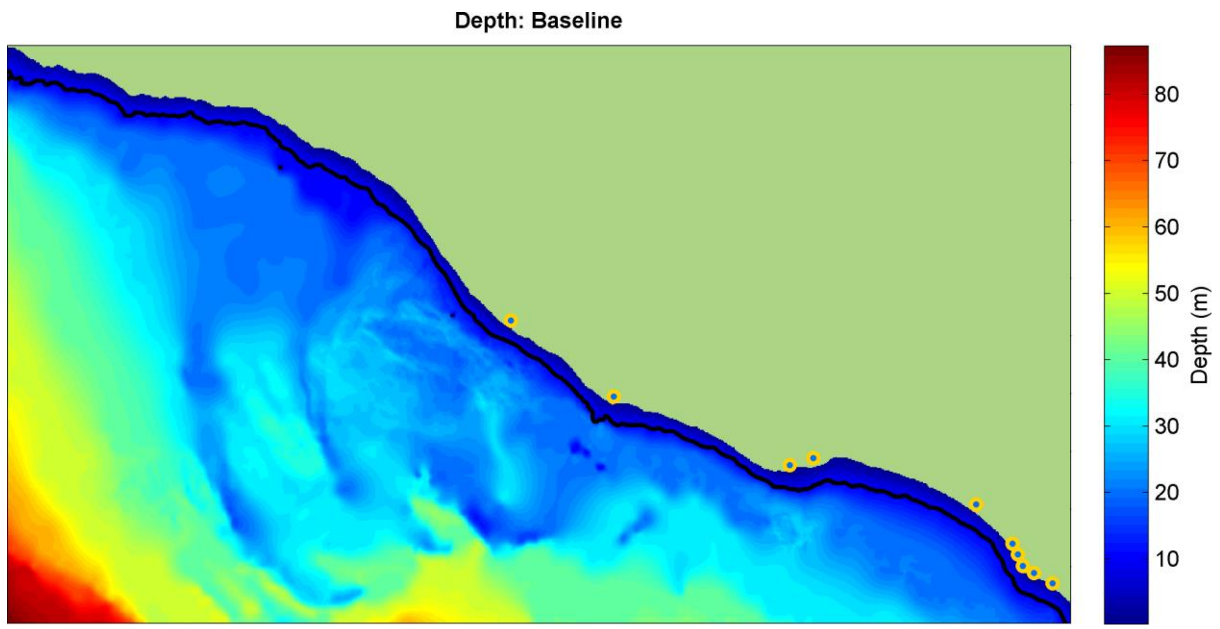
2.2.1 Model Description – SWAN

Wave transformation modelling of the offshore wave conditions inshore to the breaks was undertaken using SWAN by NIWA (Gorman, 2013). SWAN is used to model irregular waves based on deep water wave conditions, wind, bottom topography, currents and tide. SWAN explicitly accounts for all relevant processes of propagation, generation by wind, interactions between the waves and decay by breaking and bottom friction. The Model domain is shown in Figure 2.6.

SWAN (Simulating WAves Nearshore) is a third generation ocean wave propagation model, incorporating current knowledge regarding the generation, propagation and transformation of wave fields in both deep water and nearshore regions. SWAN solves the spectral action density balance equation for frequency-directional spectra. This means that the growth, refraction, and decay of each component of the complete sea state, each with a specific frequency and direction, is solved, giving a complete and realistic description of the wave field as it changes in time and space.

Physical processes that are simulated include the generation of waves by the surface wind stress, dissipation by white-capping, resonant nonlinear interaction between the wave components, bottom friction and depth limited breaking. The model is described fully in the user manual (Booij *et al*., 2004). In the SWAN surfing break impact simulations, wind input, nonlinear interactions and white-capping were turned off – these parameters could be disregarded because no wind input was used and high directional resolution (5°) was required (R. Gorman, pers. Comm).

Boundaries were developed using the best wave conditions developed for surfing at the 10 sites[4] (Table 2.2). The wave spectrum at the outer (offshore) boundaries of the model domain at any particular time were specified, this in combination with the generation by wind, and transformations within the domain determine the wave field throughout. Dissipation of waves by friction was included in the simulations and used the JONSWAP formula, with a friction factor of 0.038. Depth limited breaking was included with a depth dependent breaking criterion of 0.78. Energy loss by whitecapping is also included in the Model.



[4] No wind was used in the simulations, i.e. calm conditions were simulated.

Figure 2.6. The Model domain used for transformation modelling with SWAN showing the existing bathymetry.

3 Results

The results of differencing the outputs for each scenario (different holes and mounds in the bathymetry) with the existing scenario (no changes to the seabed) for wave heights and directions are presented in Appendices 2 and 3, respectively.

3.1 Impacts on Wave Height

From the results of the differencing, only Case 1 seabed modification has an appreciable impact in the nearshore (i.e. ~10 m deep) at Patea and Waverley (Figure 3.1), in all the other cases, the impacts are localised in the area of offshore seabed modification (Figure 3.2). In all cases, the largest changes occurred during the longer periods and higher wave conditions, which is as expected due to refraction being a function of wave-length (i.e. longer period waves have longer wave lengths and so more refraction potential). As is evident in the most extreme result presented in Figure 3.1, the changes in wave height along the coast at the 10 m contour are less than 0.1 m (0-0.03 m) for waves 3 m high (<1%). Therefore impacts on wave heights are considered insignificant with respect to impacts on surfing quality.

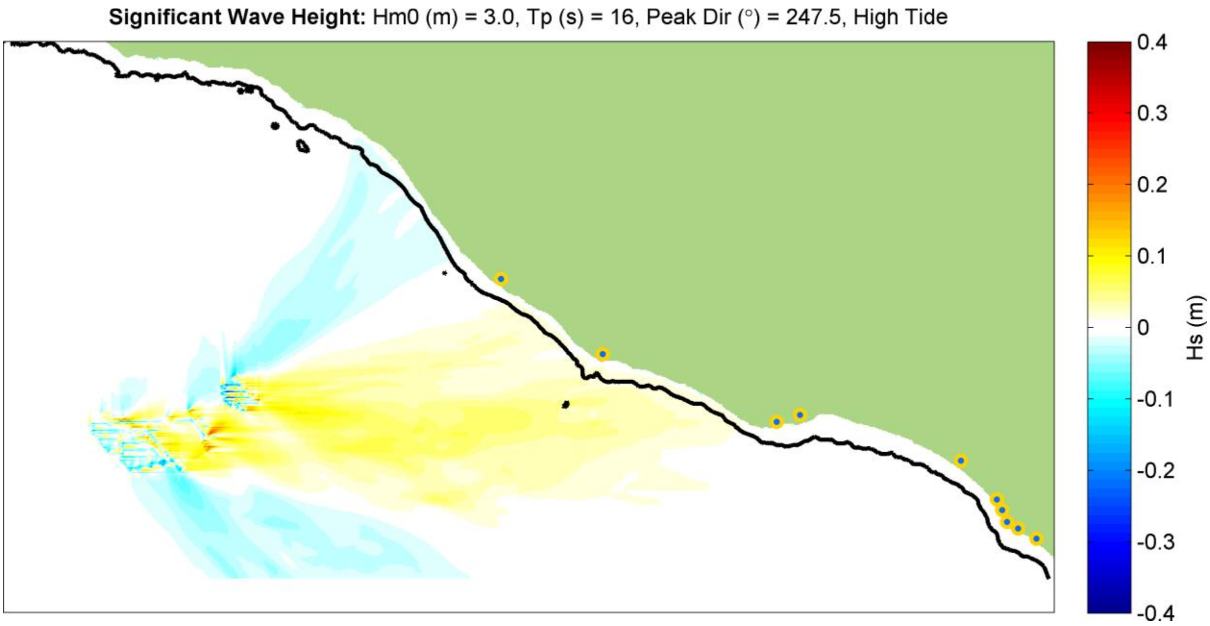


Figure 3.1. The maximum impact in modified wave heights due to Case 1 with 16 second period and 3 m wave height from the WSW. The 10 m contour is shown off of the coast as the black line.

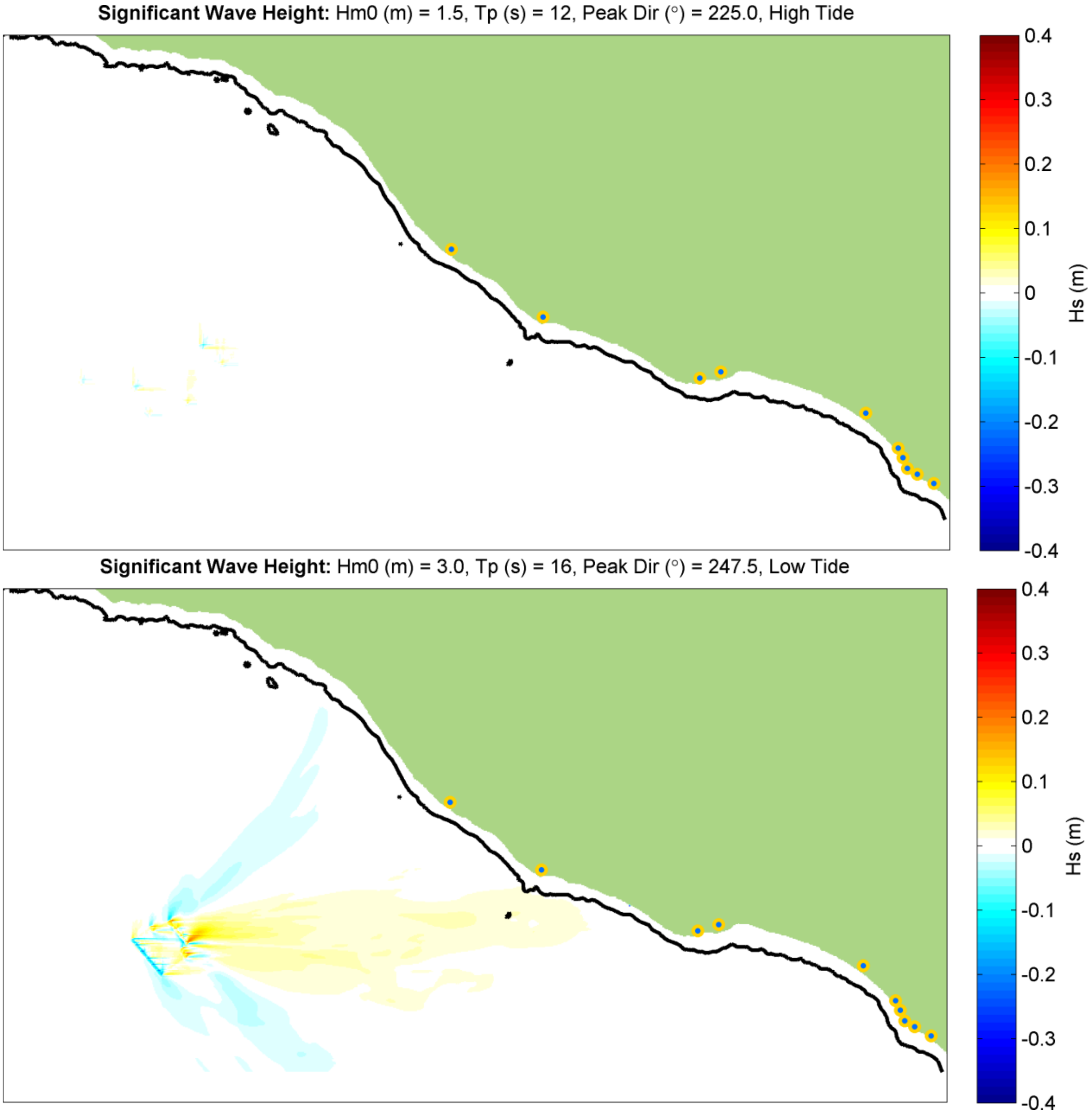


Figure 3.2. The typical impact in modified wave heights due to seabed modification for cases other than Case 1 (top), and the typical greatest changes during 16 second period and 3 m wave heights from the WSW (bottom). The 10 m contour is shown off of the coast as the black line.

3.2 Impacts on Wave Direction

With respect to modification of wave direction, again Case 1 seabed modification has the largest impact (Figure 3.3) – as would be expected since the bathymetry has the greatest modifications. As can be seen in Figure 3.3, the greatest changes to wave direction are localised. This is because the process of refraction, i.e. the change in wave speed due to depth, is quickly compensated for due to the confined nature of the seabed perturbation – the wave direction soon responds to the following/existing seabed contours. As a result, even in Case 1, the wave directions changes become <2° not far after passing the seabed perturbations and are back to existing seabed directions by the ~10 m depth contour in the most extreme cases – at this depth, waves have been aligned close to the depth contours. In all cases, the largest changes occurred during the longer periods and higher wave conditions, which is as expected due to refraction being a function of wave-length (i.e. longer period waves have longer wave lengths and so more refraction potential), although in comparison to the changes in wave height, they do not persist to the inshore zone. In most cases, any changes to wave directions are corrected (due to refraction) well before the coast (Figure 3.4). Therefore impacts on wave directions are considered insignificant with respect to impacts on surfing quality.

A matrix was created to record the cases that impacted on the 10 breaks incorporating tide, wave height, period and direction. As can be seen in Table 3.1, the matrix is sparsely populated due to the few cases that showed an effect at the breaks.

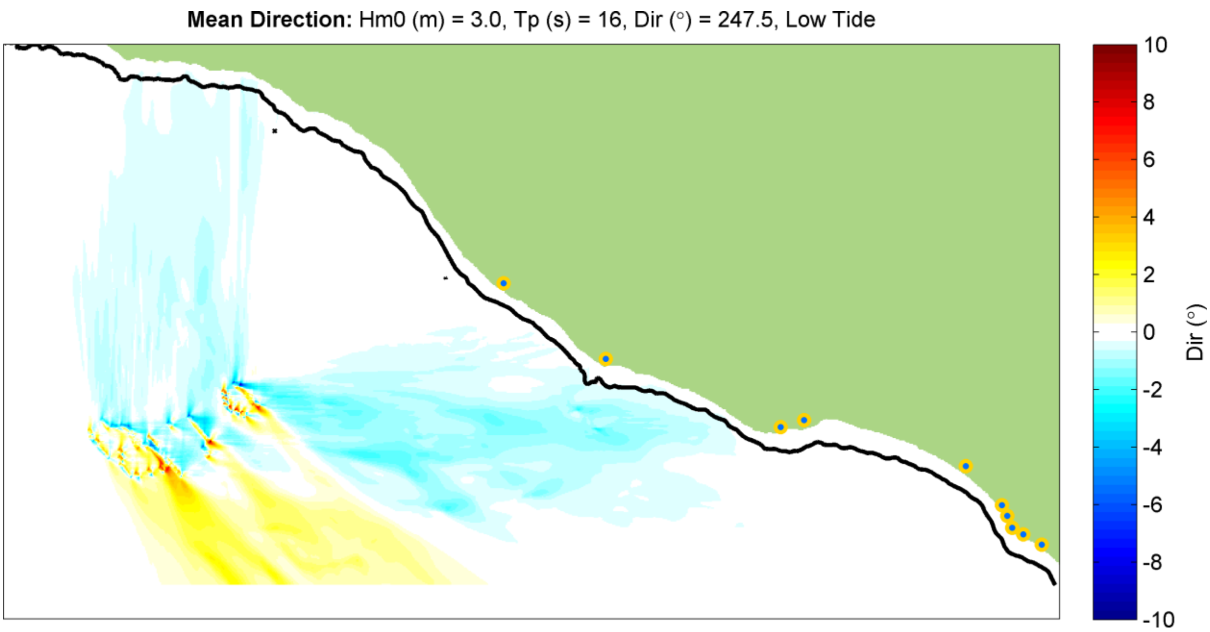


Figure 3.3. The maximum impact in modified wave directions due to Case 1 with 16 second period and 3 m wave height from the WSW. The 10 m contour is shown off of the coast as the black line.

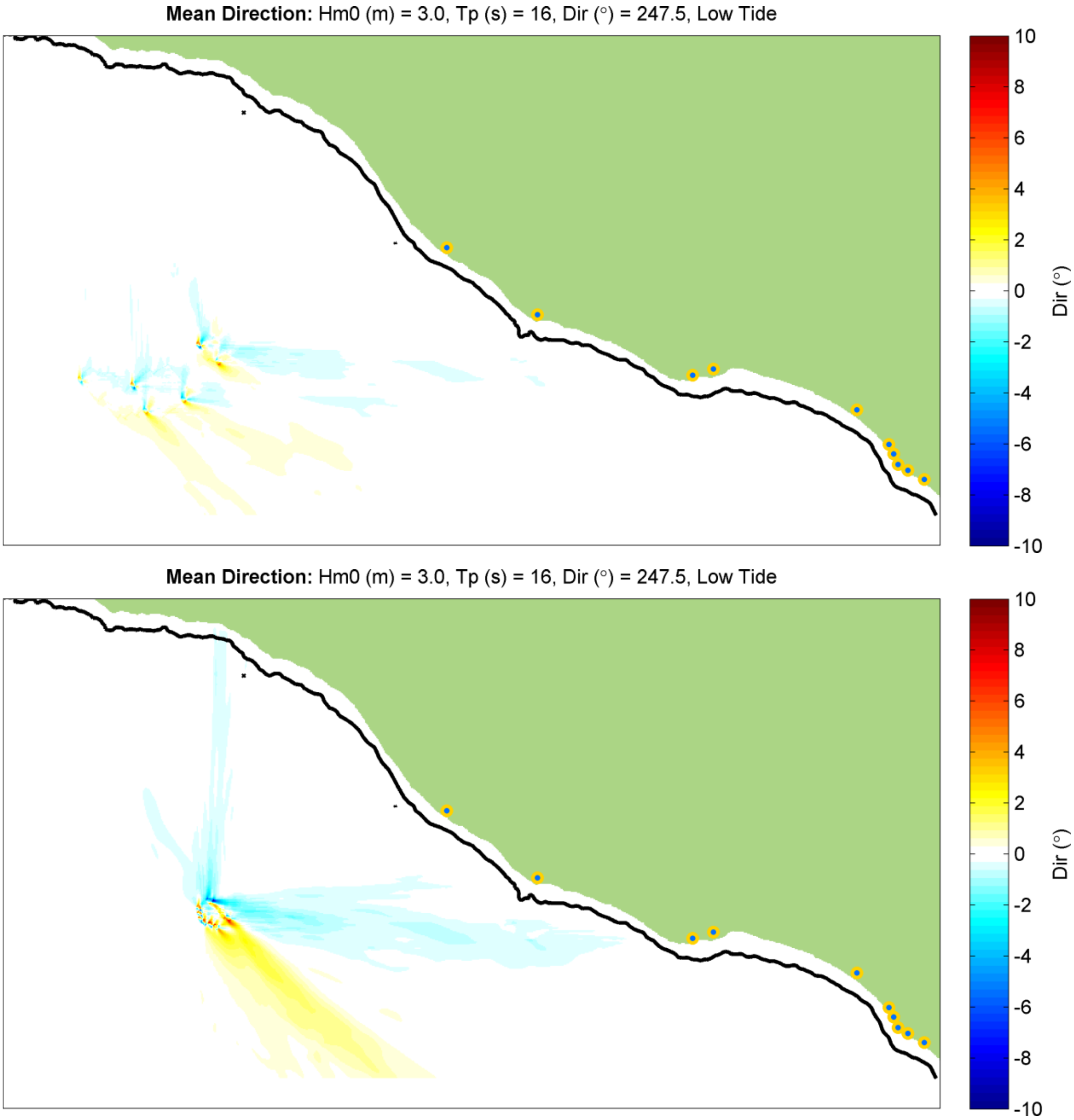


Figure 3.4. The typical impact in modified wave direction due to seabed modification for cases other than Case 1 (top), i.e. only local changes, and the changes during 16 second period and 3 m wave heights from the WSW for Case 1 (bottom). The 10 m contour is shown off of the coast as the black line.

Table 3.1. Summary of surfing conditions and Scenario impacts. Green boxes indicate wave and tide conditions conducive to good surfing conditions. Numbers in boxes refer to scenarios which show an impact at or inside the 10 m depth contour offshore of a break.

	Wave Type Condition				Break									
	Tide	Hs	Tp	Dir	Patea RM	Waverley	Waiinu	Point/Fences	Kai-iwi	Longbeach	Rangiora	N Mole	Whanganui RM	S Beach
1	Low	1.5	12	225										
2	Mid	1.5	12	225										
3	High	1.5	12	225										
4	Low	1.5	12	247										
5	Mid	1.5	12	247										
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9	High	1.5	16	225										
10	Low	1.5	16	247										
11	Mid	1.5	16	247										
12	High	1.5	16	247										
13	Low	3	12	225										
14	Mid	3	12	225										
15	High	3	12	225										
16	Low	3	12	247										
17	Mid	3	12	247		1								
18	High	3	12	247		1								
19	Low	3	16	225										
20	Mid	3	16	225										
21	High	3	16	225										
22	Low	3	16	247										
23	Mid	3	16	247		1								
24	High	3	16	247		1								

4 Summary and Conclusions

1. In order to assess the potential effects of seabed modifications due to TTR's proposed mining activities on surfing breaks in the affected areas of the Southern Taranaki Bight, numerical modelling was undertaken.
2. 10 surfing breaks were identified as potentially being impacted by modifications to the offshore seabed.
3. In order to develop wave, wind and tide boundary conditions that were representative of the surfing conditions at the 10 breaks, the New Zealand Surfing Guide and local surfer's knowledge were compiled. A total of 24 wave and tide conditions were developed for modelling.
4. It was noted that sand at the breaks, i.e. sediment supply was the biggest factor in wave quality at these breaks – sediment supply along this coast is considered highly variable by the local surfers.
5. Model SWAN was used to transform waves from deepwater into the surfing breaks over 9 different bathymetries – the existing non-modified bathymetry and 8 modified bathymetries incorporating potential seabed configurations (various mounds and pits) that could result from the mining operation.
6. Worse case bathymetry configurations and wave conditions were used for the modelling. To determine the impacts of the bathymetry modifications, model outputs were compared by differencing the existing case with each of the modified cases – a total of 216 simulations.
7. The results indicate that of the 216 cases investigated, only 4 indicate change in wave height and direction at the 2nd most northern break (Waverley). However, these changes are very small – <1% difference in height and mostly localised to the area of seabed modifications with respect to direction (<2° change), which is corrected due to refraction by ~10 m depth contour. This result is due to the relatively small volume of seabed modification located over 20 km offshore, i.e. the changes to wave height and direction at the site potential seabed modifications are lost as the waves propagate into the breaks from >20 km offshore. Similar results were found for the offshore dump site (~17 km away from the Nationally Significant surfing breaks of Aramoana and

Whareakeake) for Port Otago, i.e. insignificant wave height and direction changes at the surfing breaks (Bell *et al*., 2009).

8. In conclusion, the investigation has indicated that impacts on the 10 local surfing breaks are likely to be insignificant at Waverley and have no impacts on the other breaks in the area.
9. Information relating to TTR's additional scientific work undertaken since 2014 has been provided and the conclusions is this report remain valid

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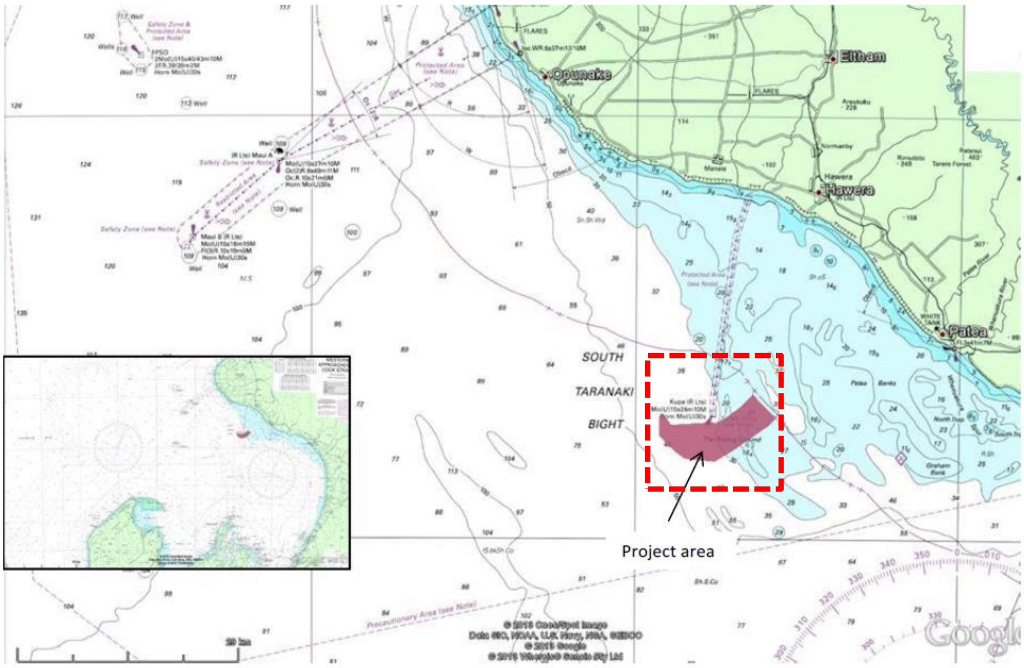
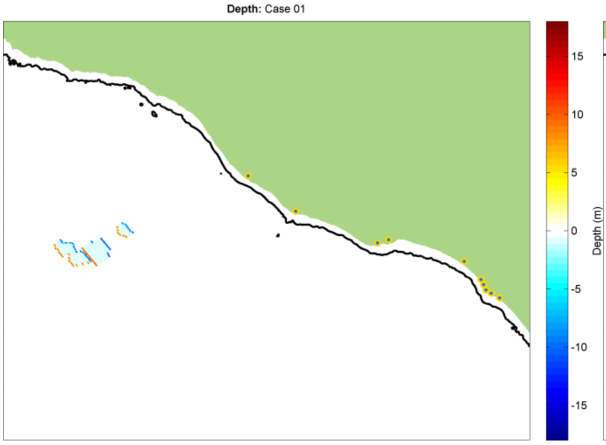
Appendix 1 – Seabed Modifications for Cases 1-8



The close-up region of bathymetry presented below is denoted by the red box.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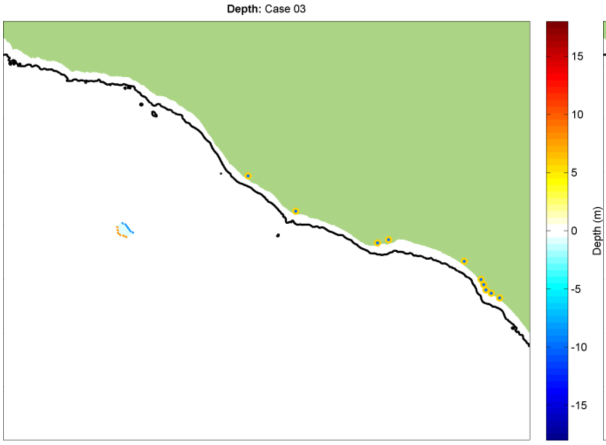
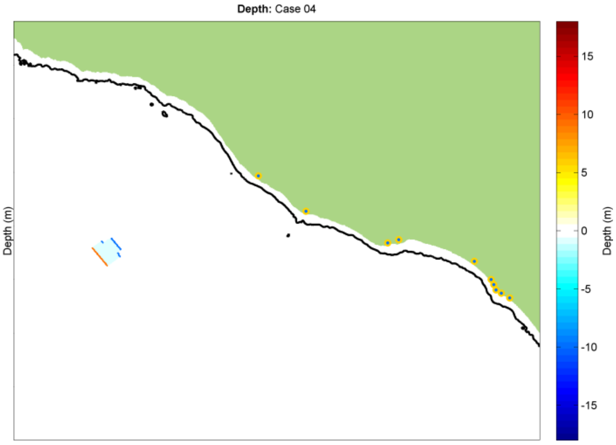
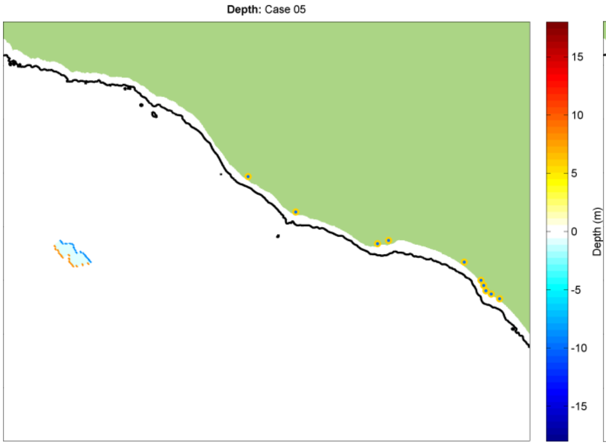
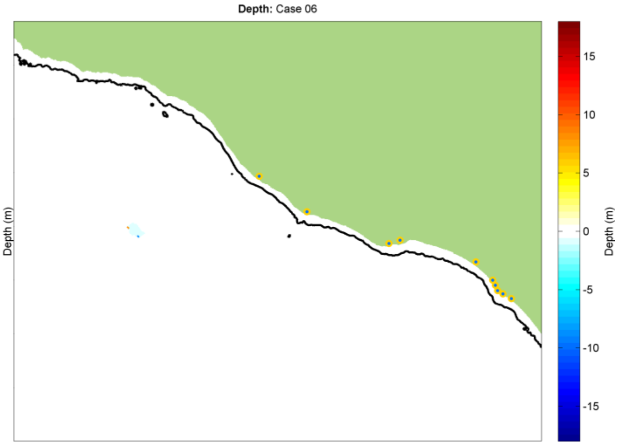
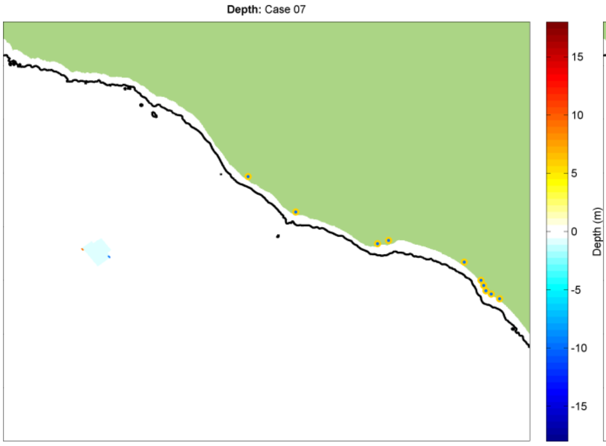
-15
Depth (m)


Depth: Case 03
15
10
5
0
-5
-10
-15
Depth (m)

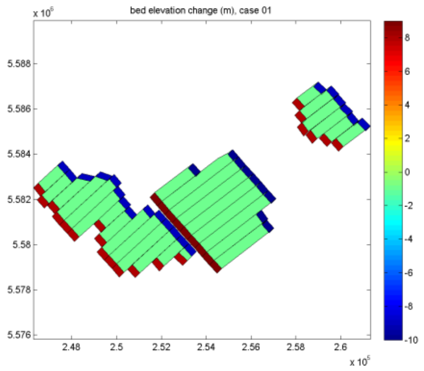

Depth: Case 04
15
10
5
0
-5
-10
-15
Depth (m)

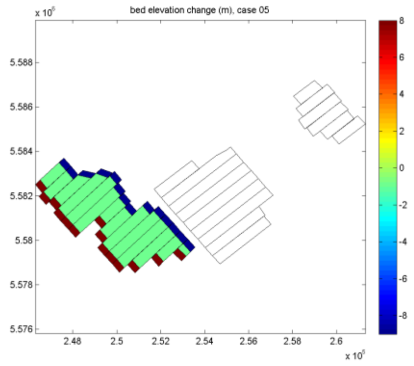

Depth: Case 05
15
10
5
0
-5
-10
-15
Depth (m)

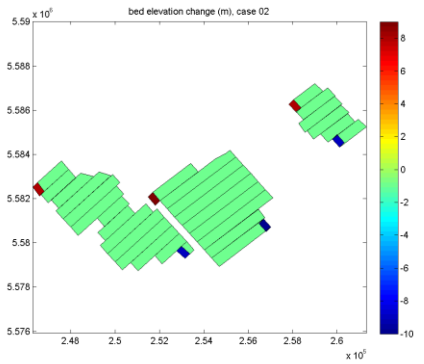

Depth: Case 06
15
10
5
0
-5
-10
-15
Depth (m)

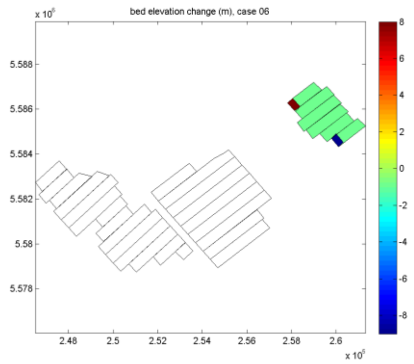

Depth: Case 07
15
10
5
0
-5
-10
-15
Depth (m)

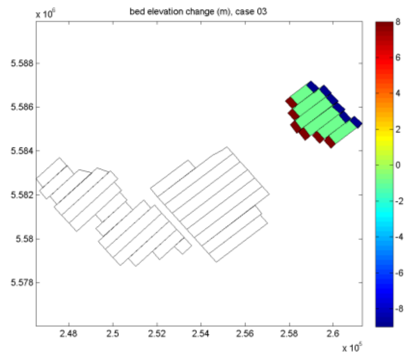

Depth: Case 08
15
10
5
0
-5
-10
-15
Depth (m)

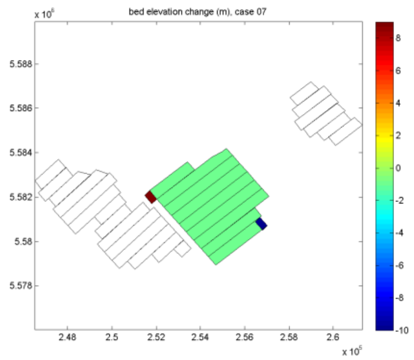

bed elevation change (m), case 01

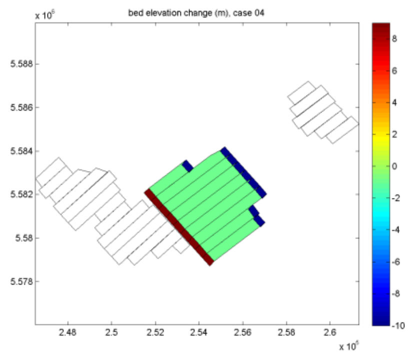

bed elevation change (m), case 05

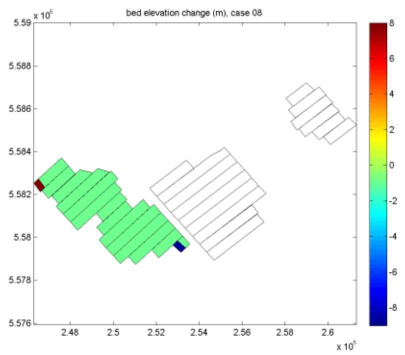

bed elevation change (m), case 02


bed elevation change (m), case 06


bed elevation change (m), case 03

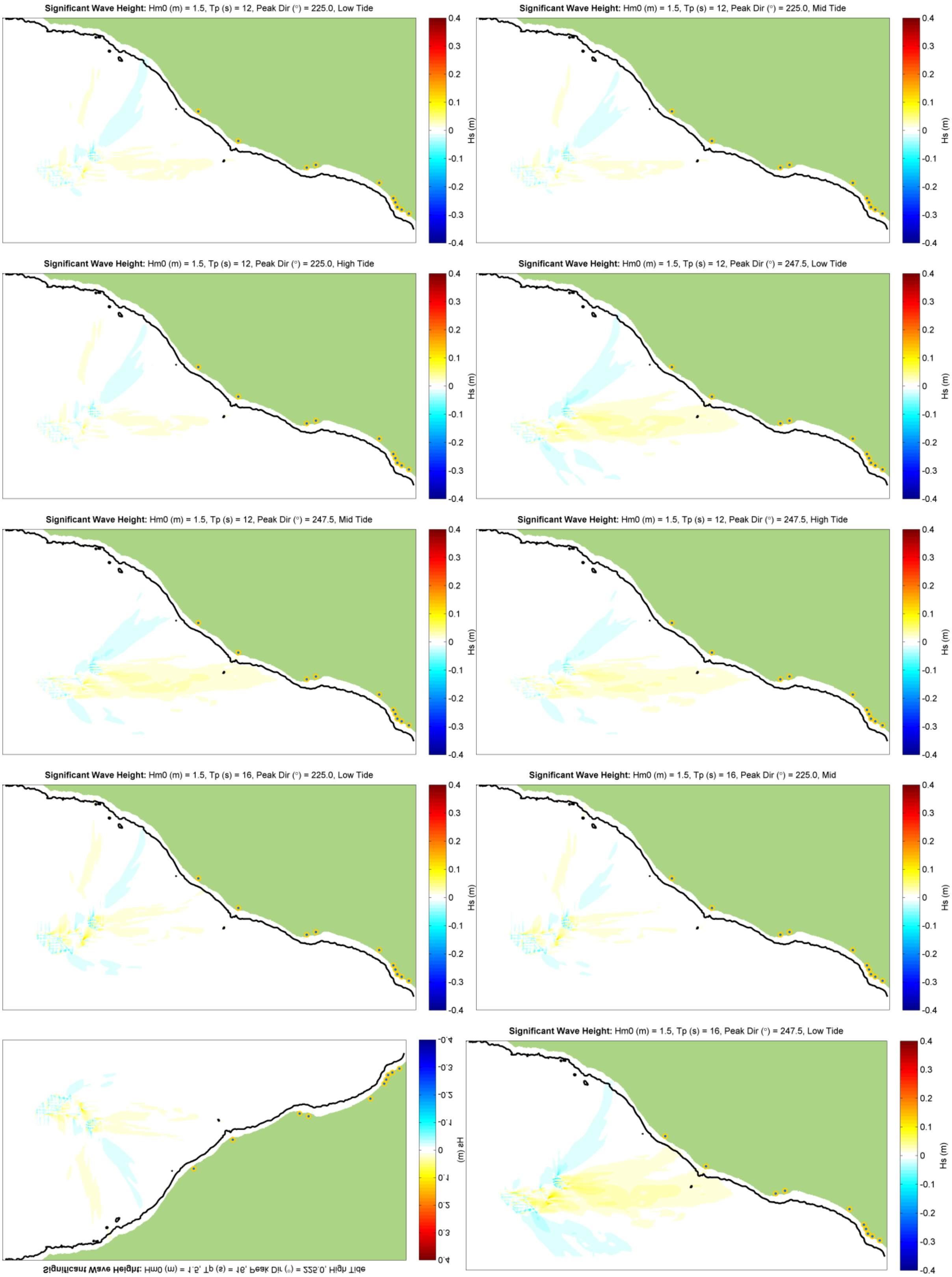

bed elevation change (m), case 07

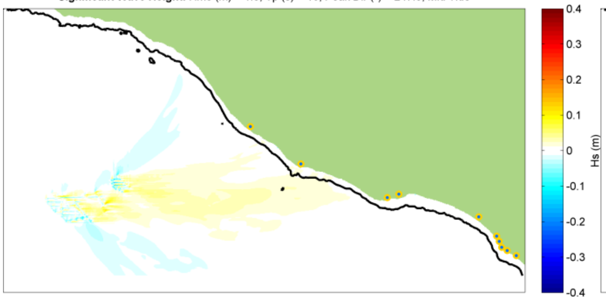

bed elevation change (m), case 04


bed elevation change (m), case 08

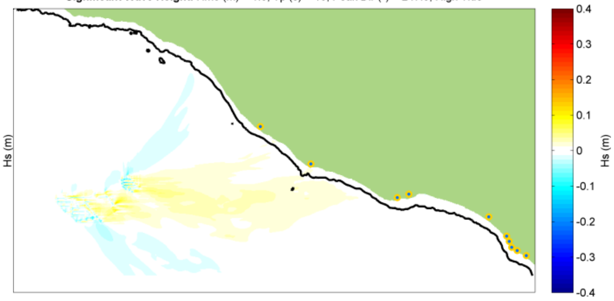
Appendix 2 – Difference Plots for Wave Heights

Scenario 1

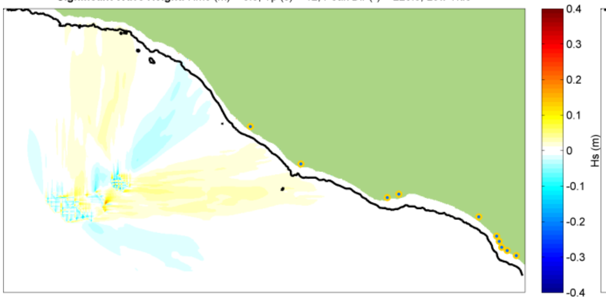

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Mid
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide
Hs (m)



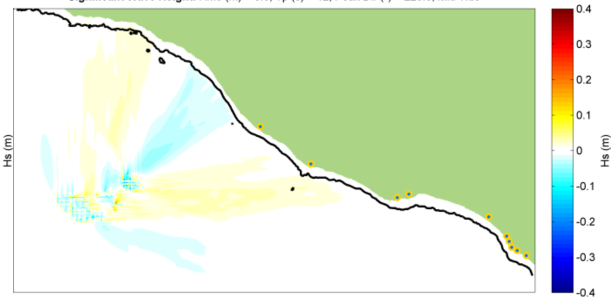
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide



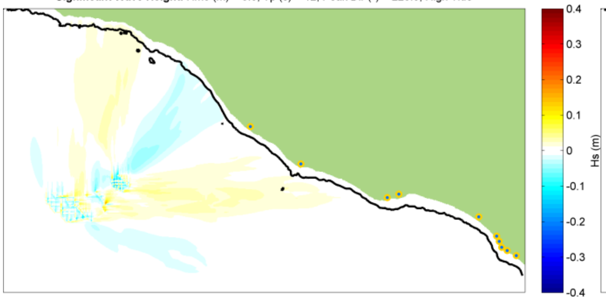
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide



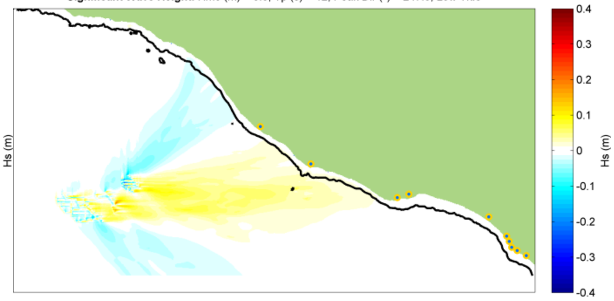
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide



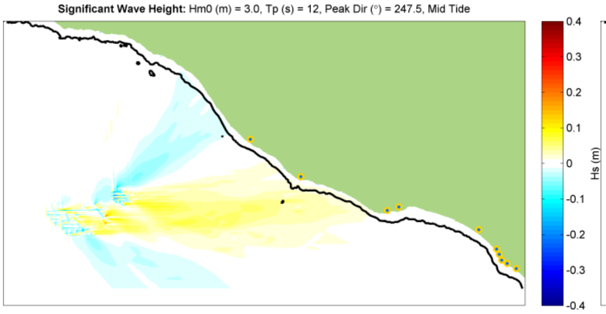
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide



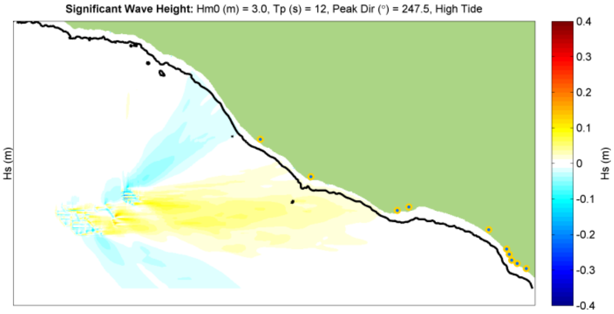
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide



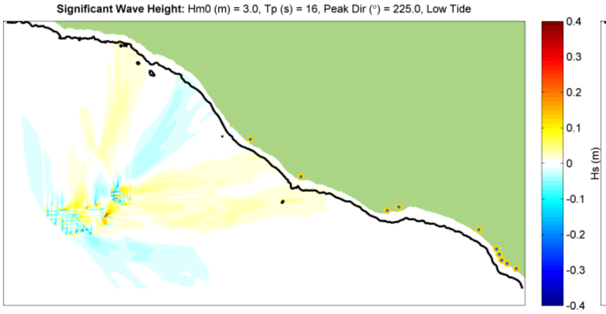
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide



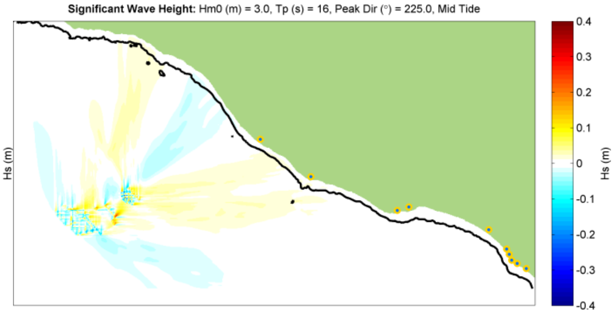
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide



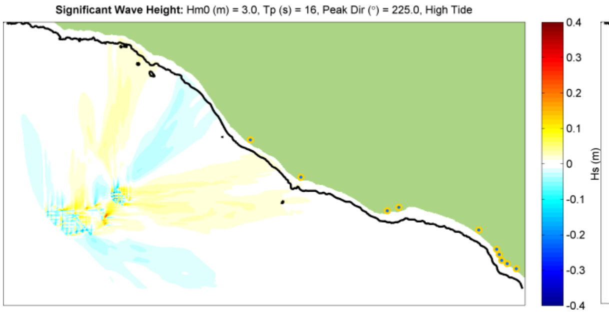
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide

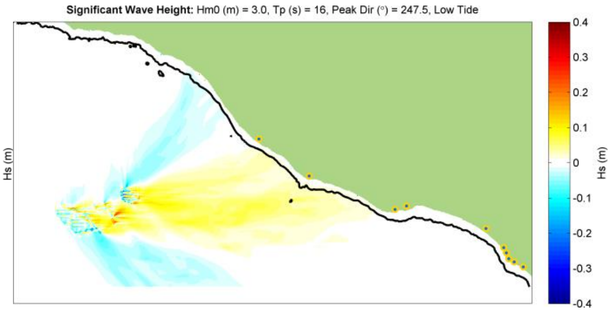


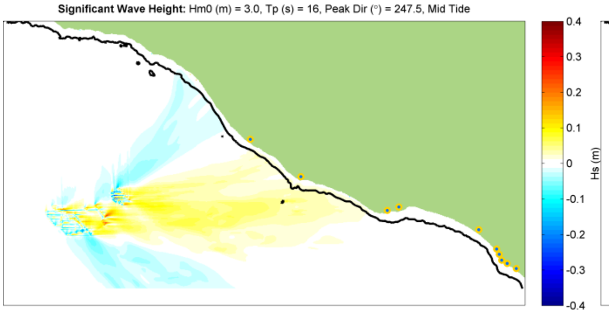
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide

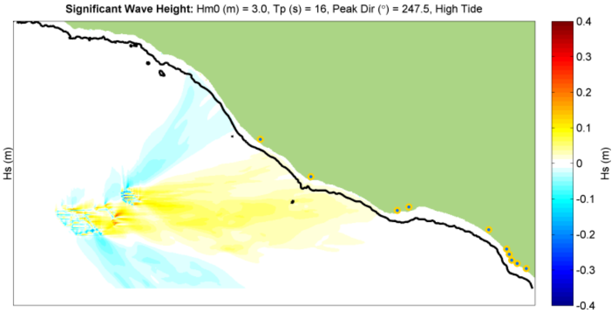


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Mid Tide

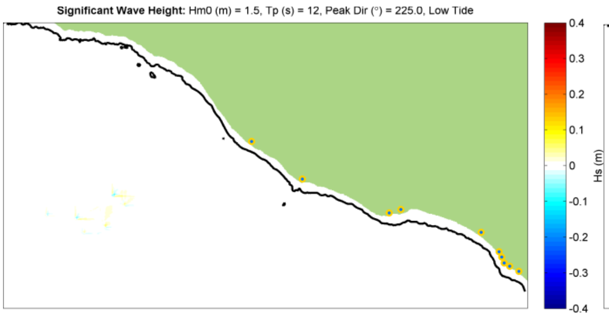

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

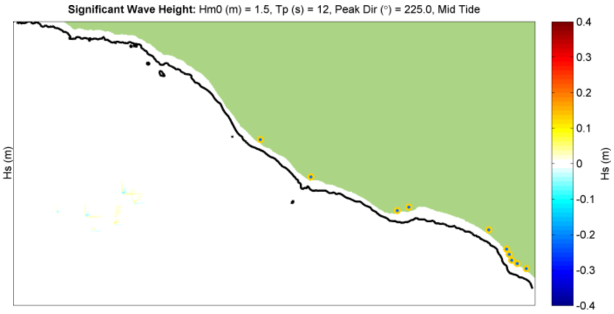

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

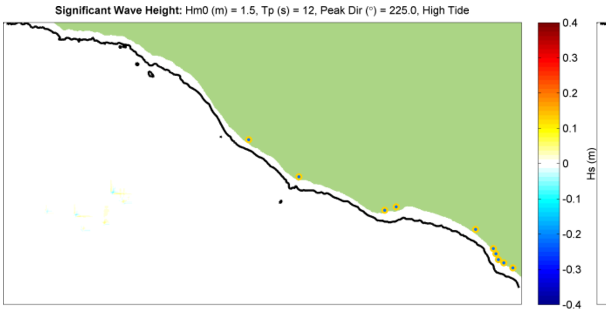

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

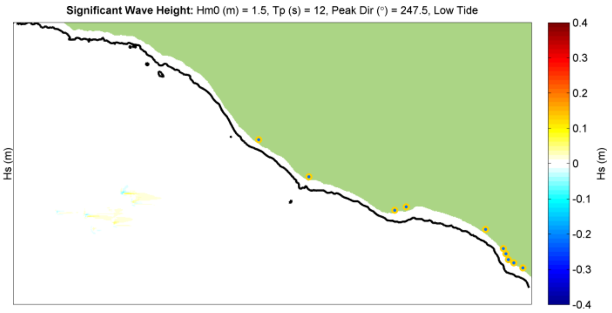

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

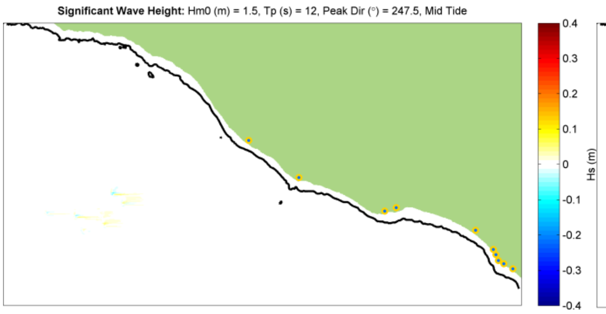
Scenario 2

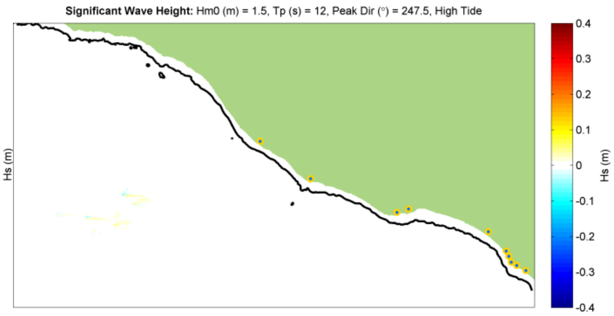

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

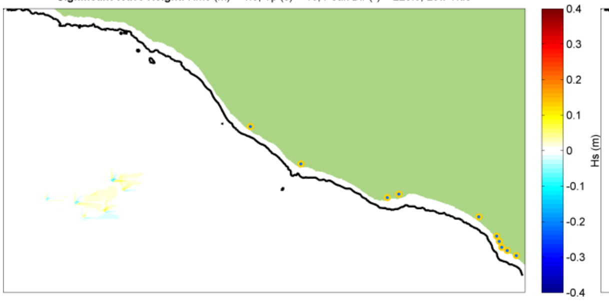

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

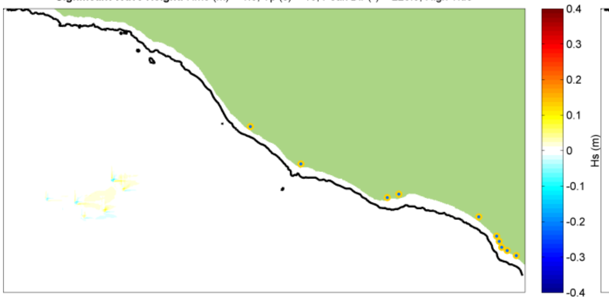

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide



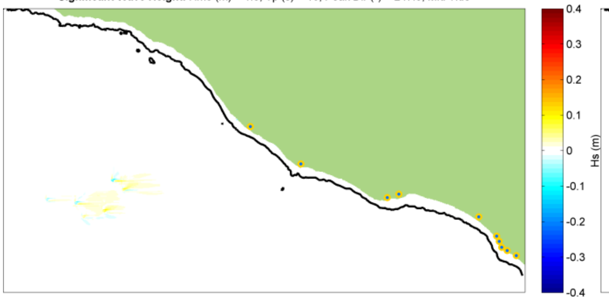
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Mid

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide

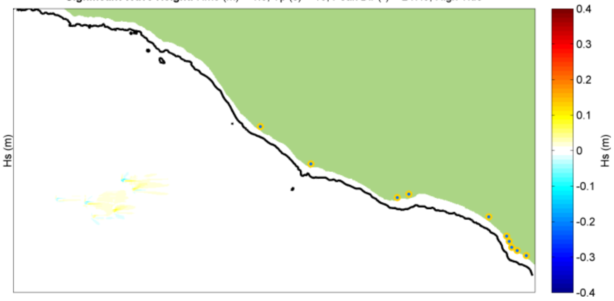


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide

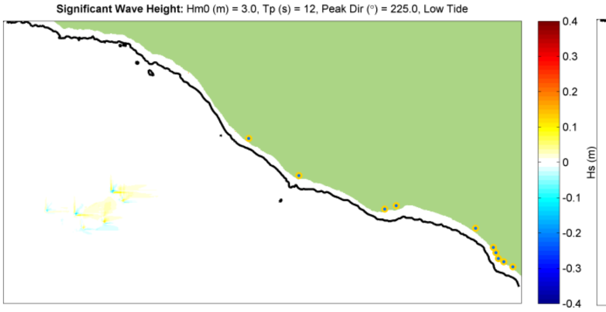
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide



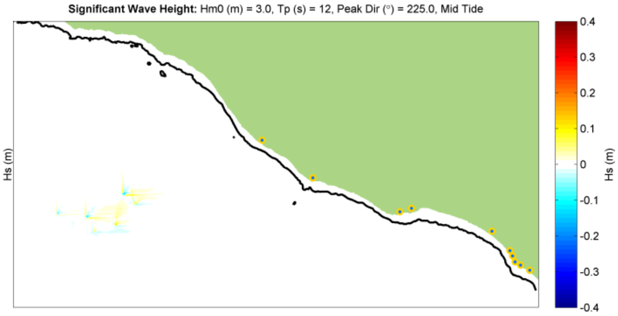
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide



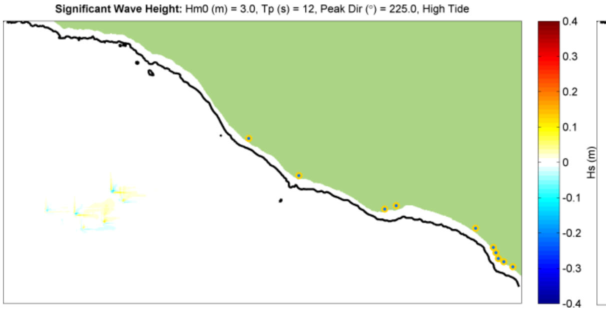
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide



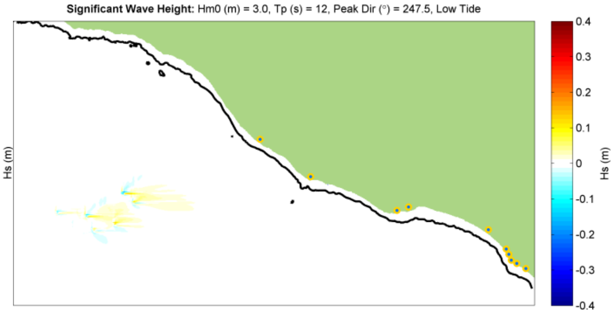
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide

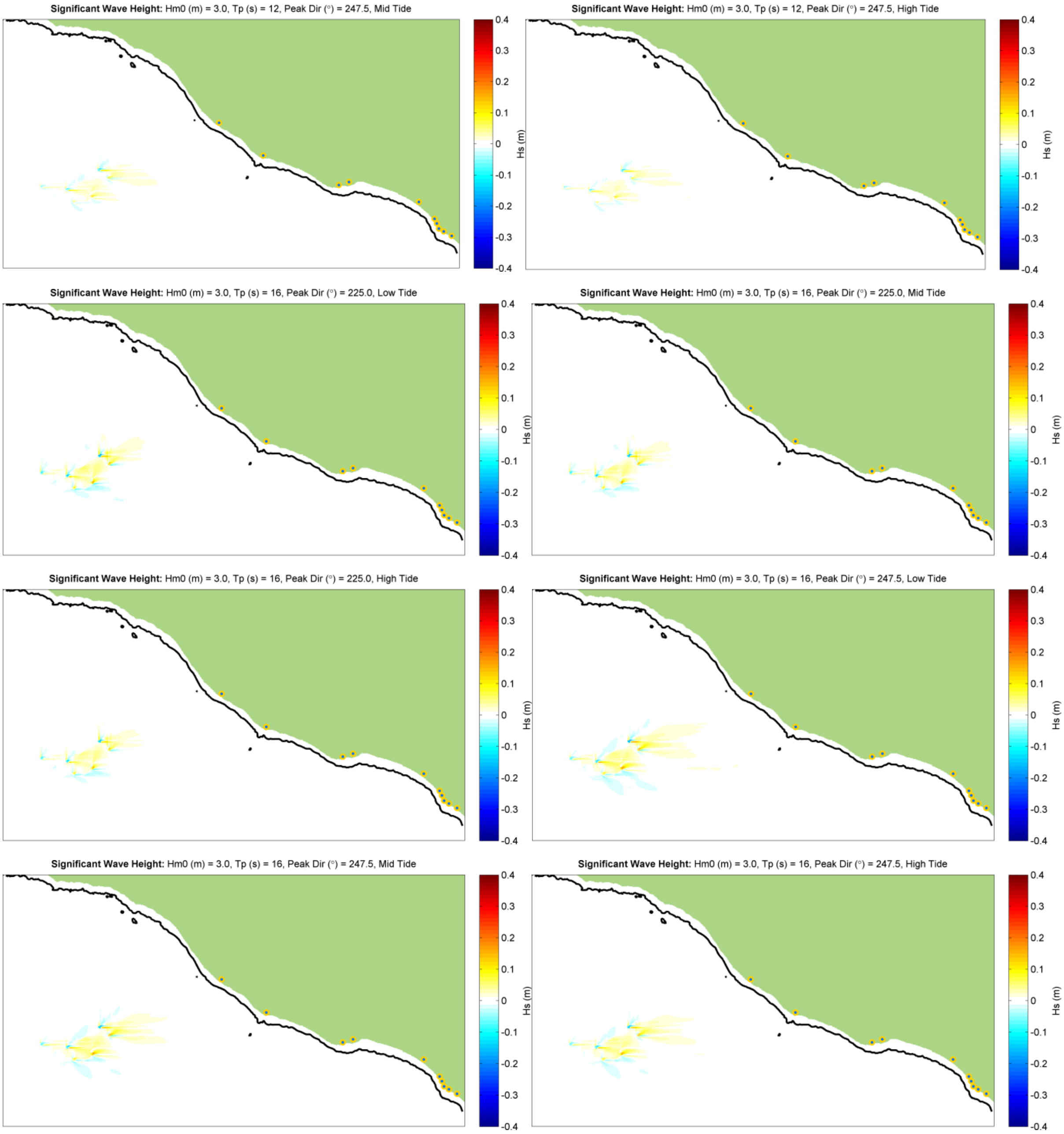


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide

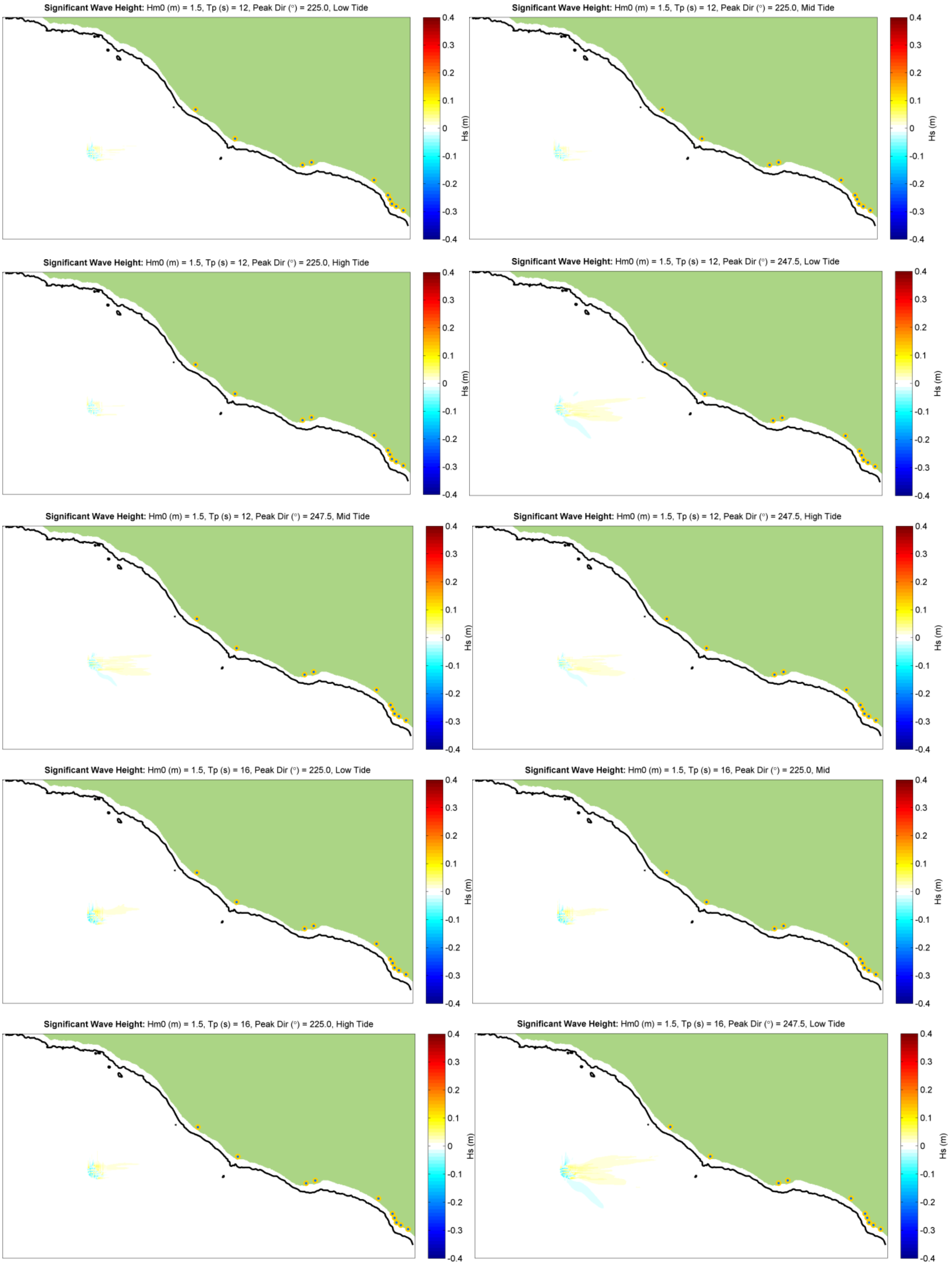


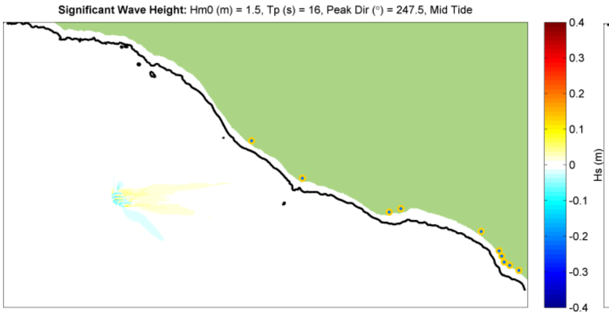
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide

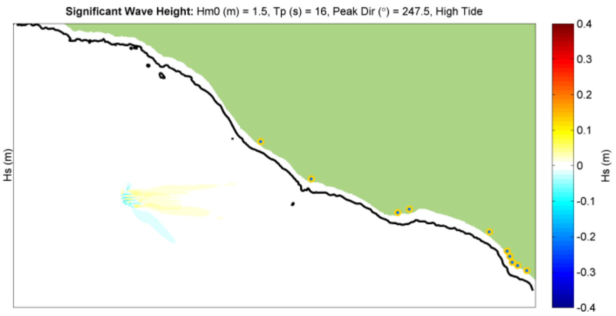


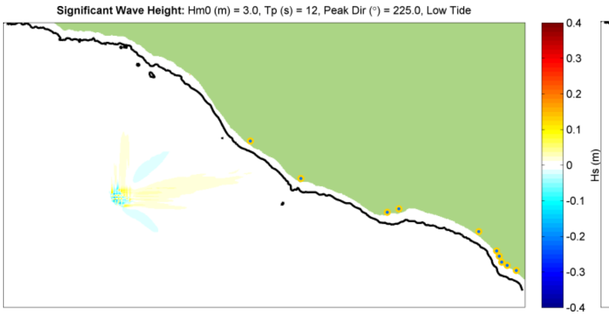

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Mid Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide
Hs (m)

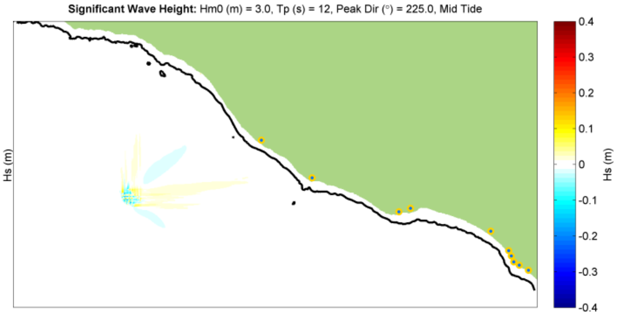
Scenario 3

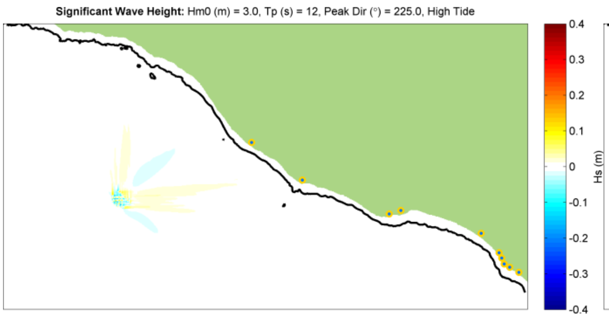

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Mid
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide
Hs (m)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4

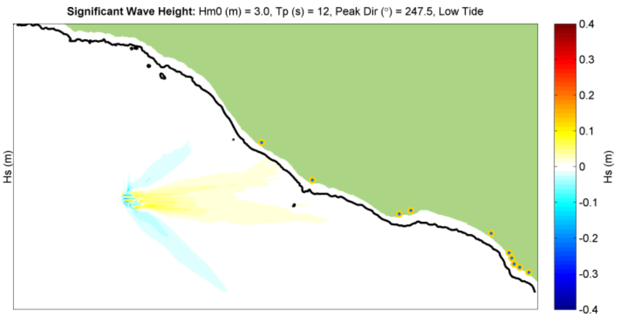

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

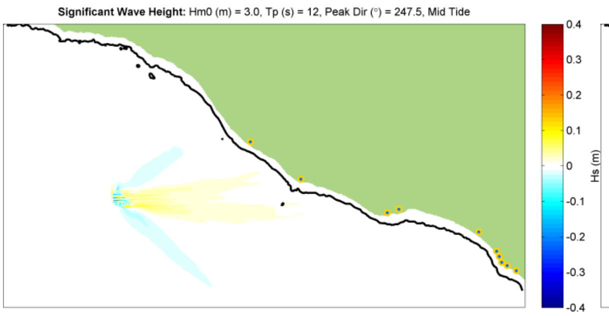

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

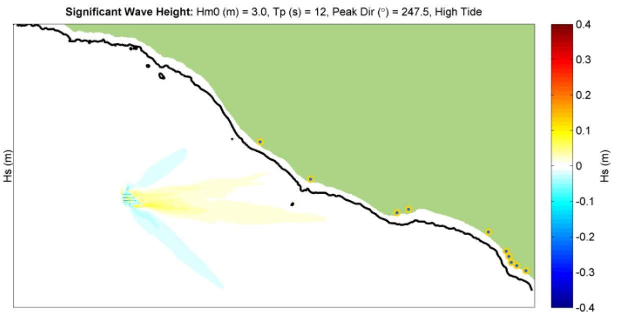

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

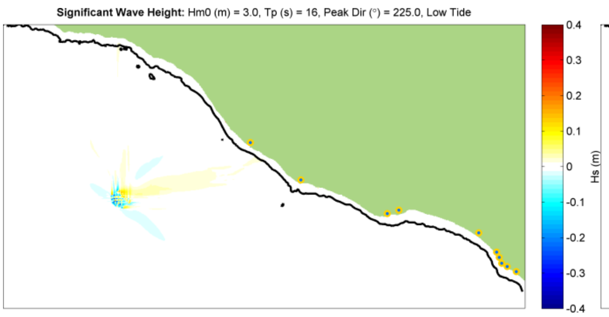

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

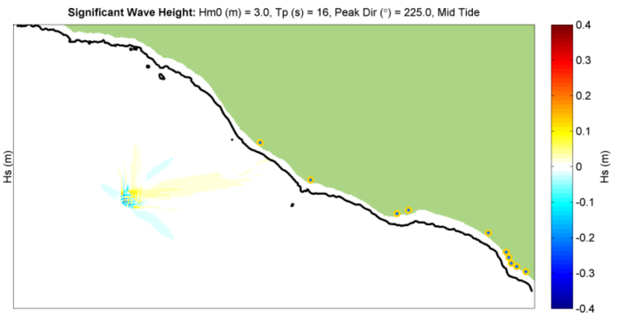

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

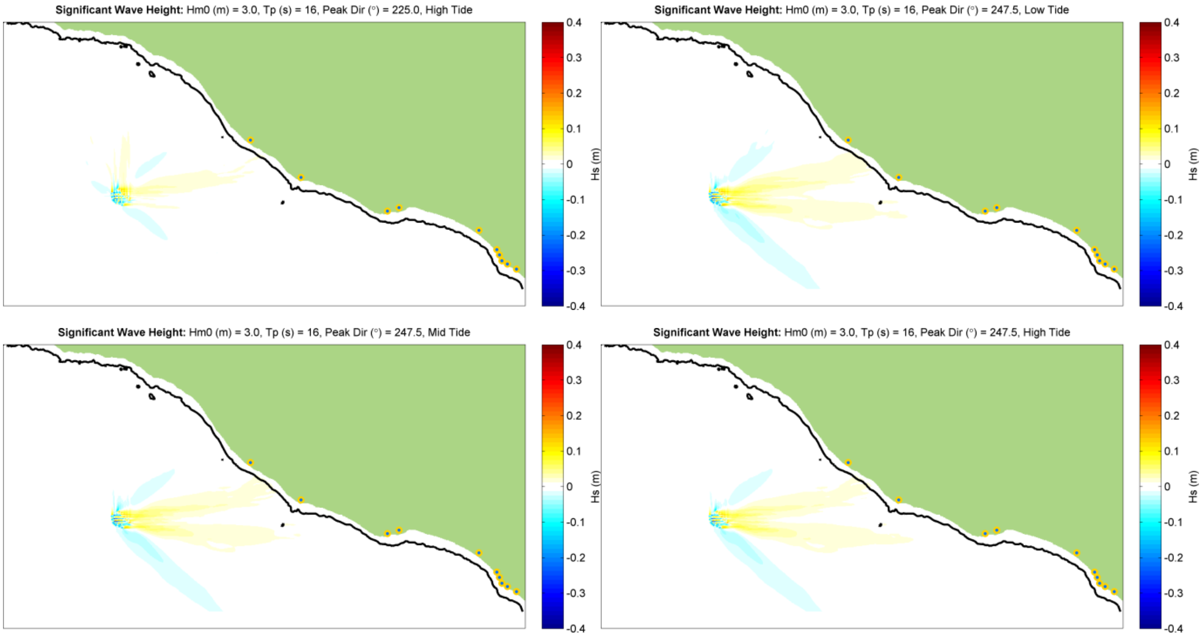

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

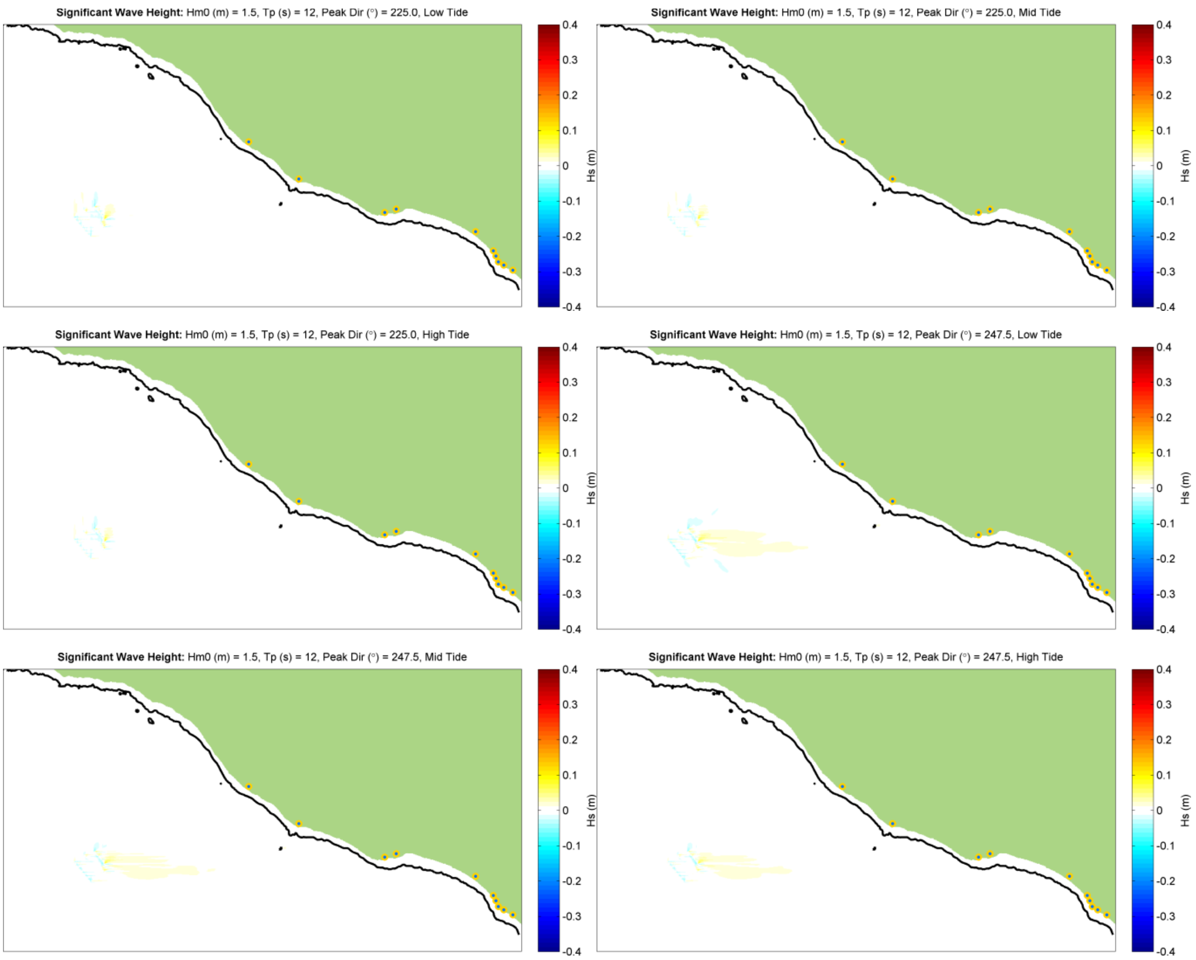

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

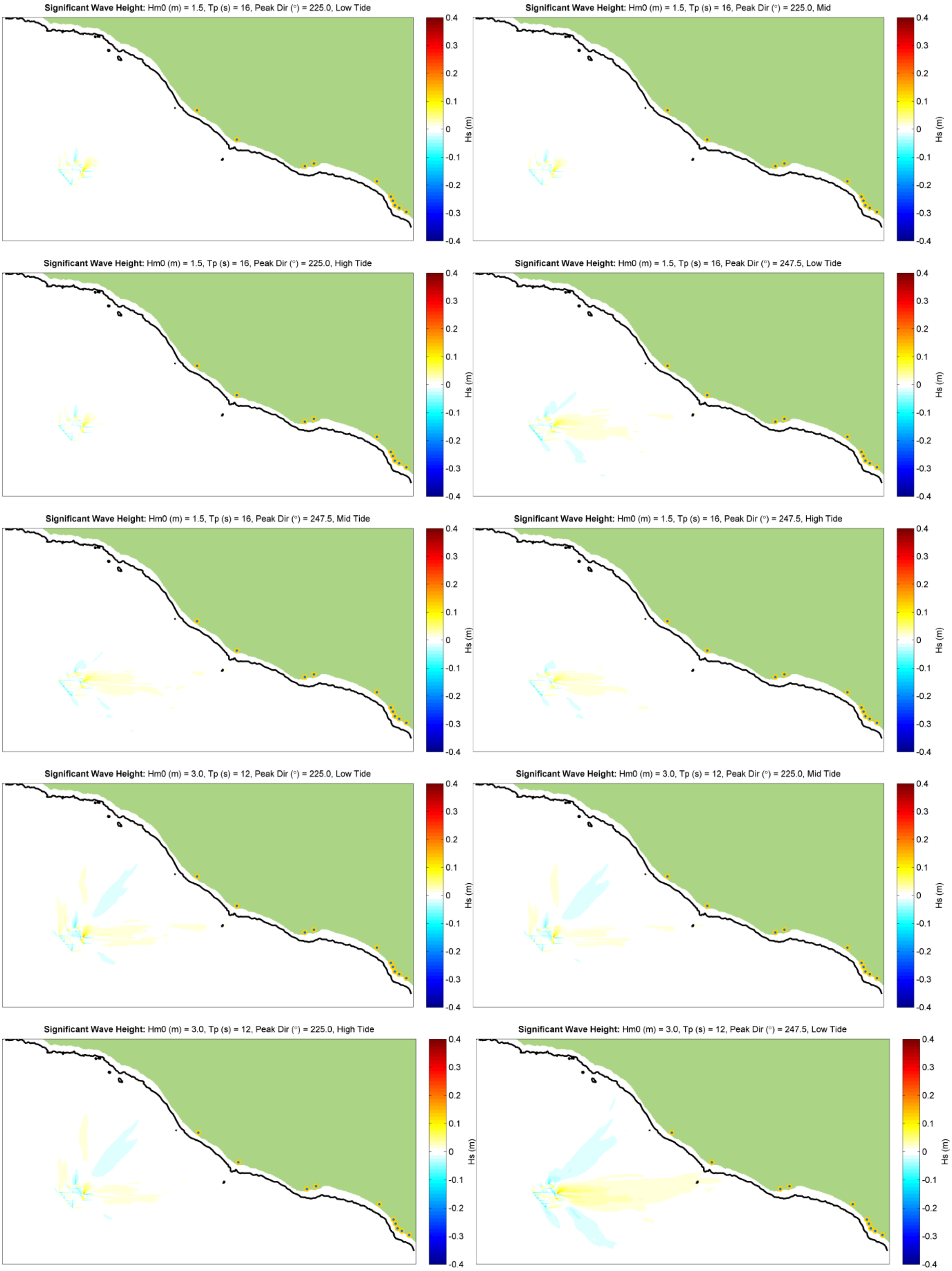

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Mid Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

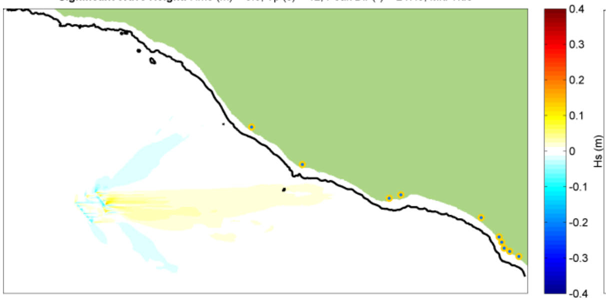

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide

Scenario 4

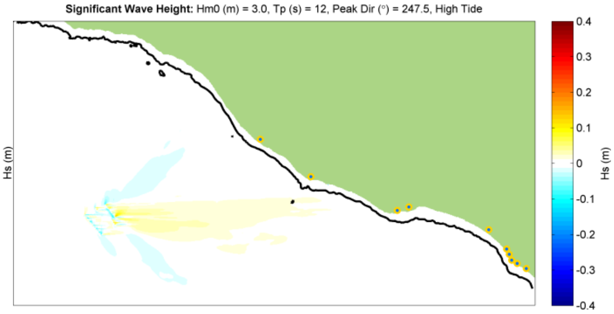

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Mid
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide
Hs (m)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4

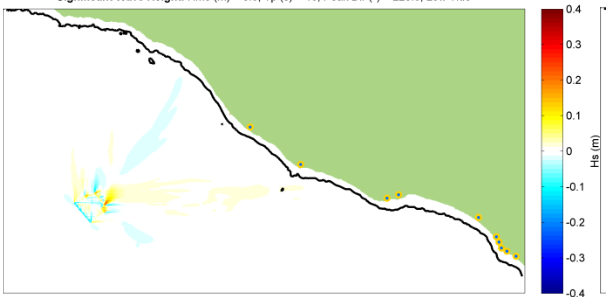
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide



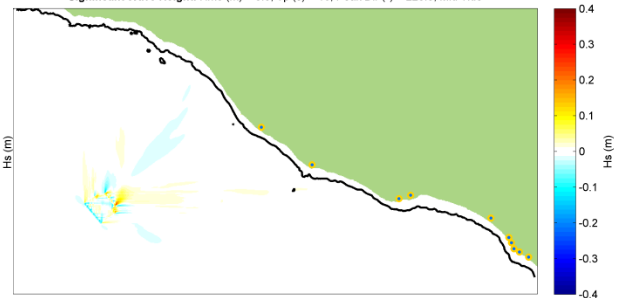
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide



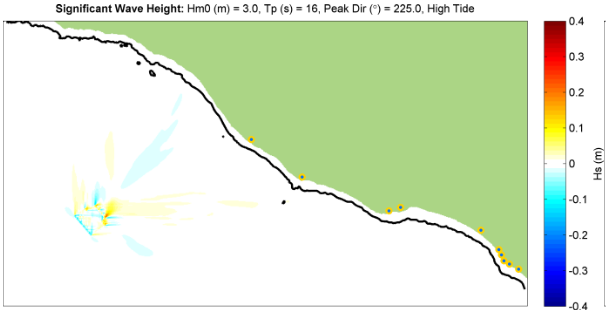
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide



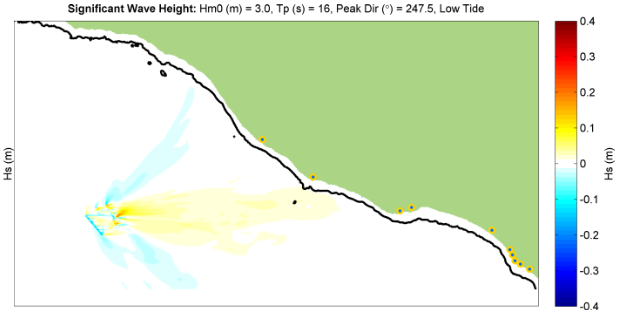
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Mid Tide



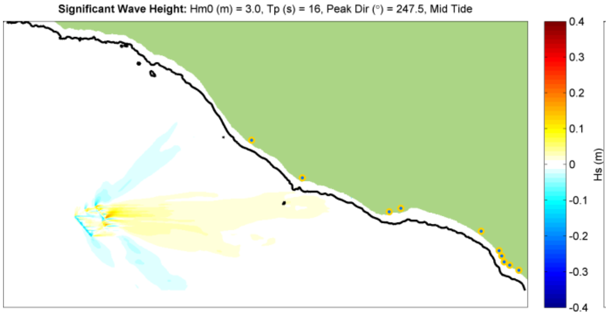
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide



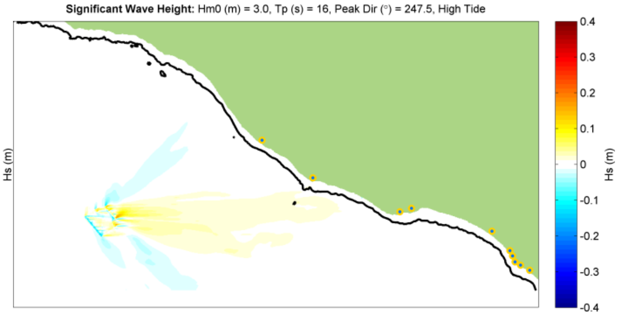
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide



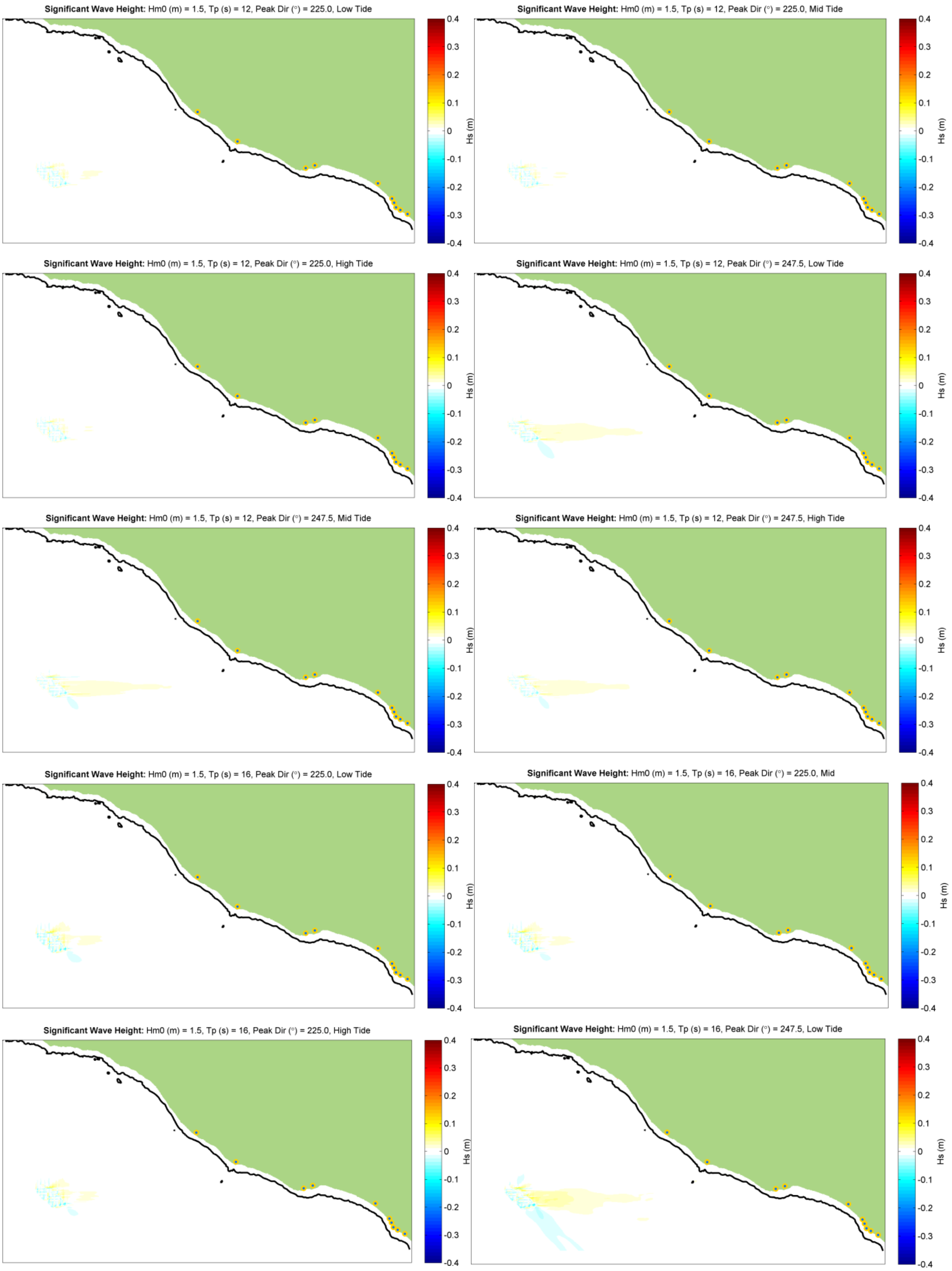
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide



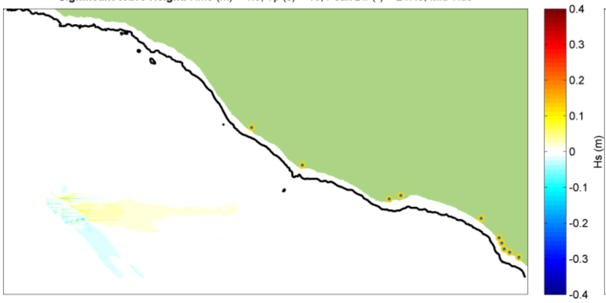
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide



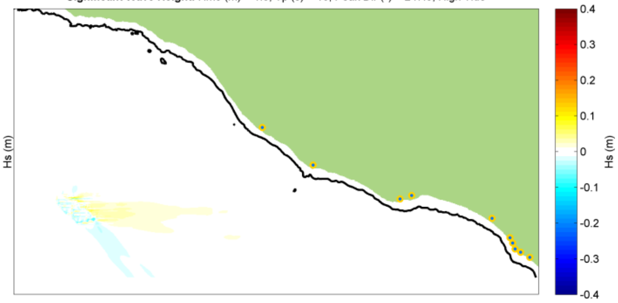
Scenario 5


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Mid
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Hs (m)

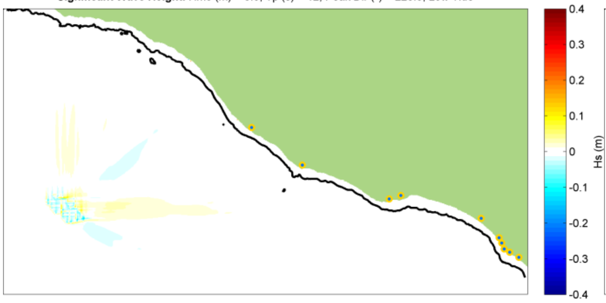
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide



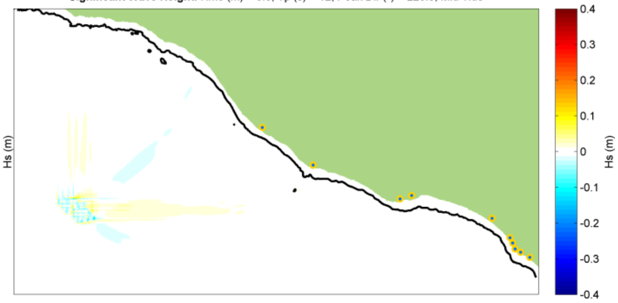
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide



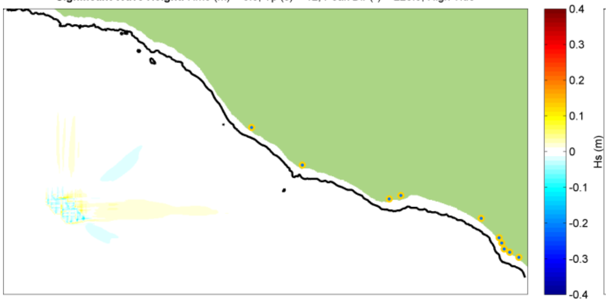
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide



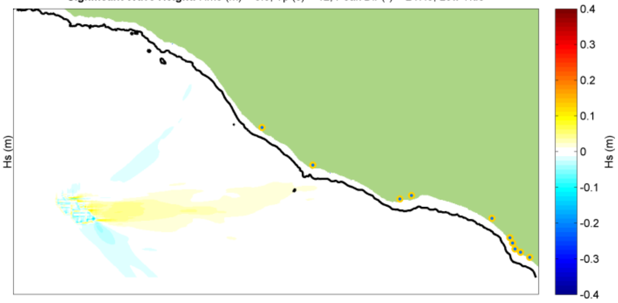
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide



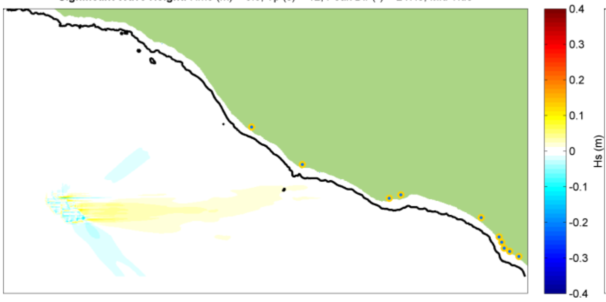
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide



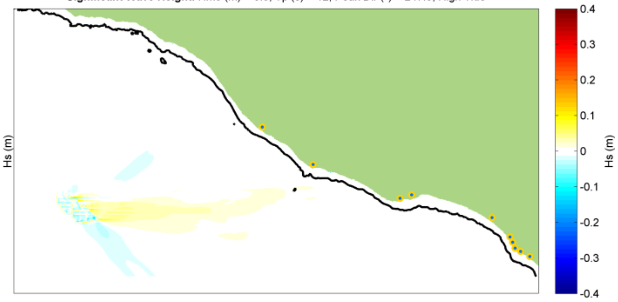
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide



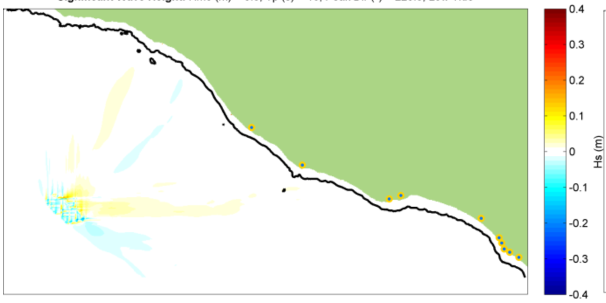
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide



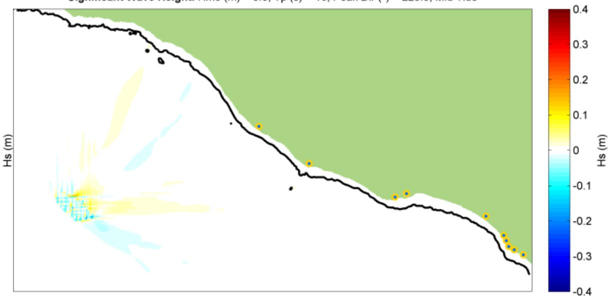
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide



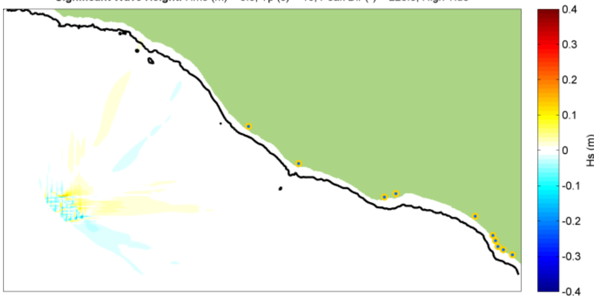
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide



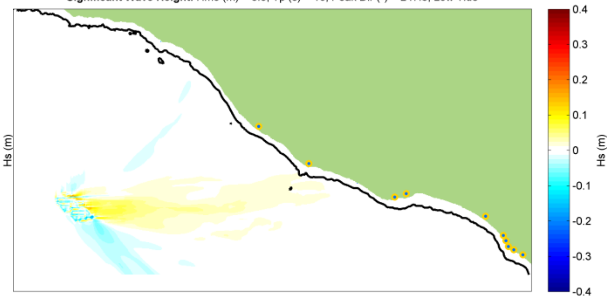
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Mid Tide



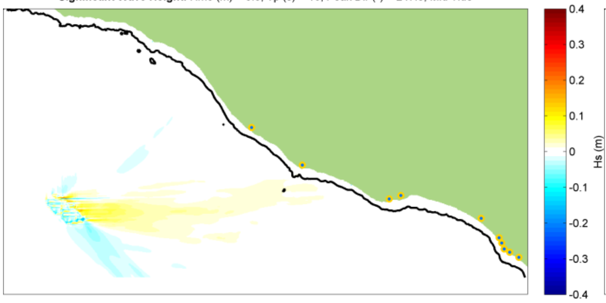
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide



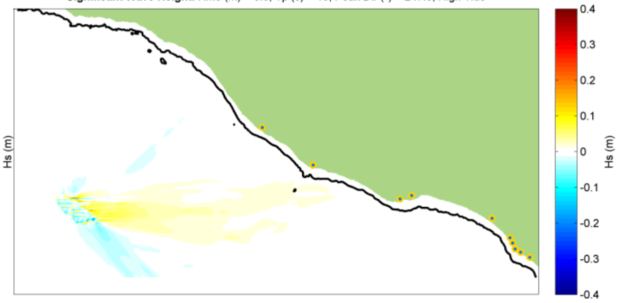
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide



Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide

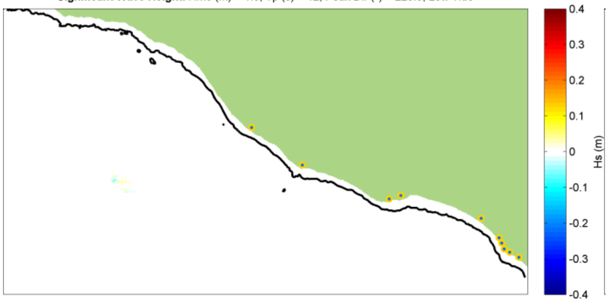


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide



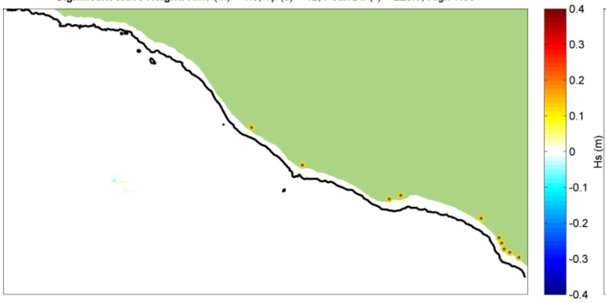
Scenario 6

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide



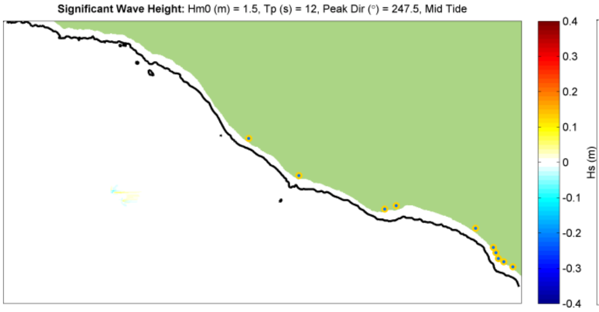
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide

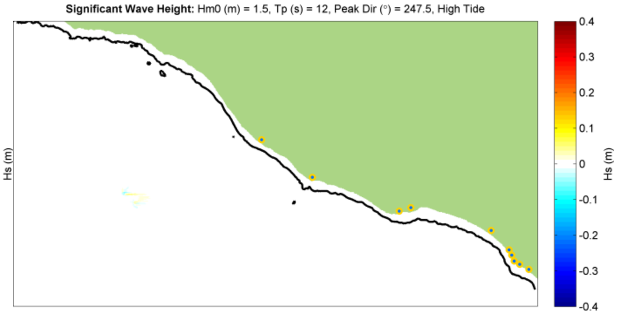


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide

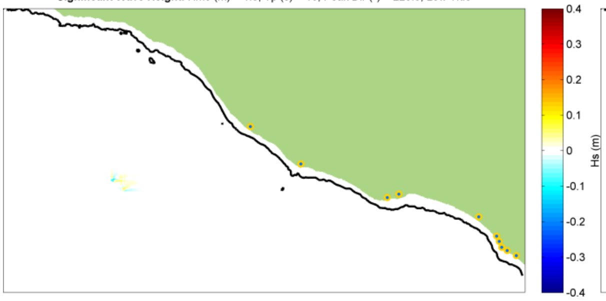
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide



Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide

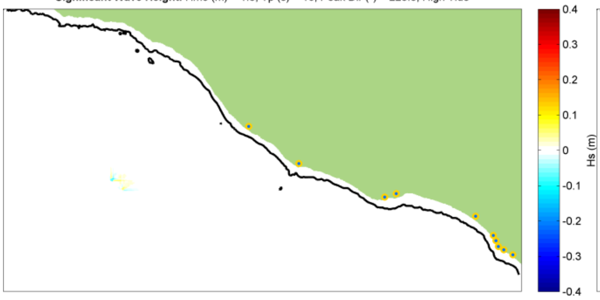


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide

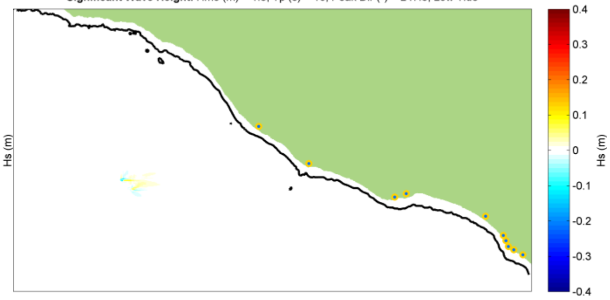


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Mid

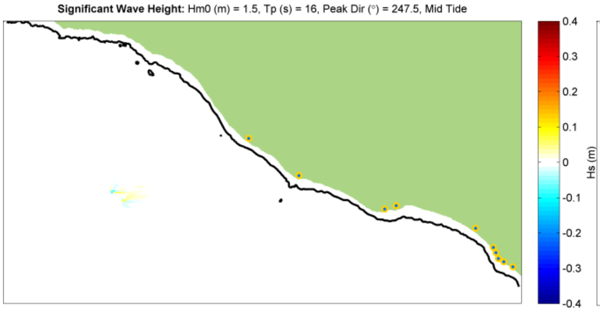
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide



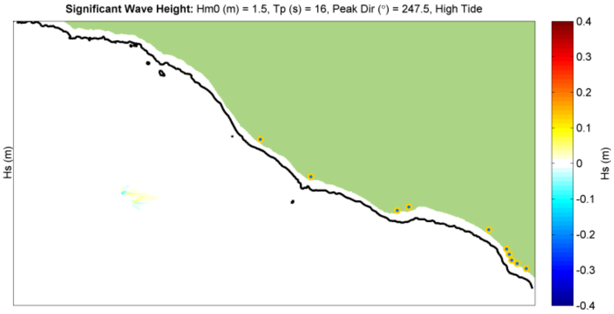
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide



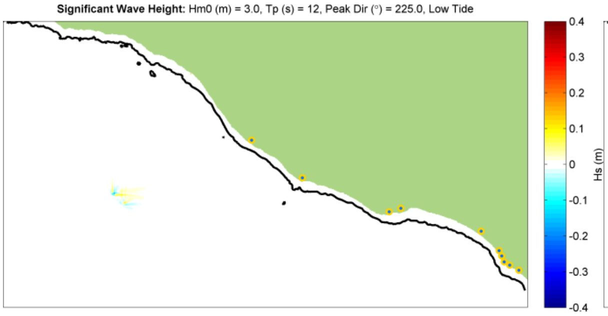
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide



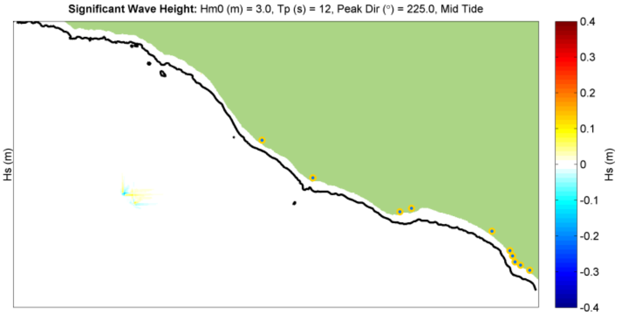
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide



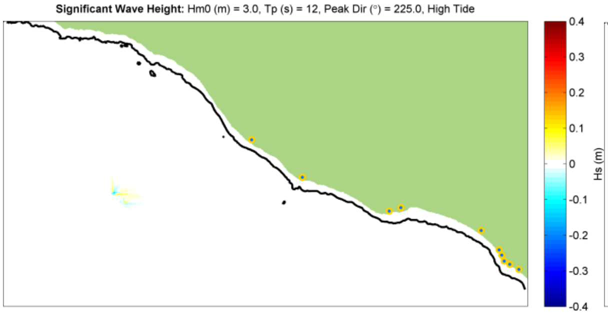
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide



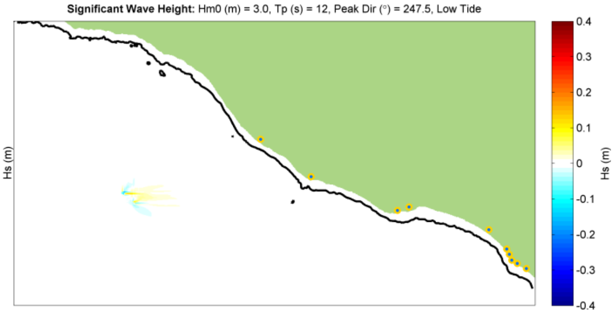
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide

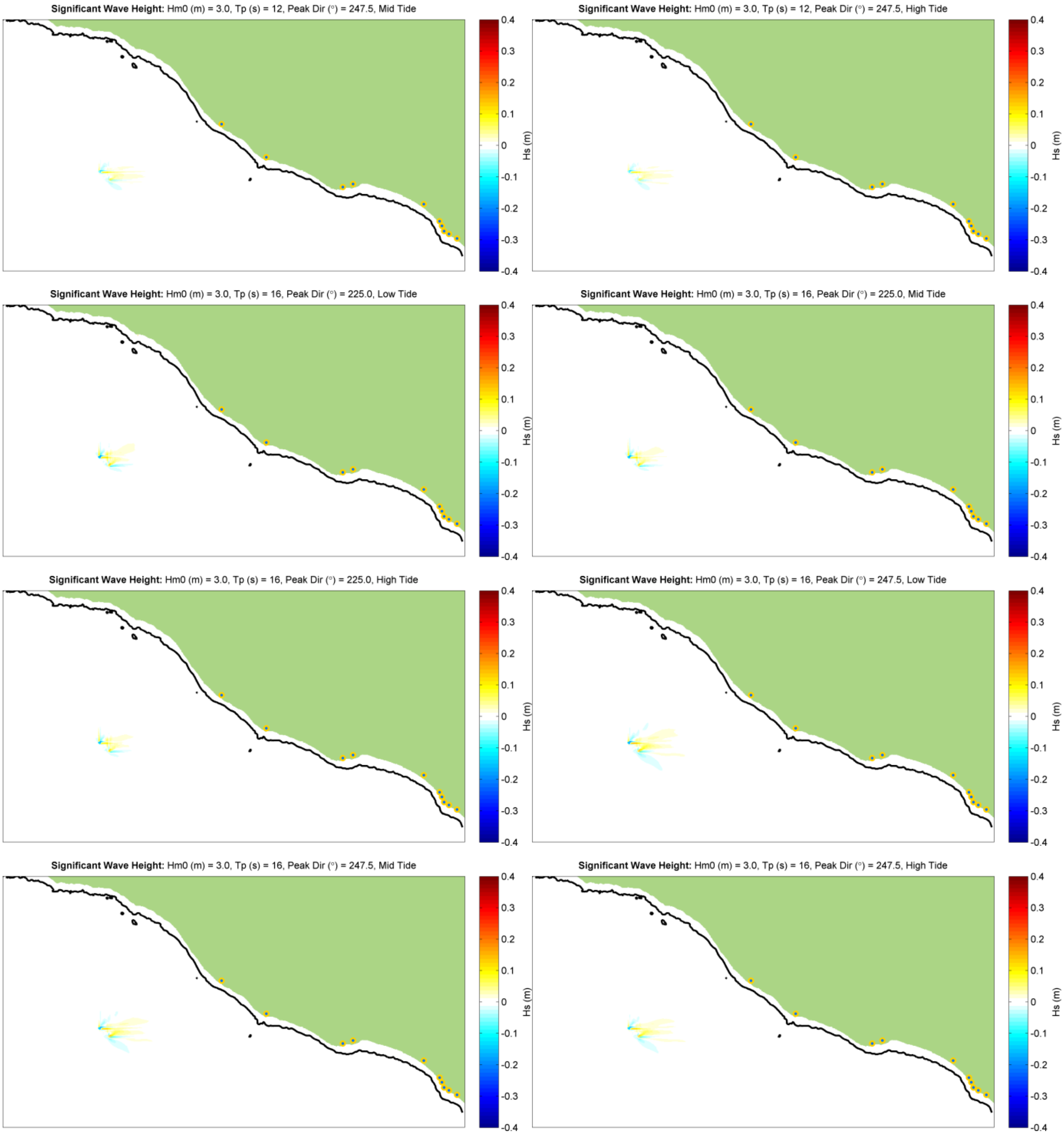


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide



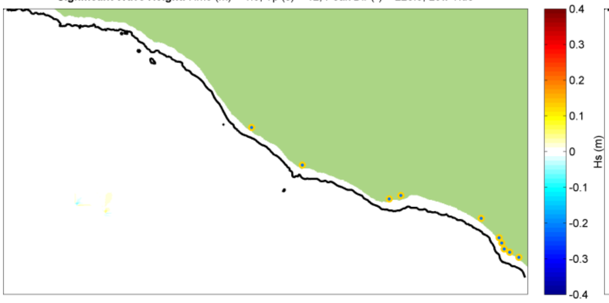
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide




Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Mid Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide
Hs (m)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4

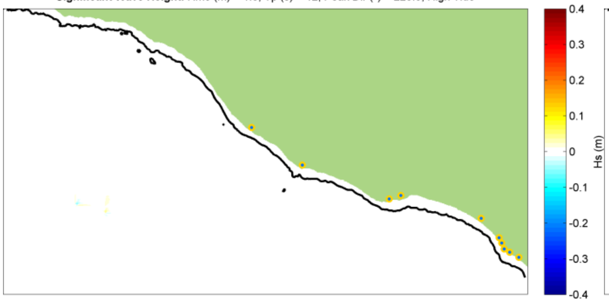
Scenario 7

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide



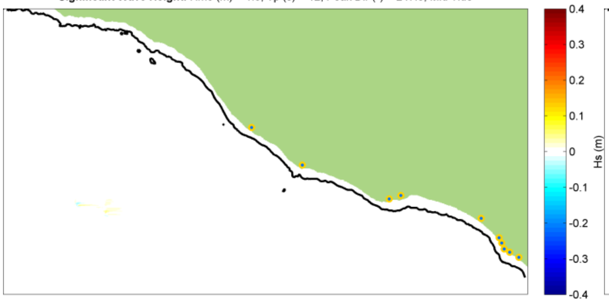
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide



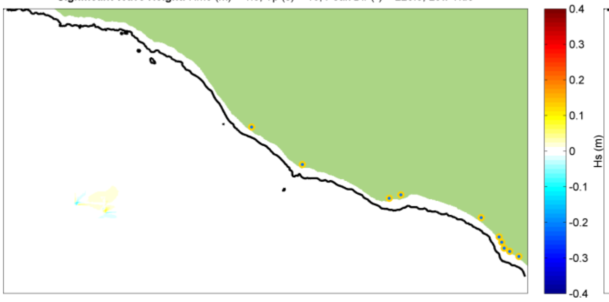
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide



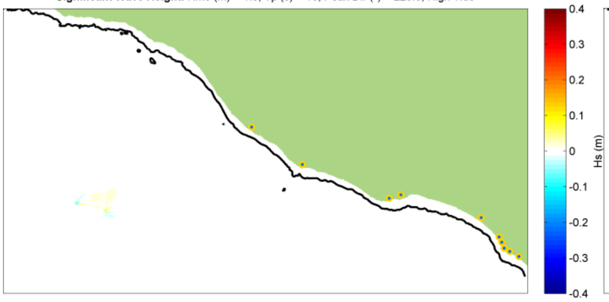
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide



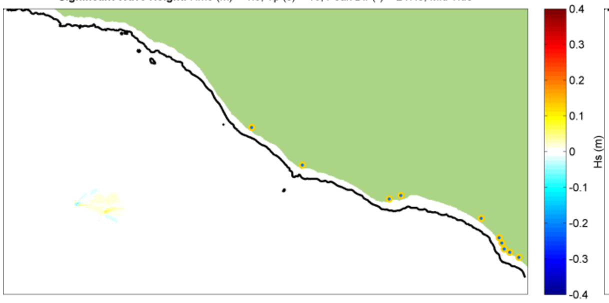
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Mid

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide



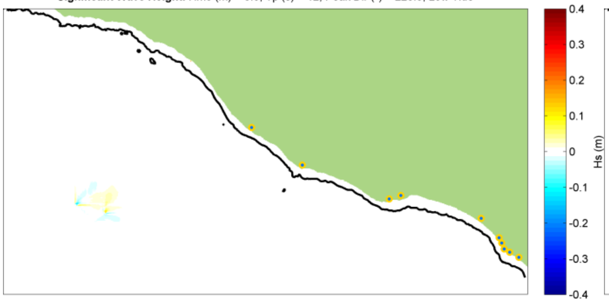
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide



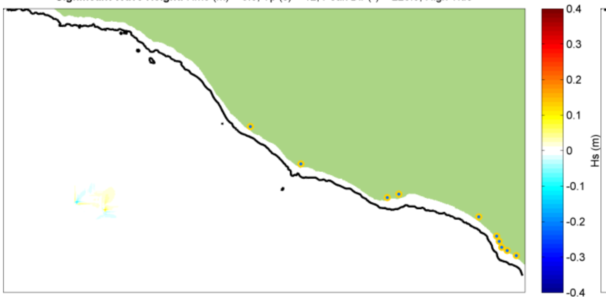
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide



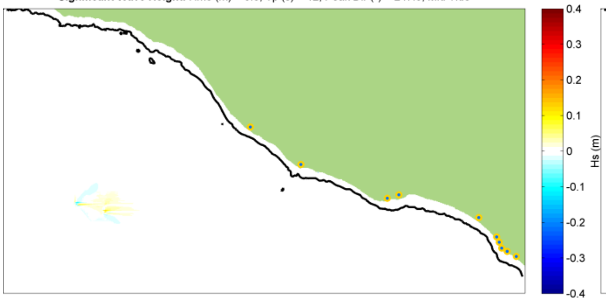
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide



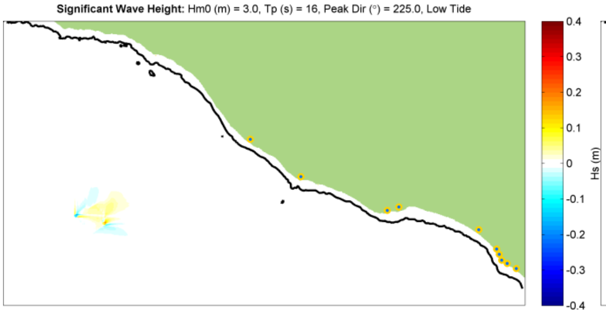
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide

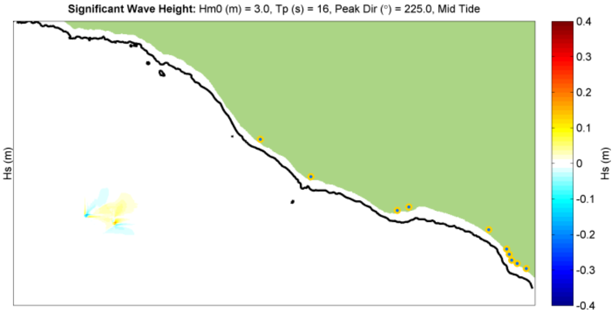


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide

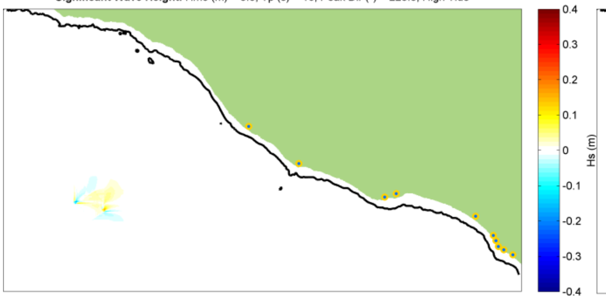
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide



Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Mid Tide

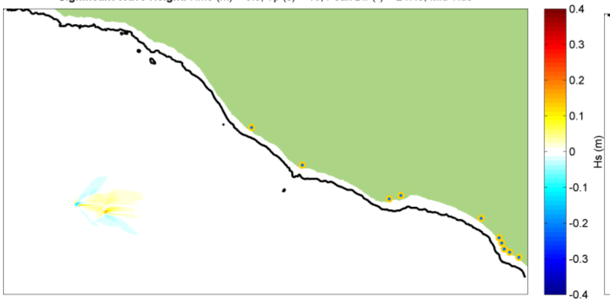


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide



Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide

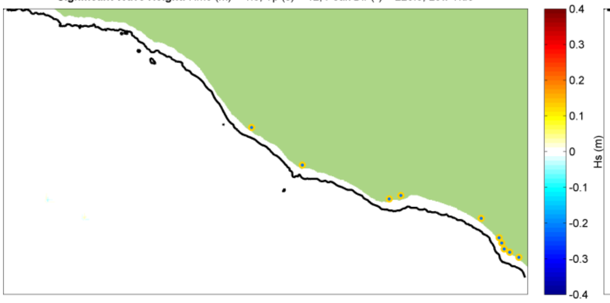
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide



Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide

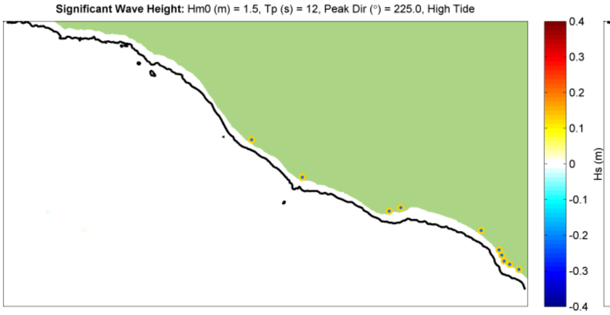
Scenario 8

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide

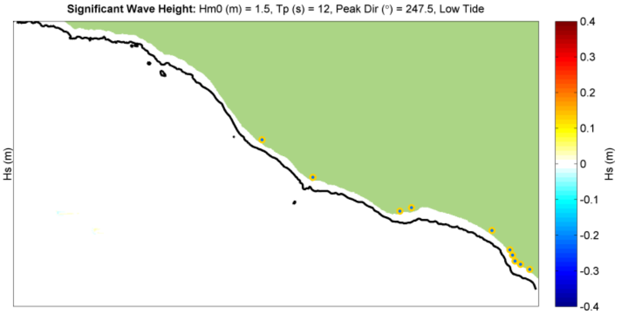


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide

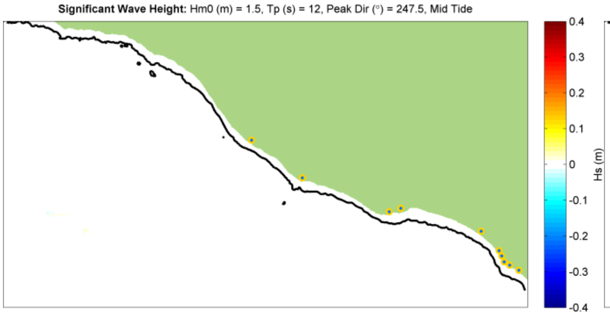
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide



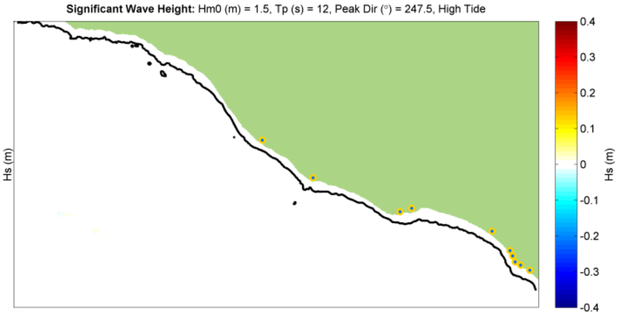
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide



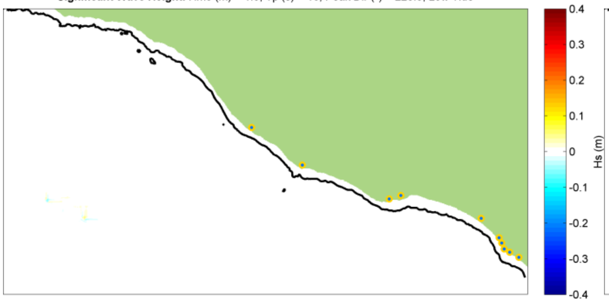
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide



Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide

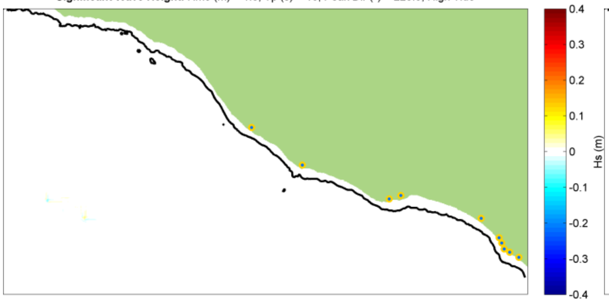


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide



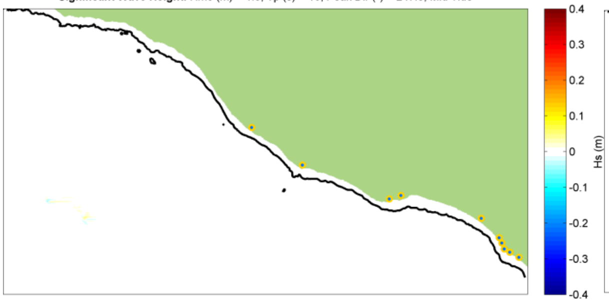
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, Mid

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide



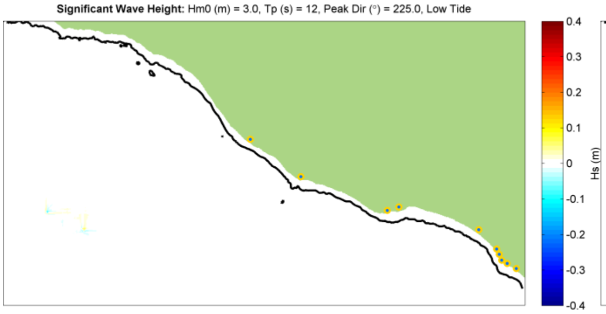
Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide

Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide

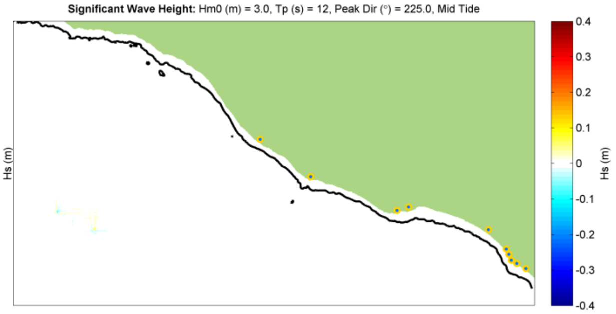


Significant Wave Height: Hm0 (m) = 1.5, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide

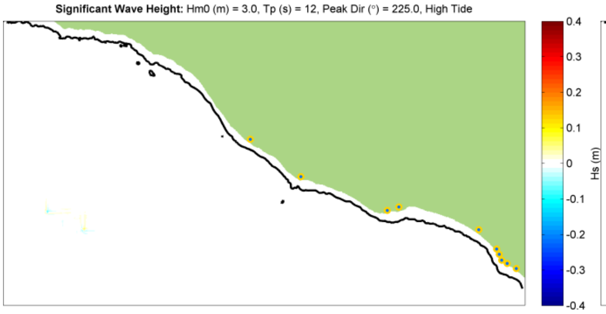
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Low Tide



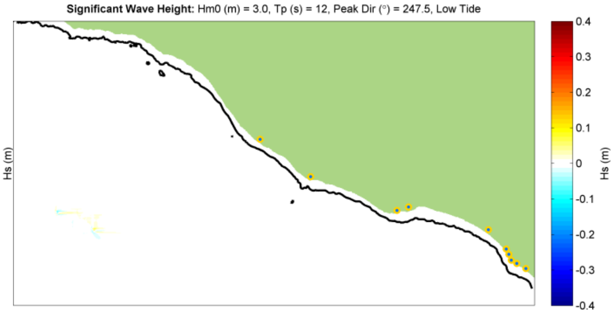
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, Mid Tide



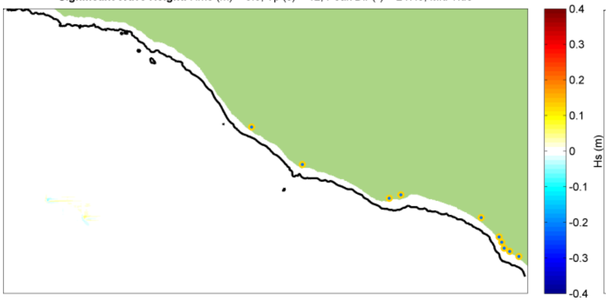
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 225.0, High Tide



Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Low Tide

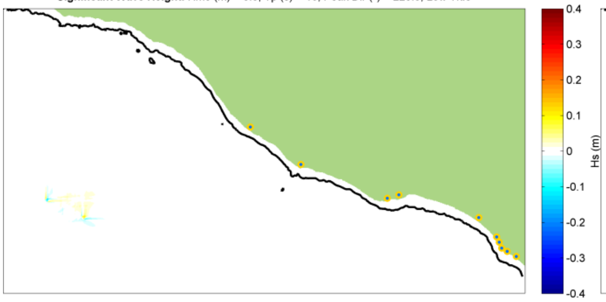


Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, Mid Tide



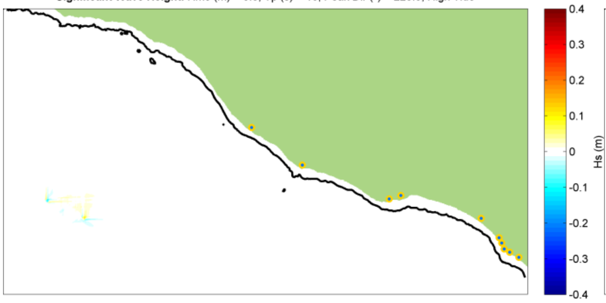
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 12, Peak Dir (°) = 247.5, High Tide

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Low Tide



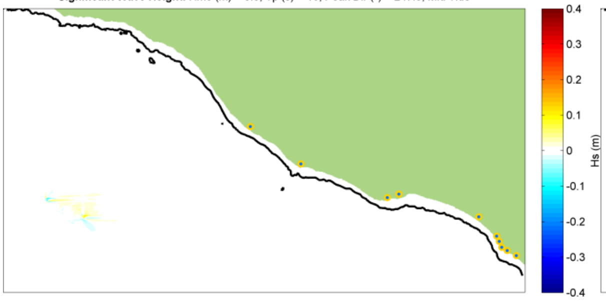
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, Mid Tide

Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 225.0, High Tide



Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Low Tide

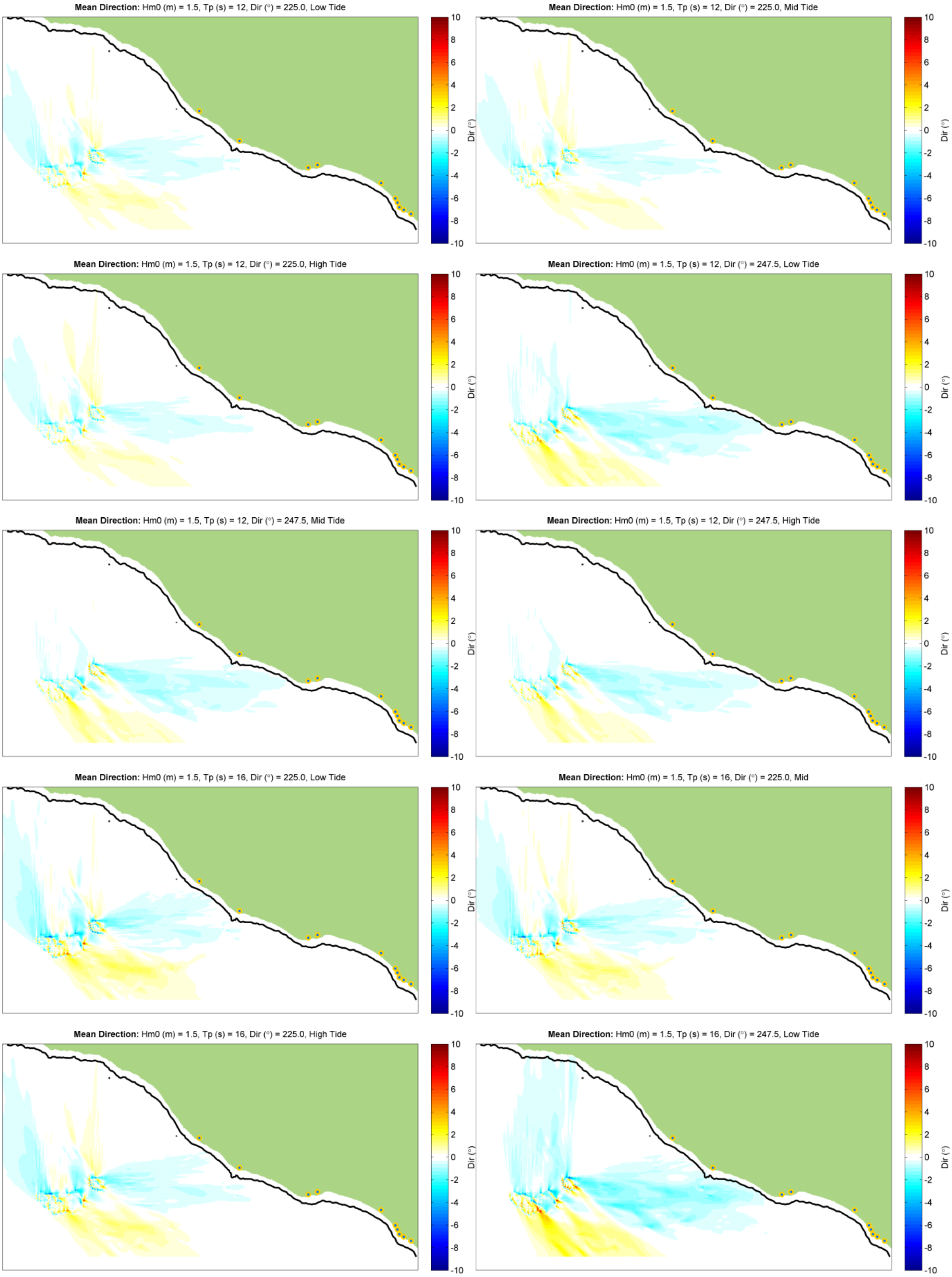
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, Mid Tide



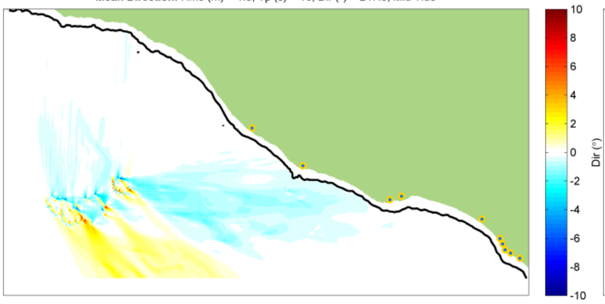
Significant Wave Height: Hm0 (m) = 3.0, Tp (s) = 16, Peak Dir (°) = 247.5, High Tide

Appendix 3 – Difference Plots for Wave Directions

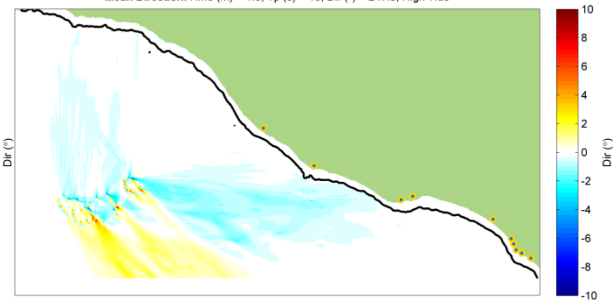
Scenario 1


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Mid Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Low Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, High Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Mid
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Low Tide
Dir (°)
10
8
6
4
2
0
-2
-4
-6
-8
-10

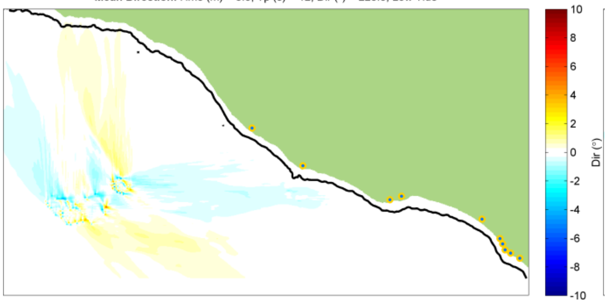
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Mid Tide



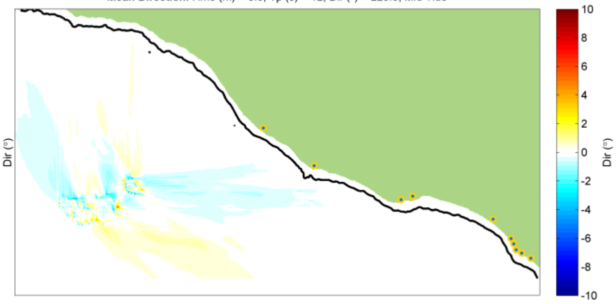
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, High Tide



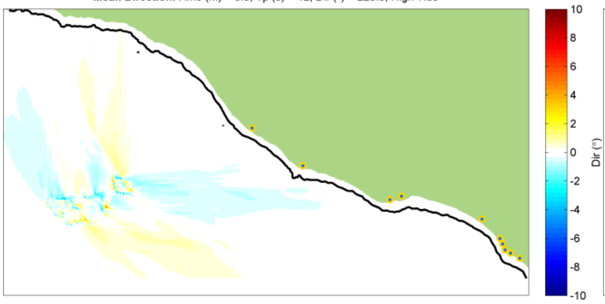
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Low Tide



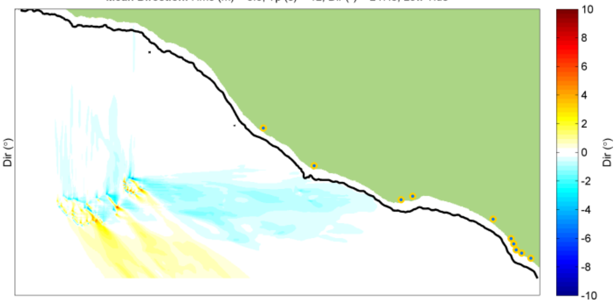
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Mid Tide



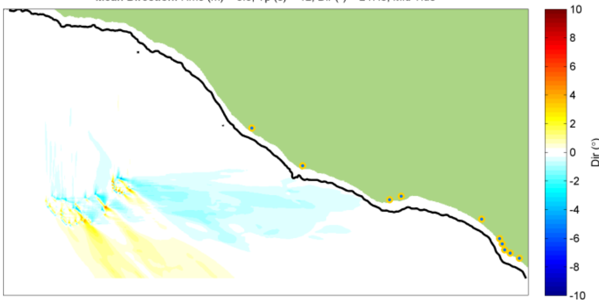
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, High Tide



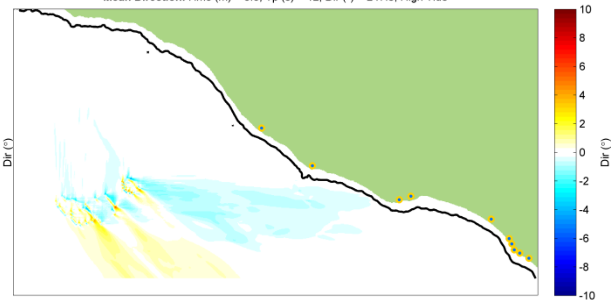
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Low Tide



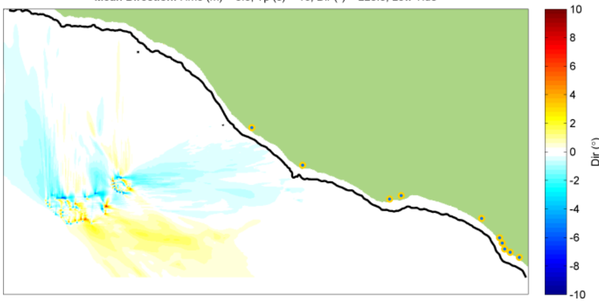
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Mid Tide



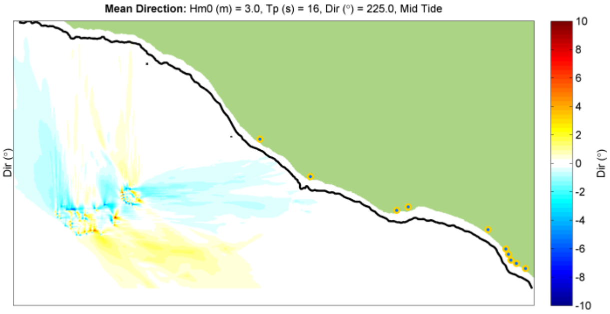
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, High Tide



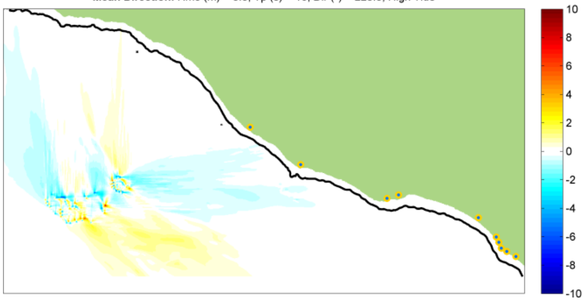
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Low Tide



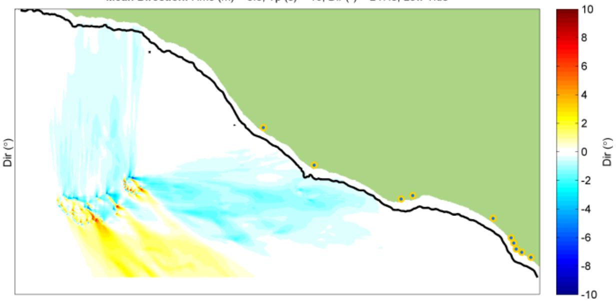
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Mid Tide



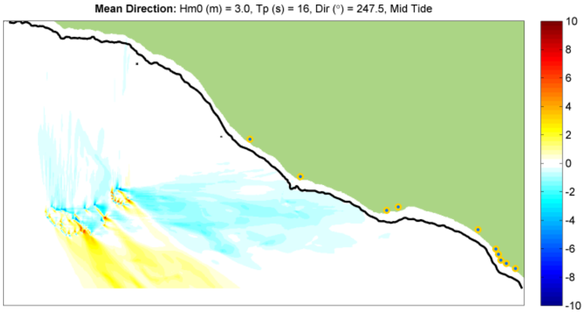
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, High Tide



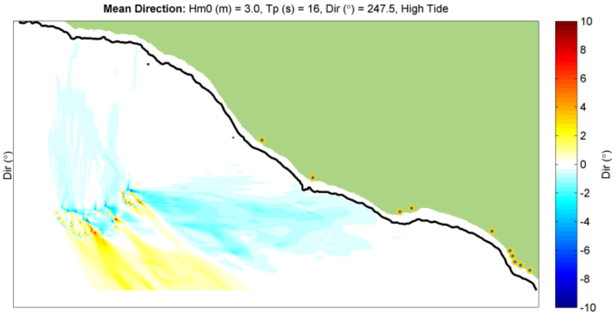
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Low Tide



Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Mid Tide

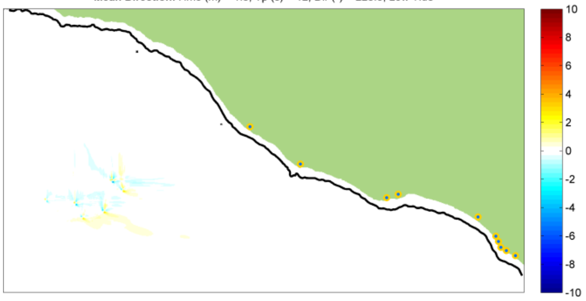


Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, High Tide

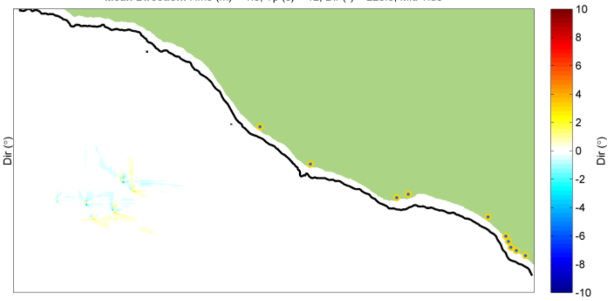


Scenario 2

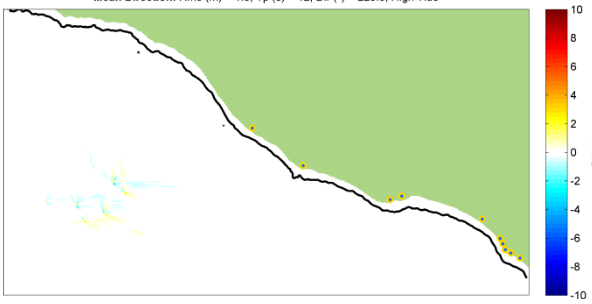
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Low Tide



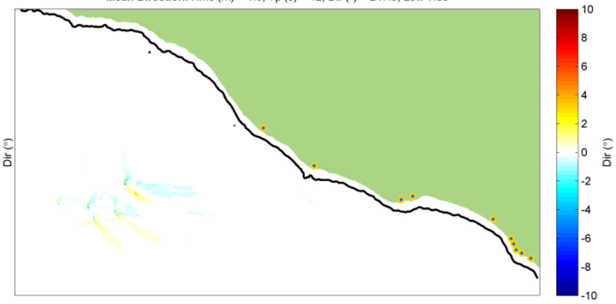
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Mid Tide



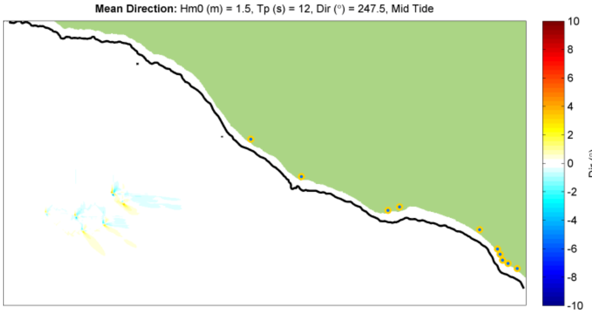
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, High Tide



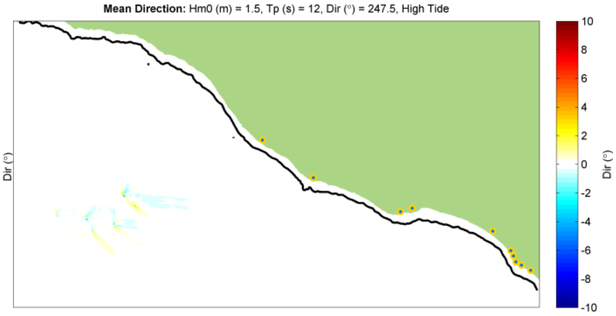
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Low Tide



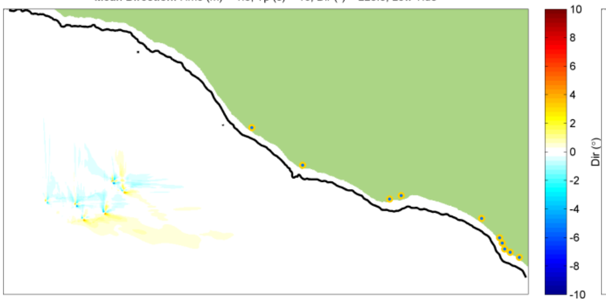
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Mid Tide



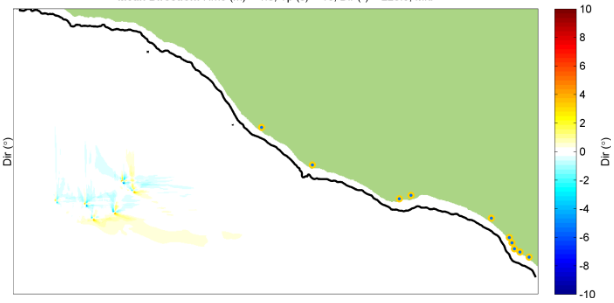
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, High Tide



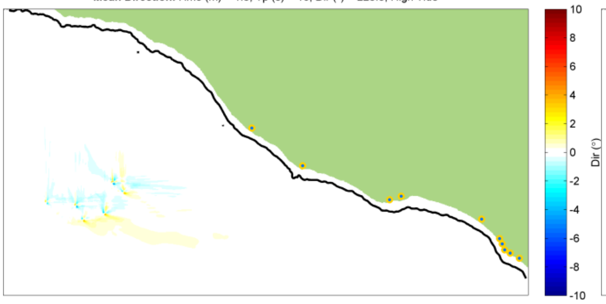
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Low Tide



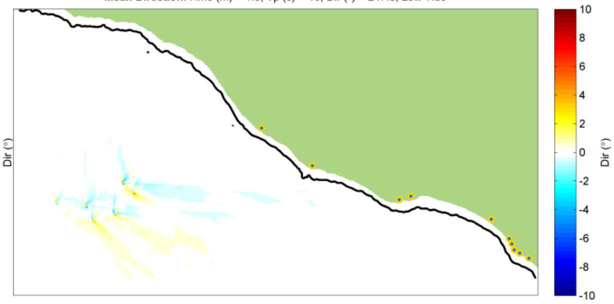
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Mid



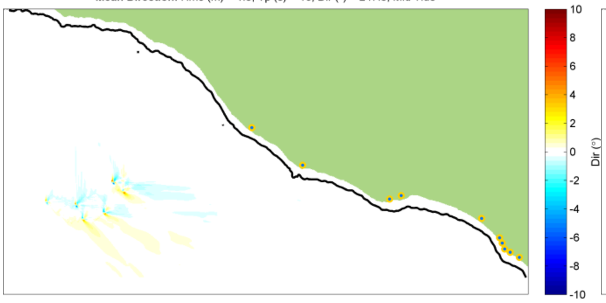
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, High Tide



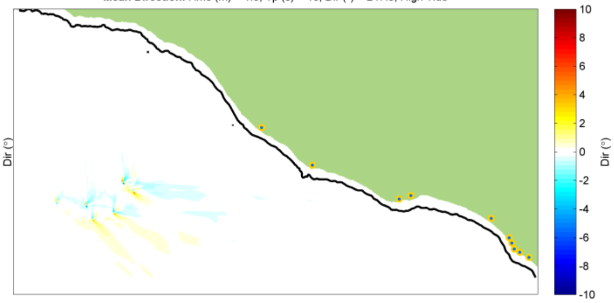
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Low Tide



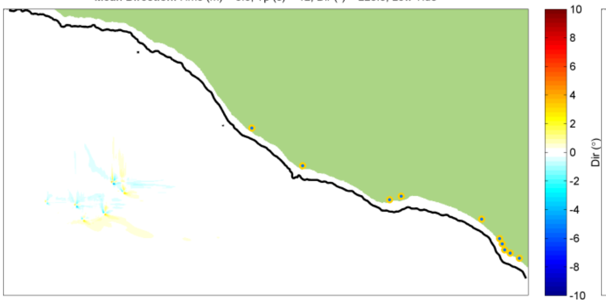
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Mid Tide



Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, High Tide

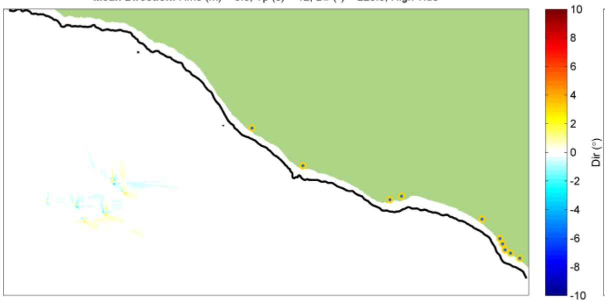


Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Low Tide

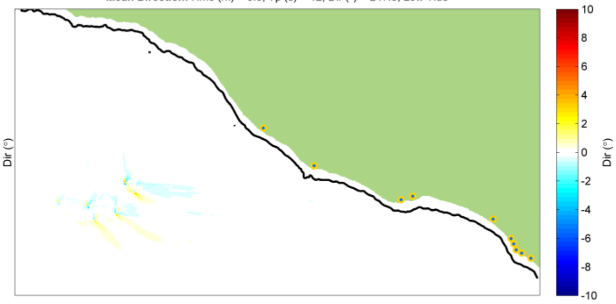


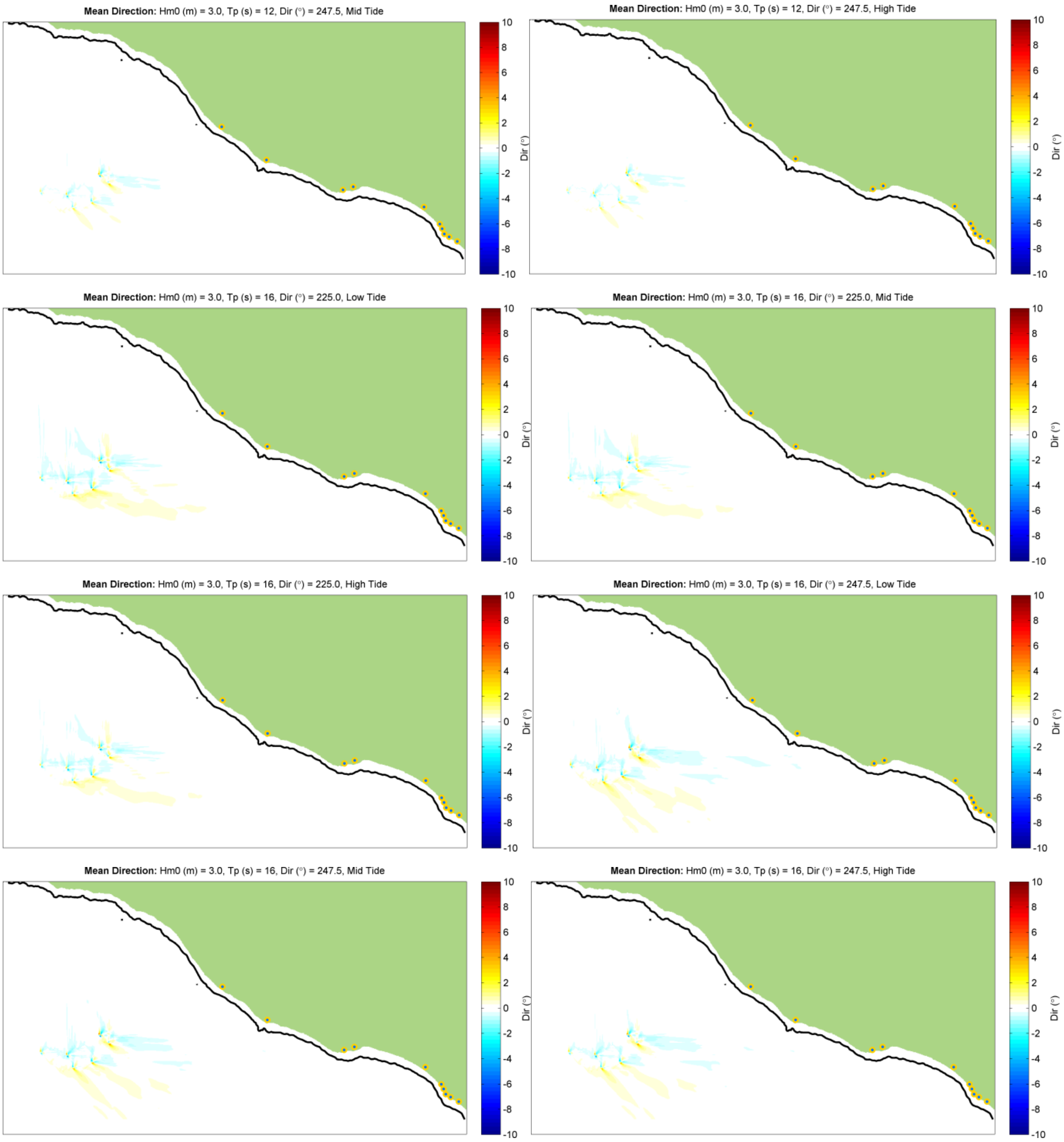
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Mid Tide

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, High Tide



Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Low Tide

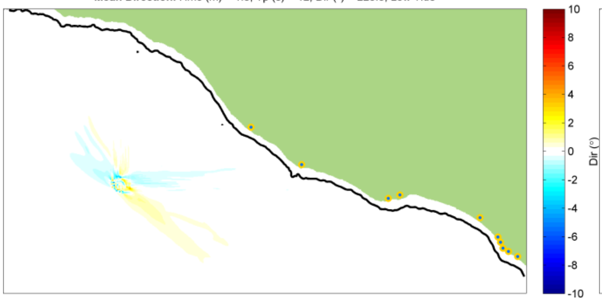




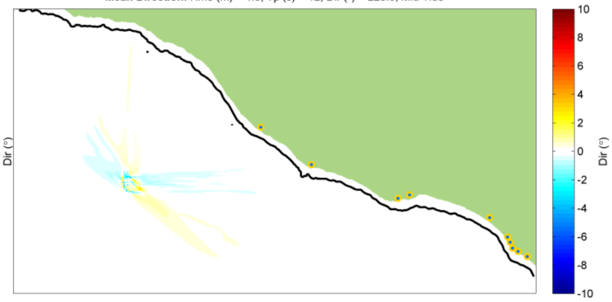
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, High Tide
Dir (°)
10
8
6
4
2
0
-2
-4
-6
-8
-10

Scenaio 3

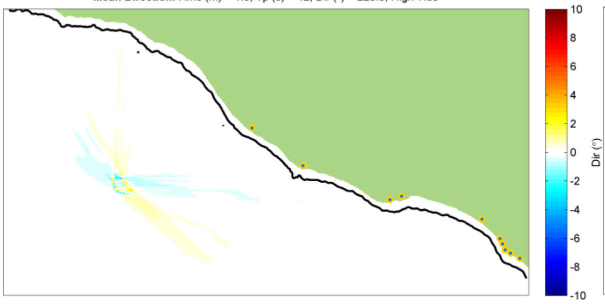
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Low Tide



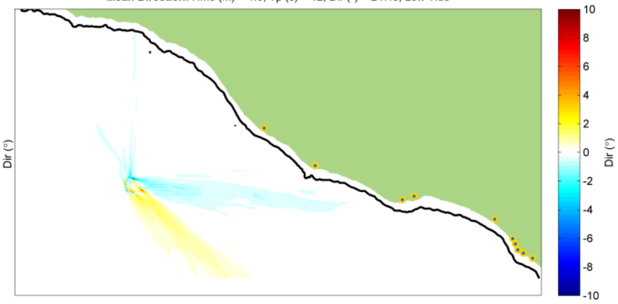
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Mid Tide



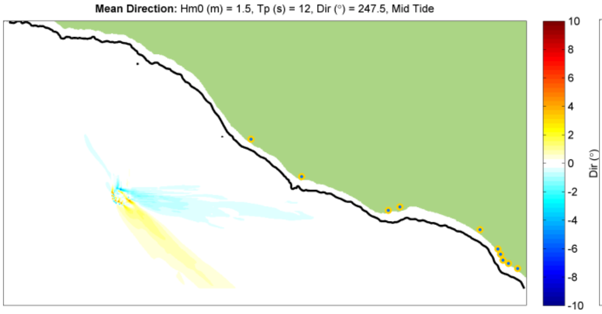
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, High Tide



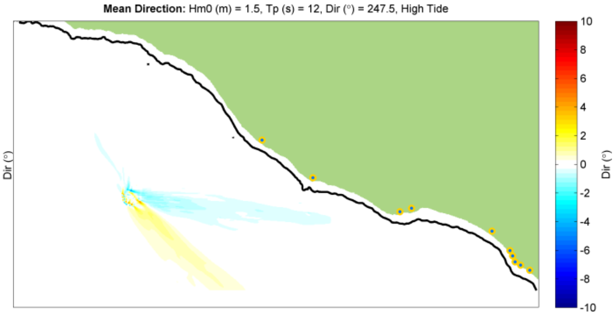
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Low Tide



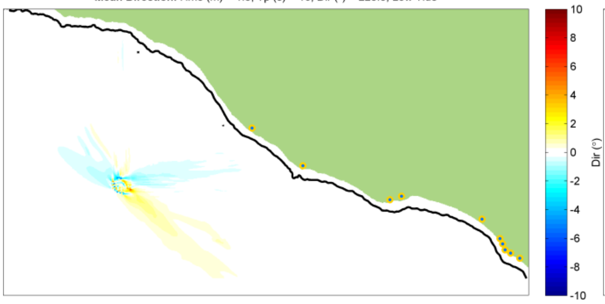
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Mid Tide



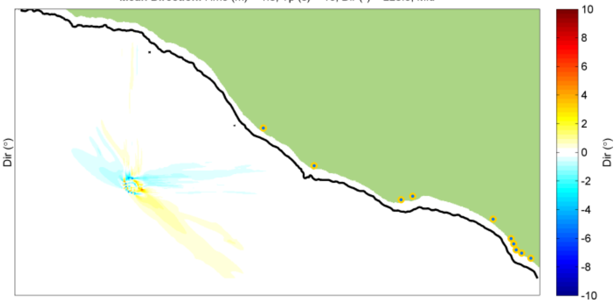
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, High Tide



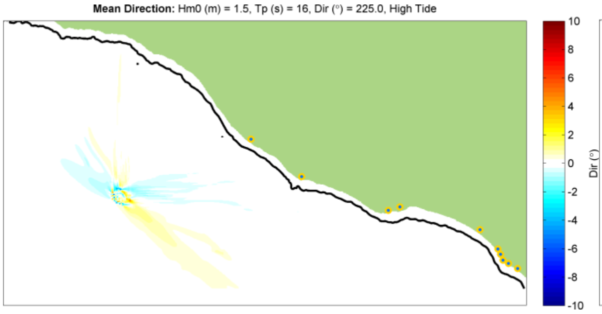
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Low Tide



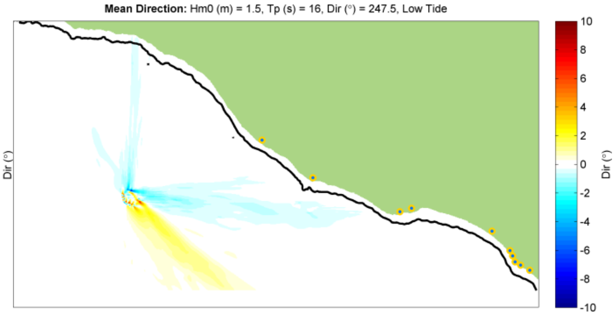
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Mid



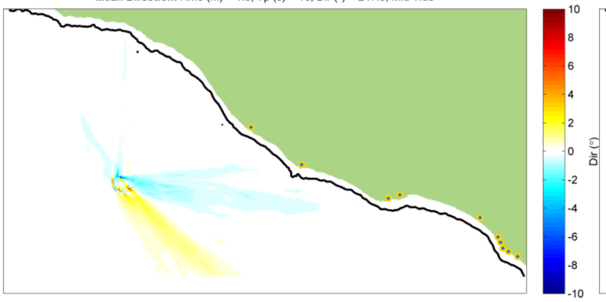
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, High Tide



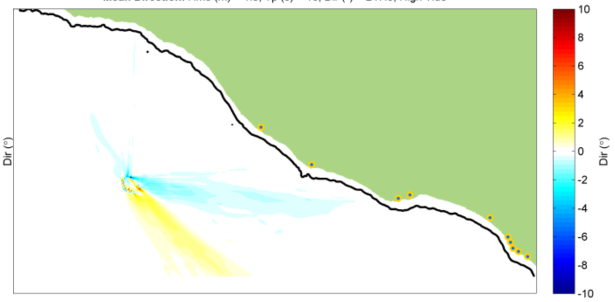
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Low Tide



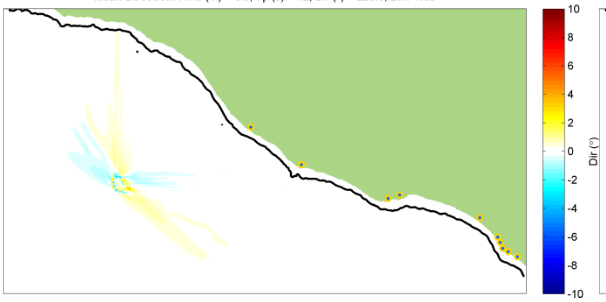
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Mid Tide



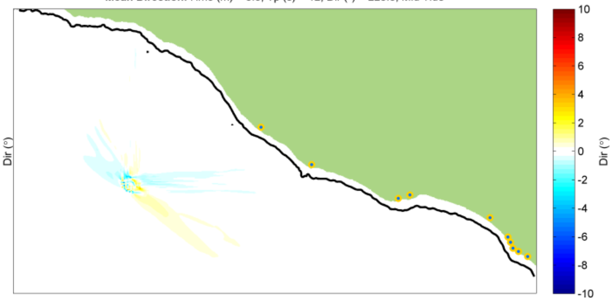
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, High Tide



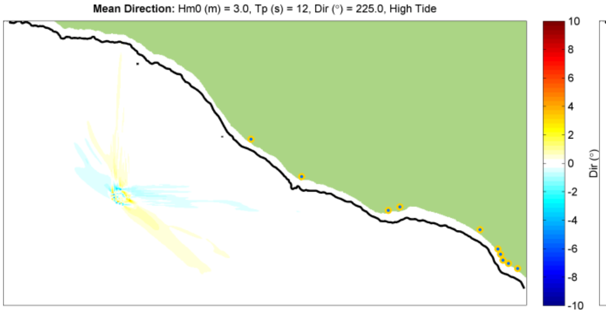
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Low Tide



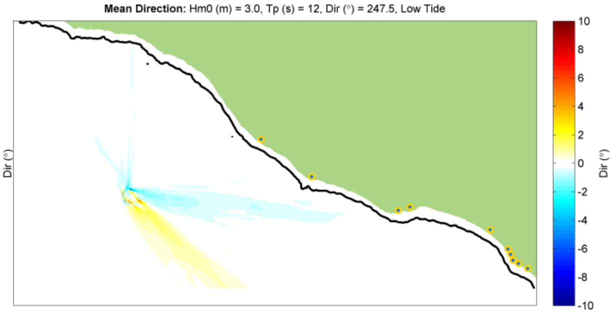
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Mid Tide



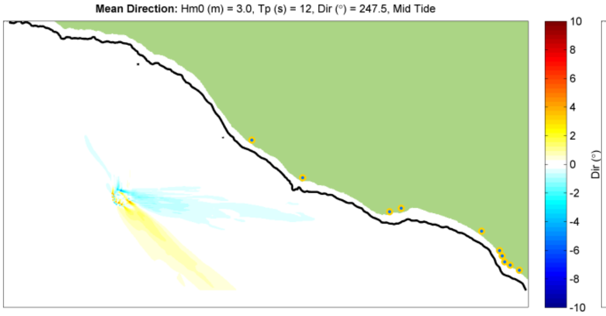
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, High Tide



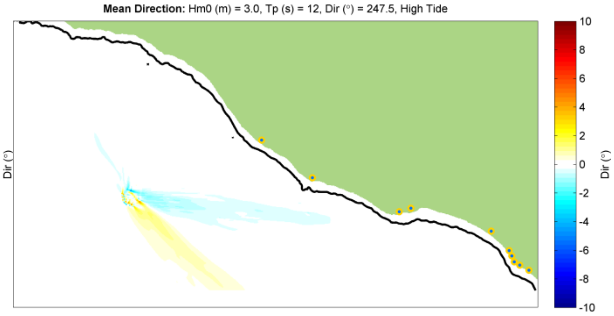
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Low Tide



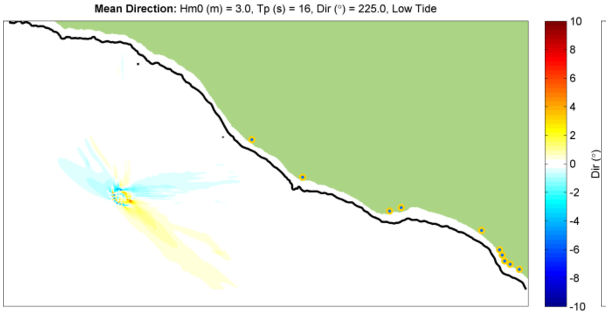
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Mid Tide



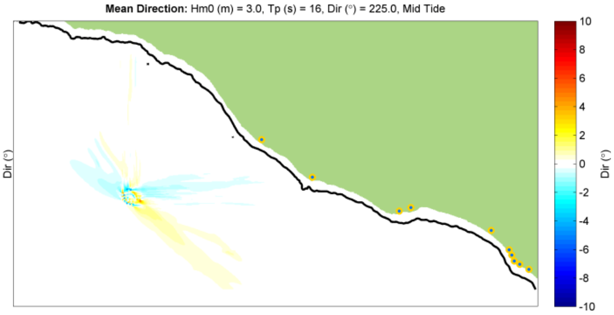
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, High Tide



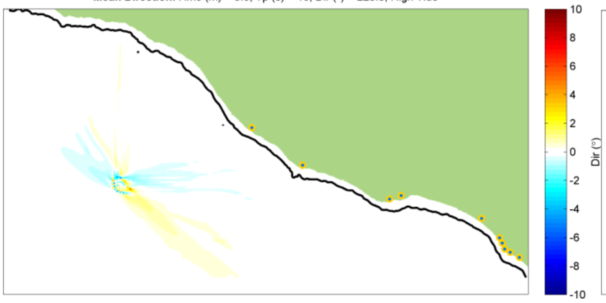
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Low Tide



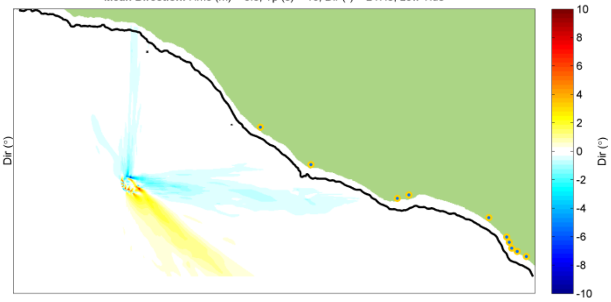
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Mid Tide



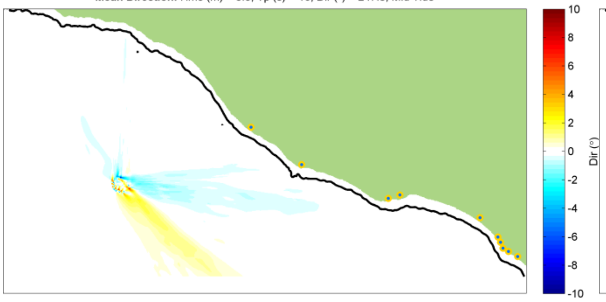
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, High Tide



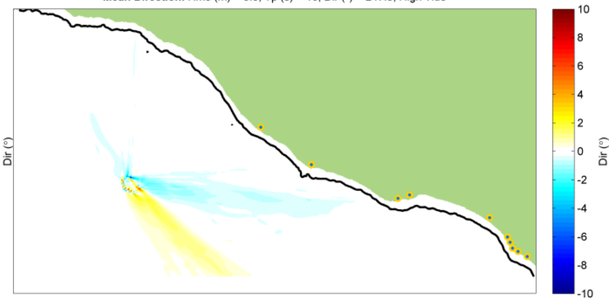
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Low Tide



Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Mid Tide

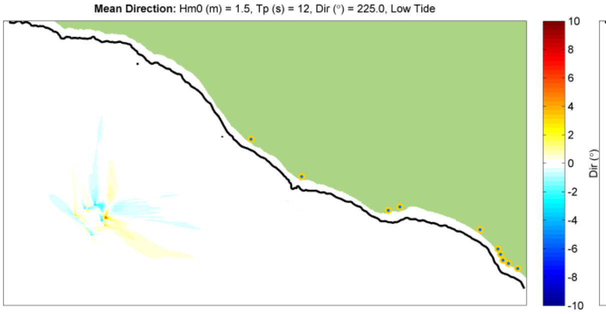


Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, High Tide

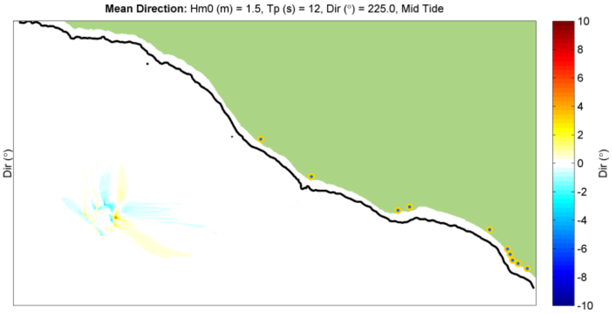


Scenario 4

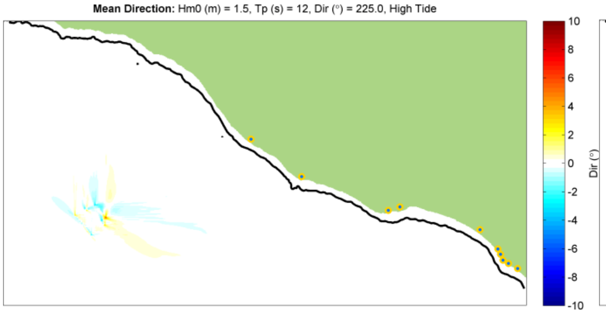
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Low Tide



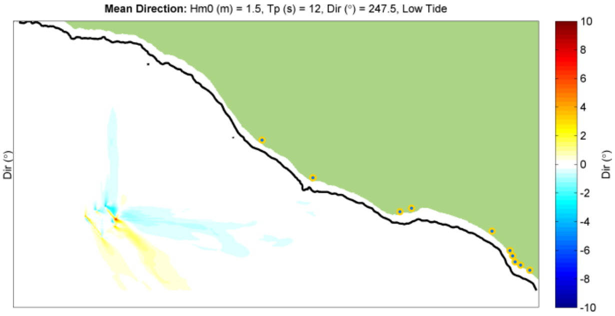
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Mid Tide



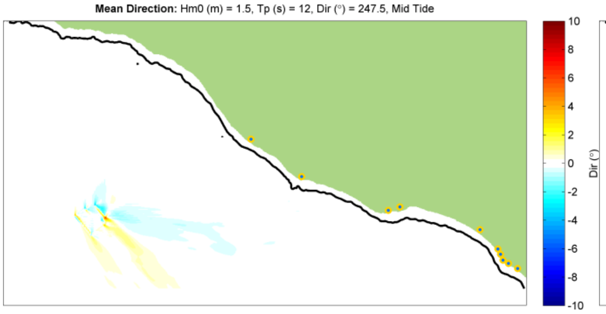
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, High Tide



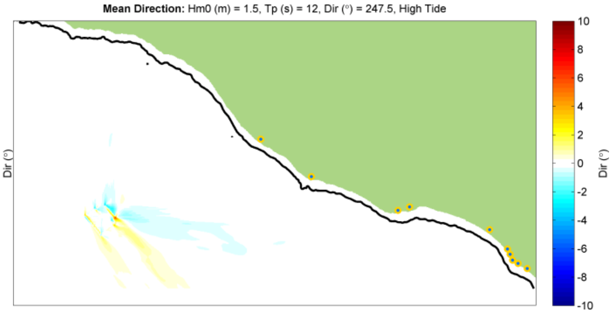
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Low Tide

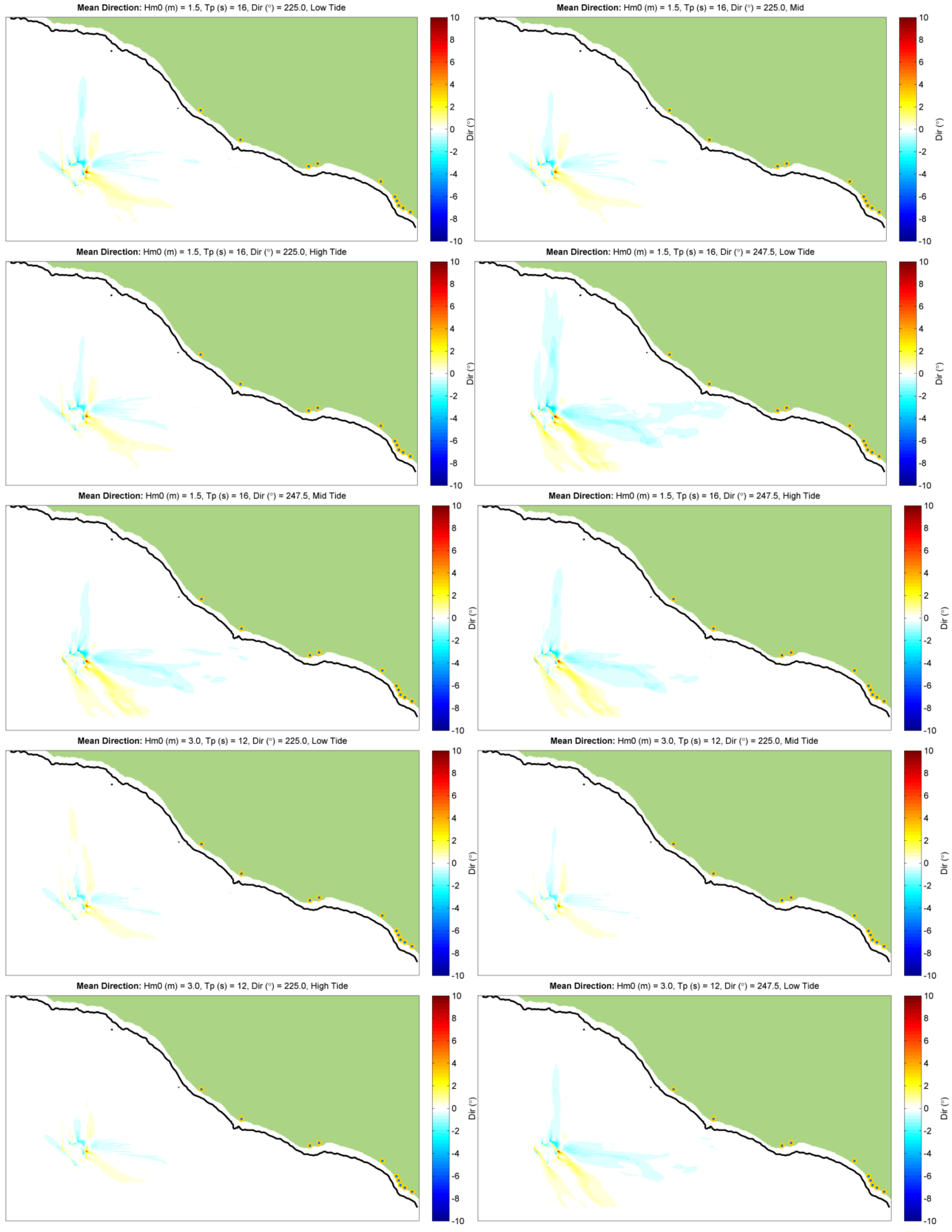


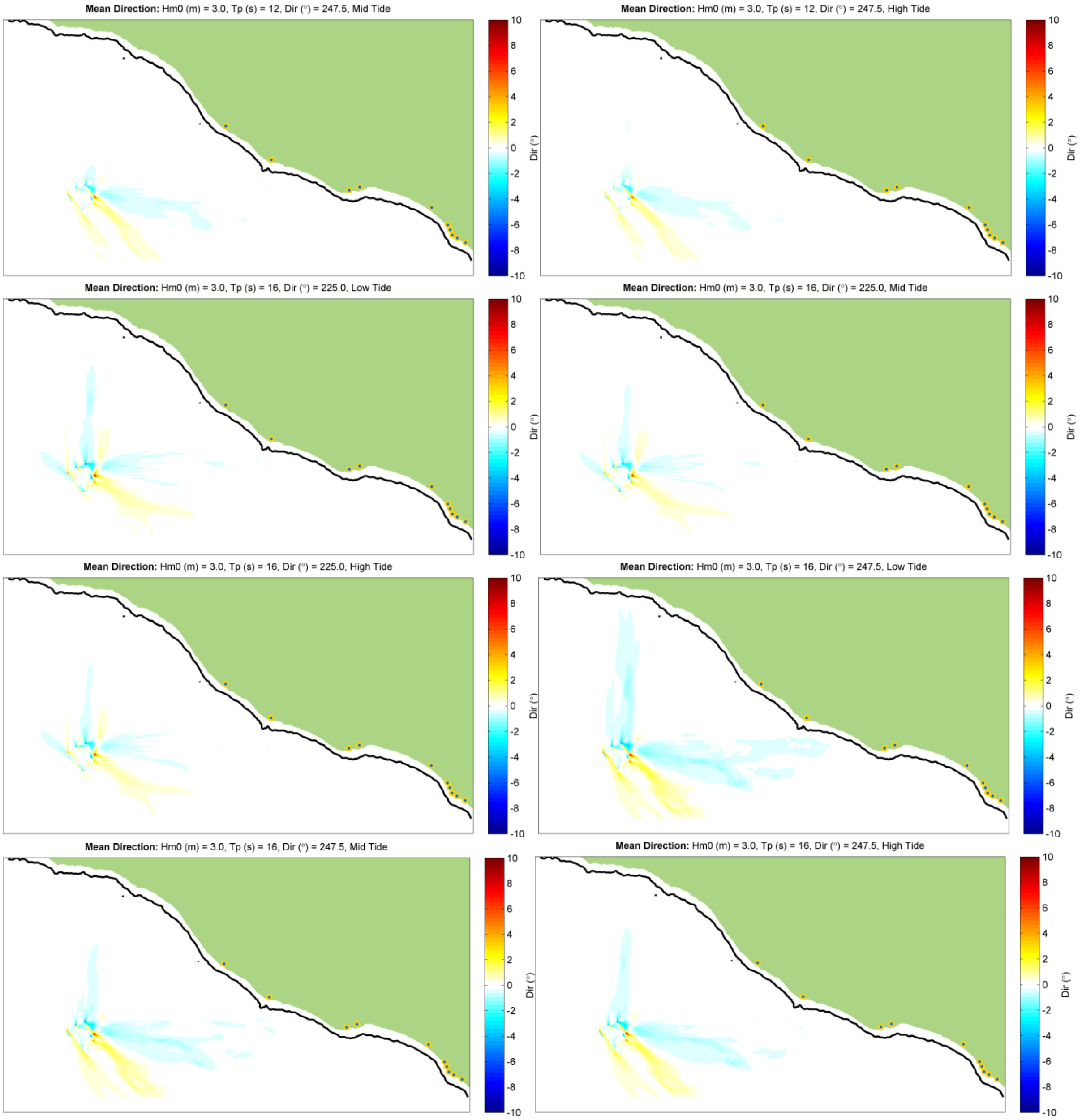
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Mid Tide



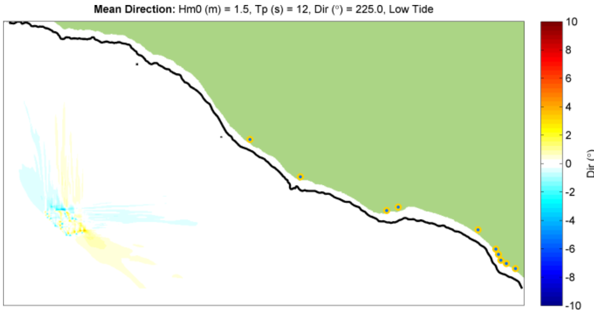
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, High Tide

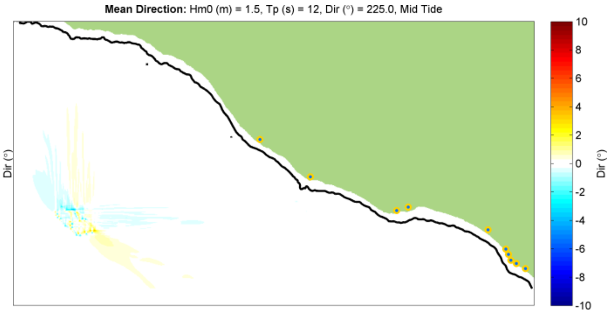


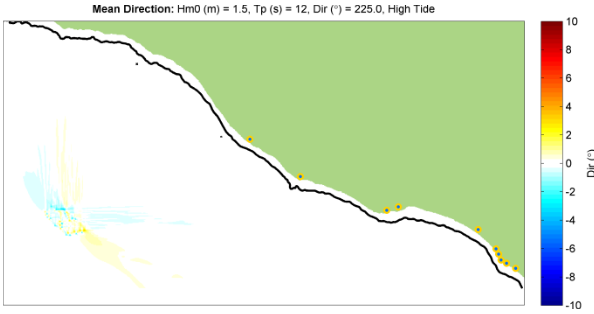

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Mid
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Low Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Low Tide
Dir (°)
10
8
6
4
2
0
-2
-4
-6
-8
-10

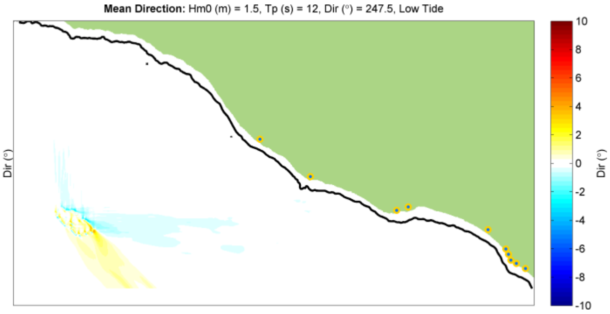

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, High Tide
Dir (°)
10
8
6
4
2
0
-2
-4
-6
-8
-10

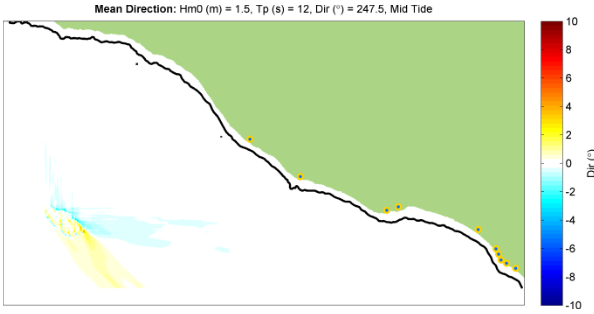
Scenario 5

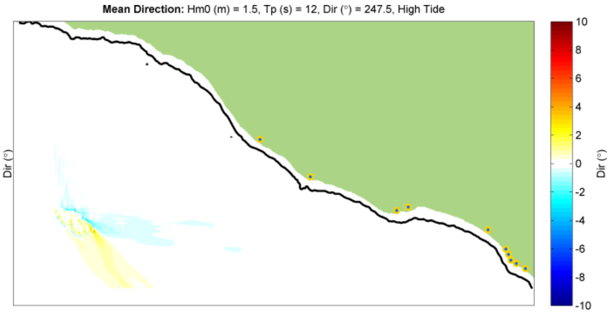

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Low Tide
Dir (°)

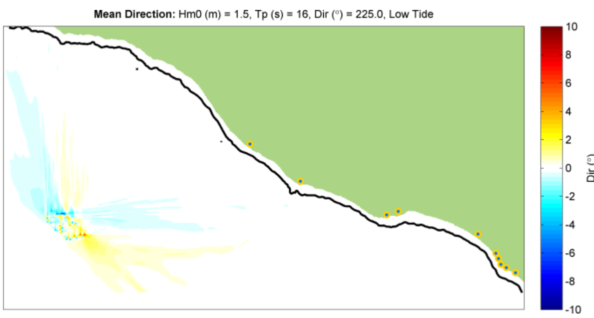

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Mid Tide
Dir (°)

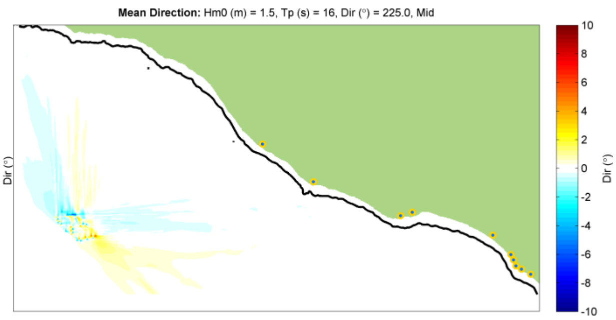

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, High Tide
Dir (°)

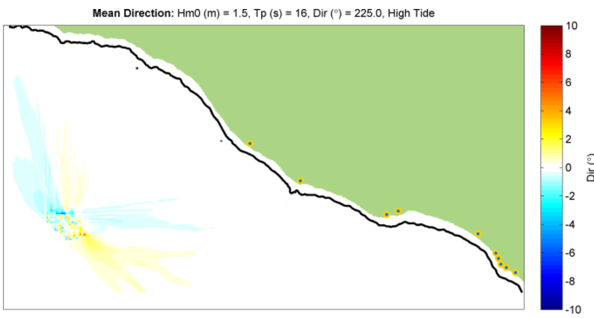

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Low Tide
Dir (°)

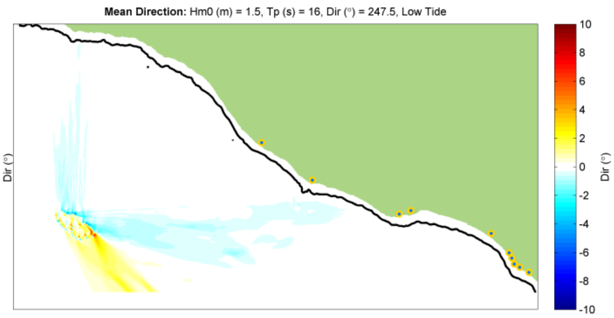

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Mid Tide
Dir (°)

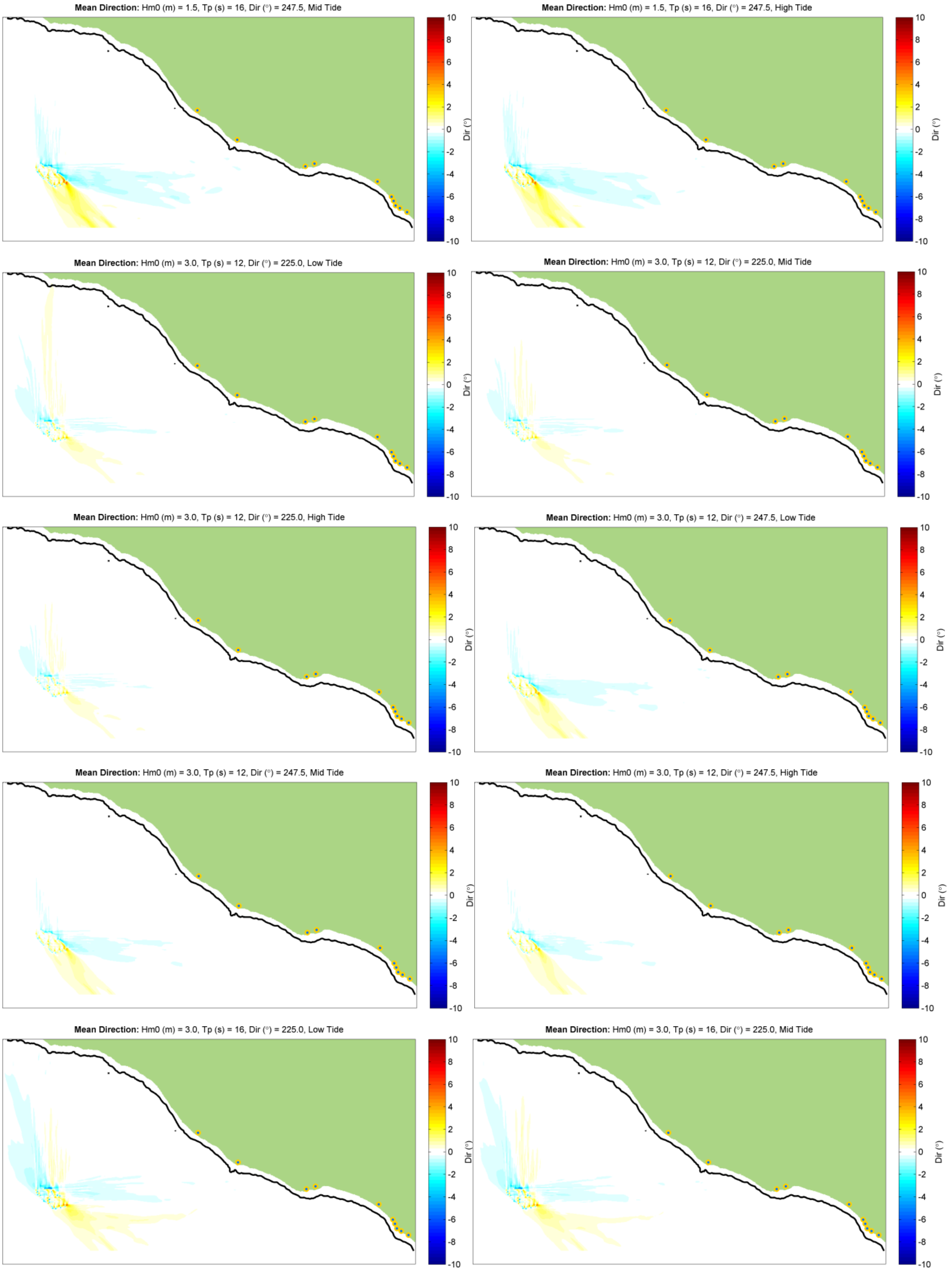

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, High Tide
Dir (°)


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Low Tide
Dir (°)

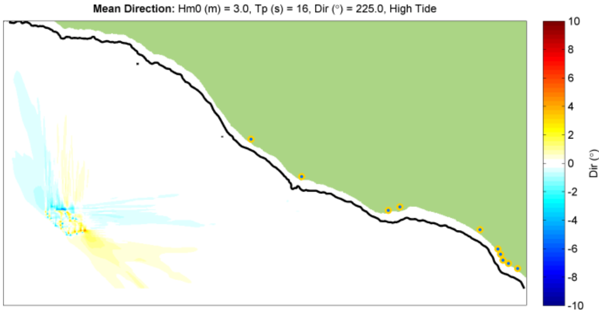

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Mid
Dir (°)


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, High Tide
Dir (°)

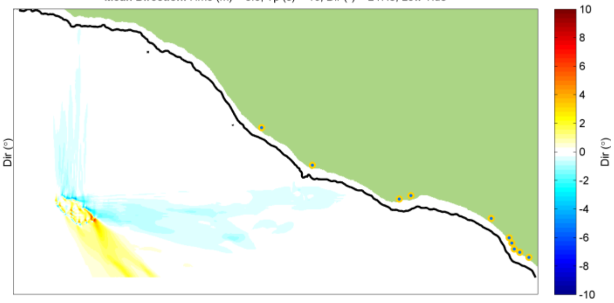

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Low Tide
Dir (°)


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Mid Tide
10
8
6
4
2
0
-2
-4
-6
-8
-10
Dir (°)

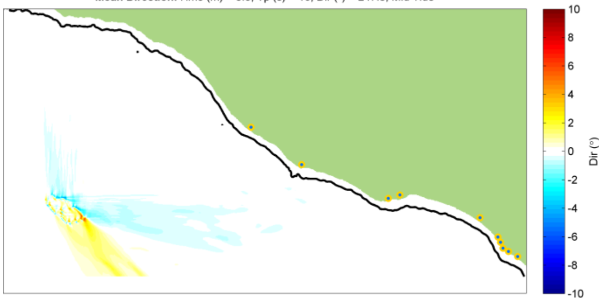
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, High Tide



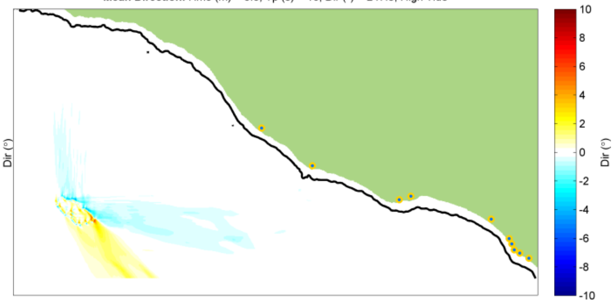
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Low Tide



Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Mid Tide

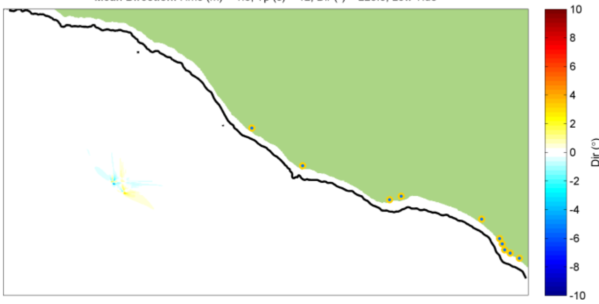


Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, High Tide



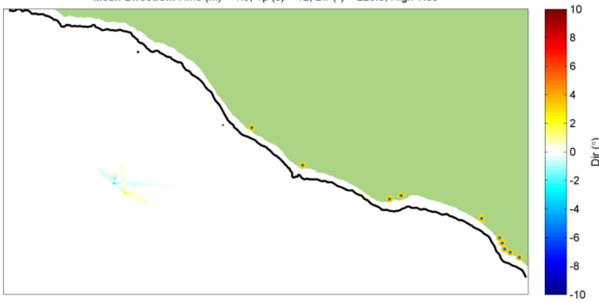
Scenario 6

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Low Tide

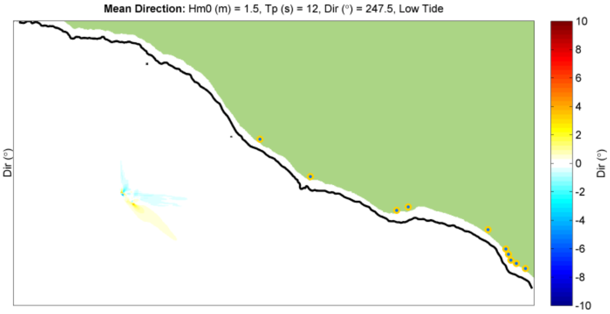


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Mid Tide

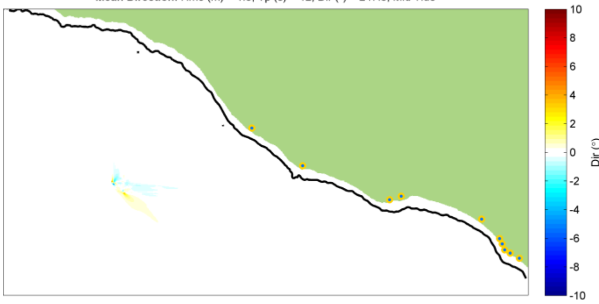
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, High Tide



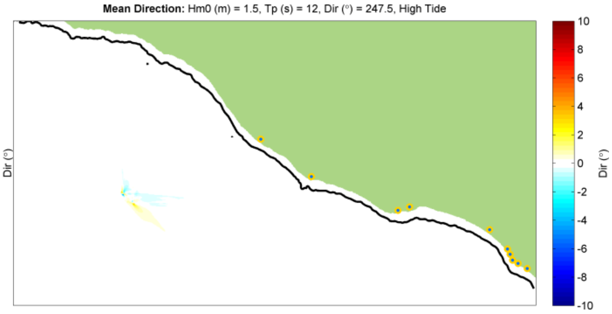
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Low Tide



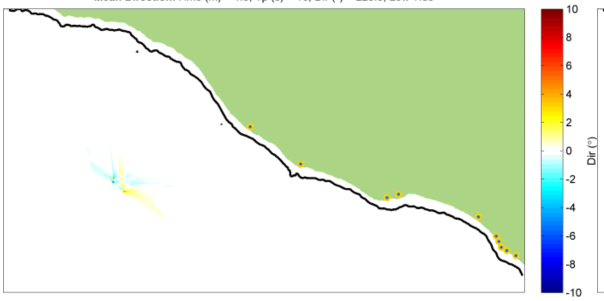
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Mid Tide



Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, High Tide

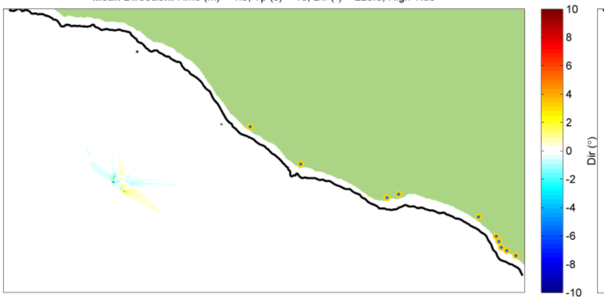


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Low Tide

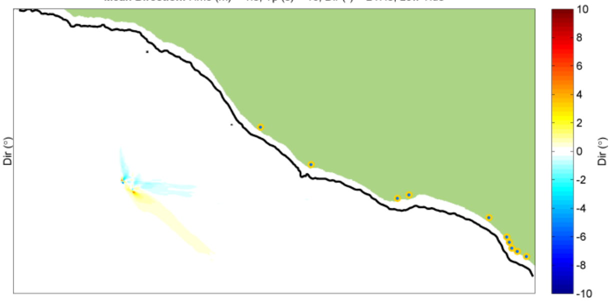


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Mid

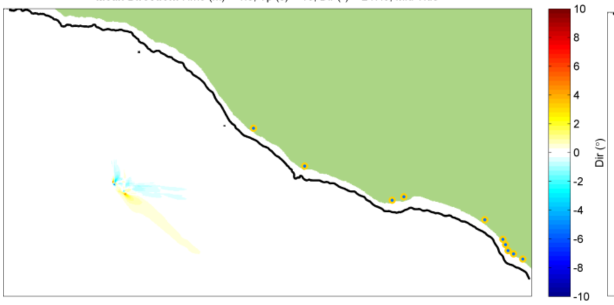
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, High Tide



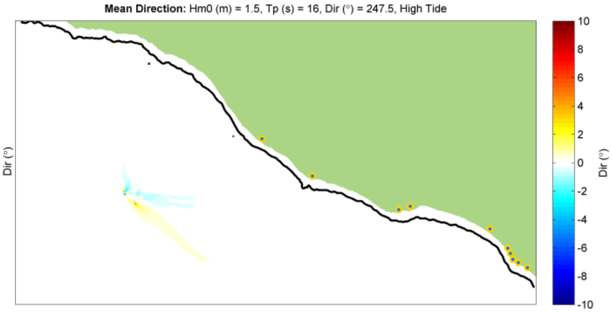
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Low Tide



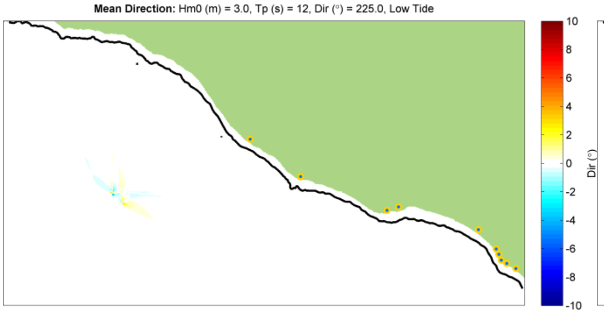
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Mid Tide



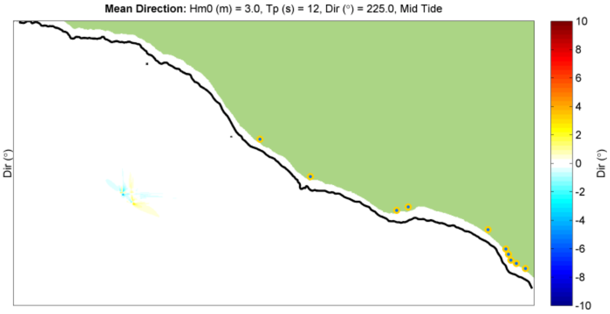
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, High Tide



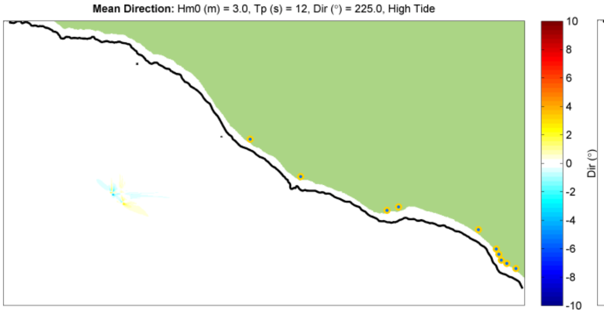
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Low Tide



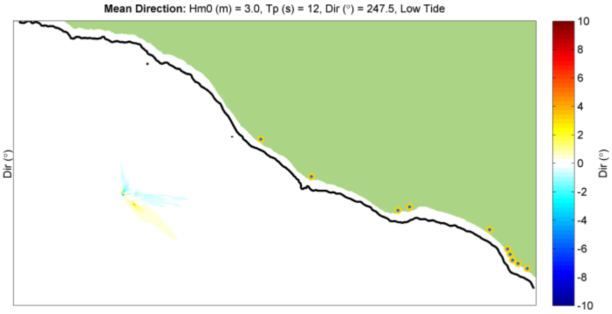
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Mid Tide

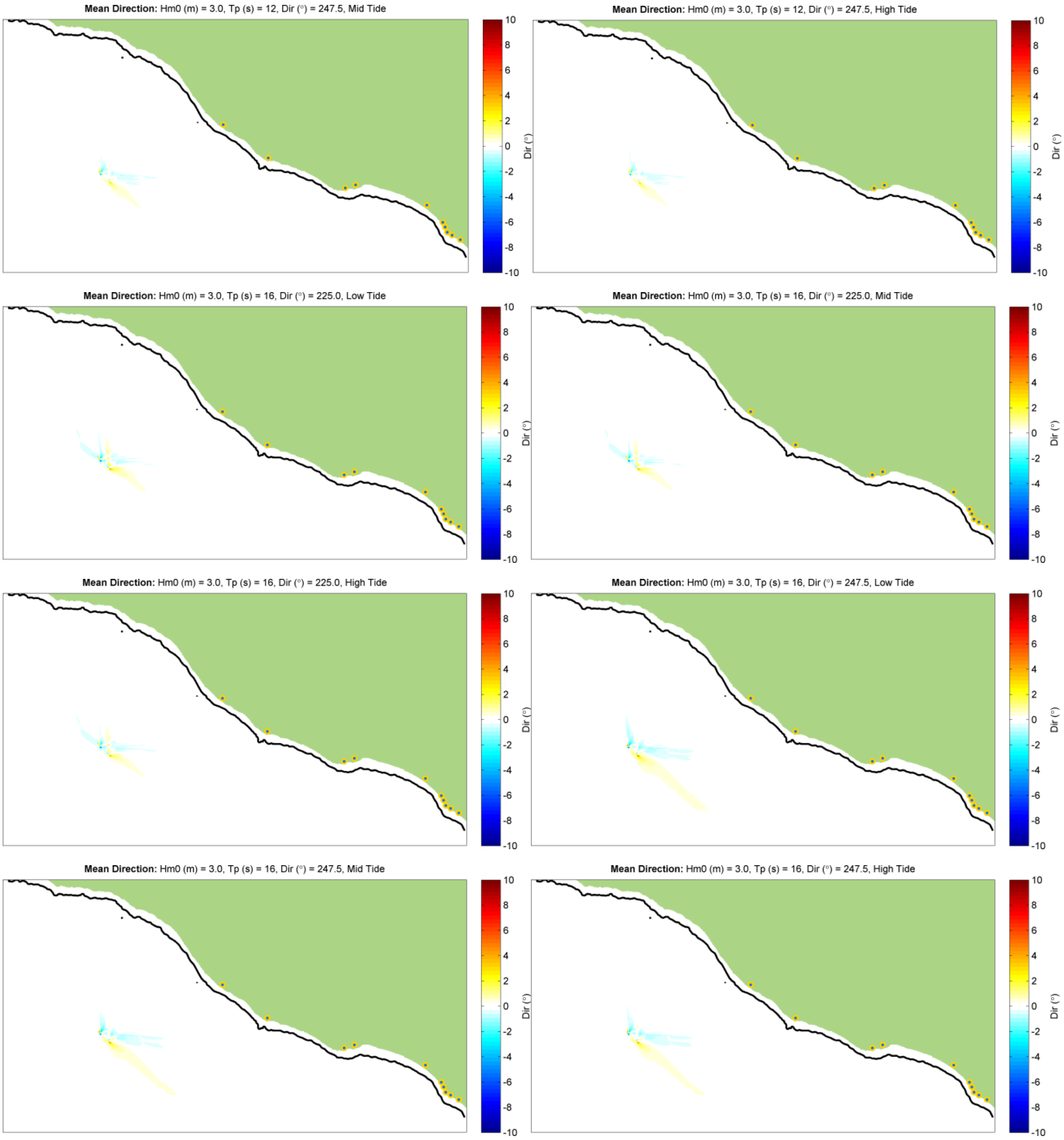


Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, High Tide



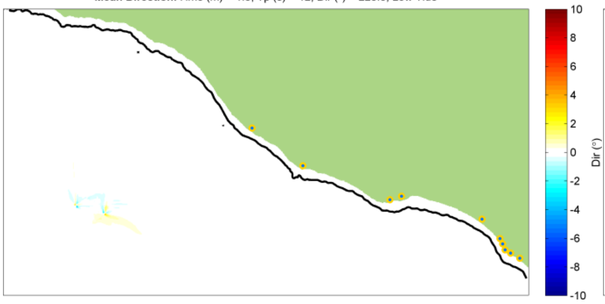
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Low Tide




Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, High Tide
Dir (°)
10
8
6
4
2
0
-2
-4
-6
-8
-10

Scenario 7

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Low Tide

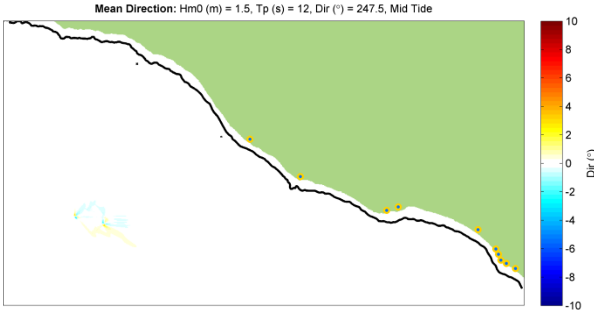


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Mid Tide

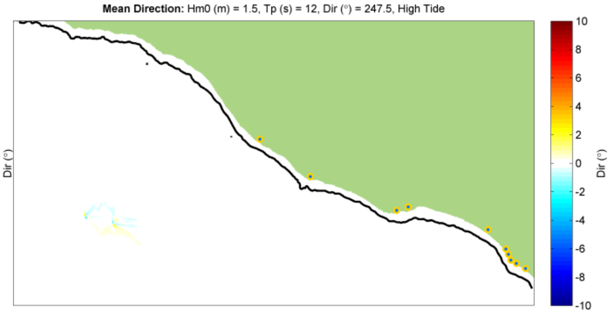
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, High Tide

Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Low Tide

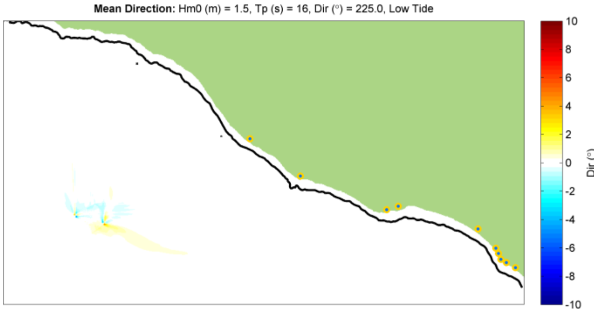
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Mid Tide



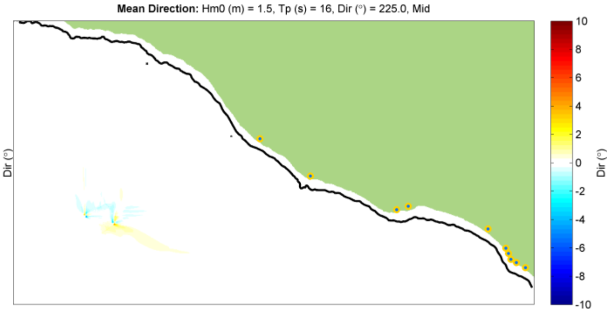
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, High Tide



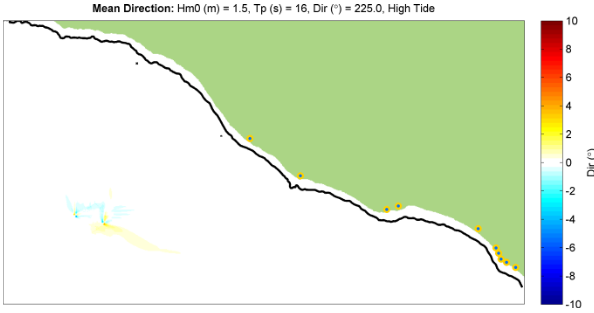
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Low Tide



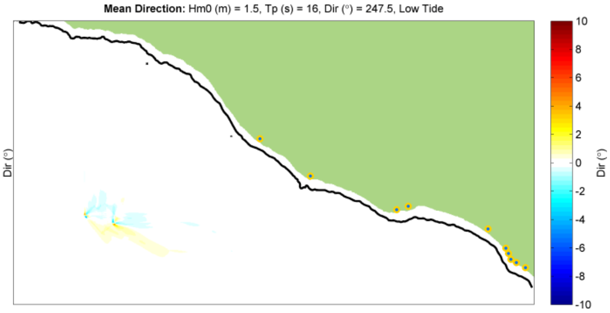
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Mid



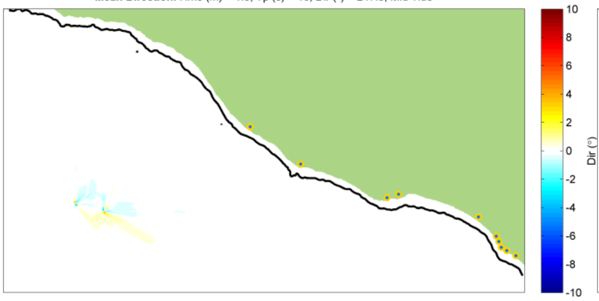
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, High Tide



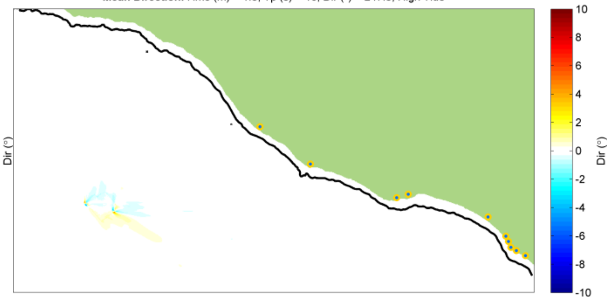
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Low Tide



Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Mid Tide



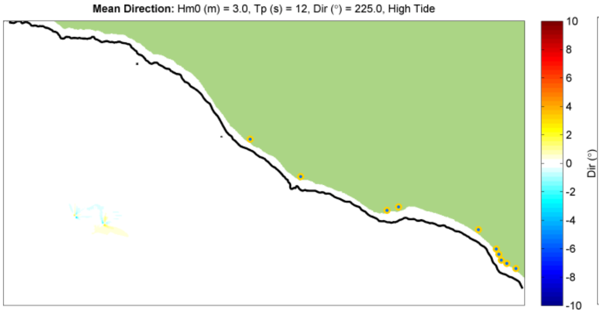
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, High Tide



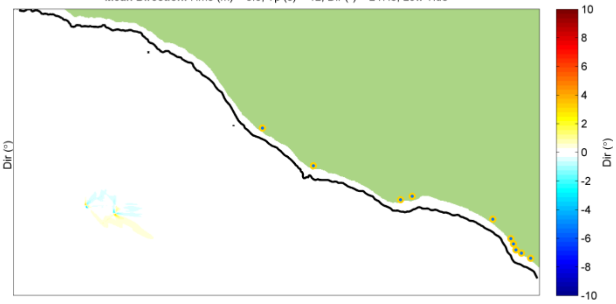
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Low Tide

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Mid Tide

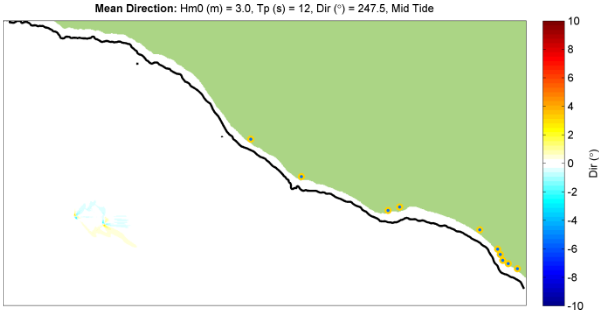
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, High Tide



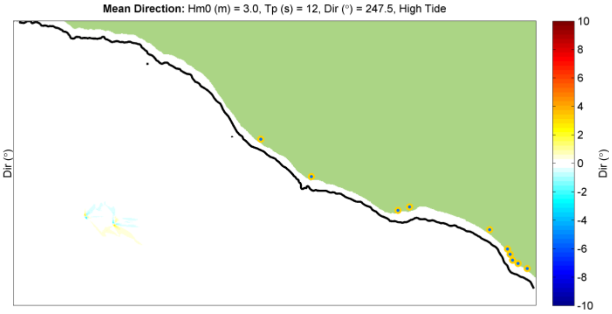
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Low Tide



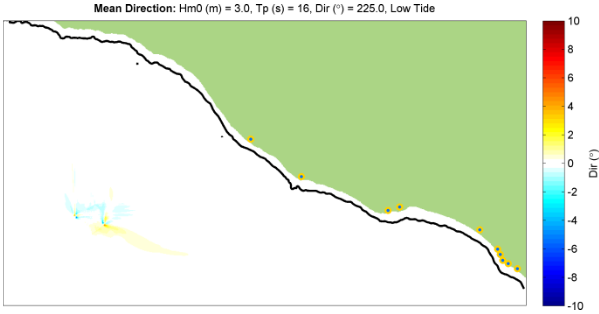
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Mid Tide



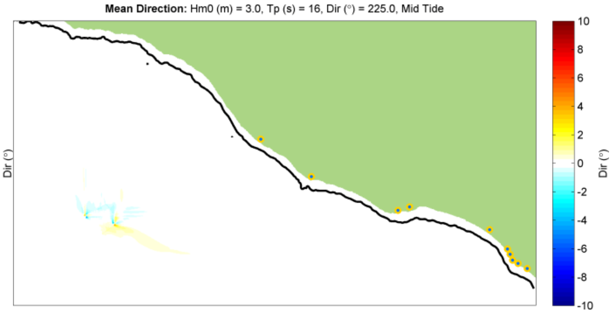
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, High Tide



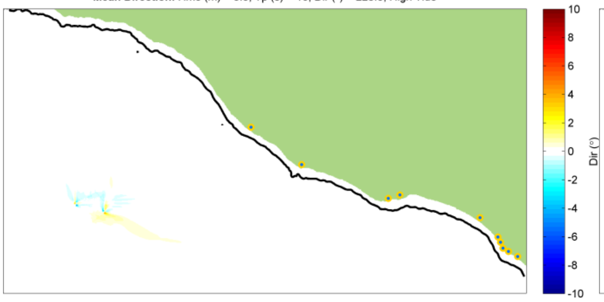
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Low Tide



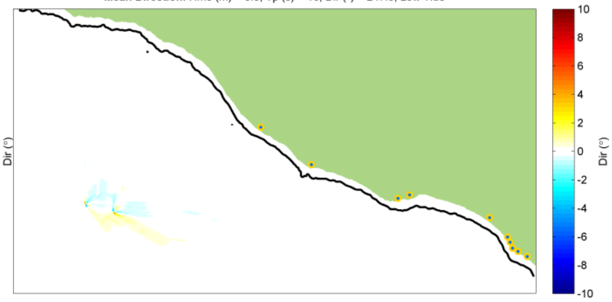
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Mid Tide



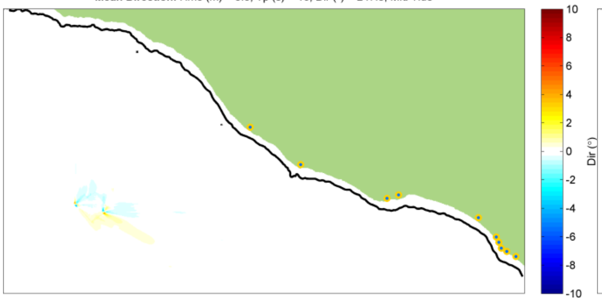
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, High Tide



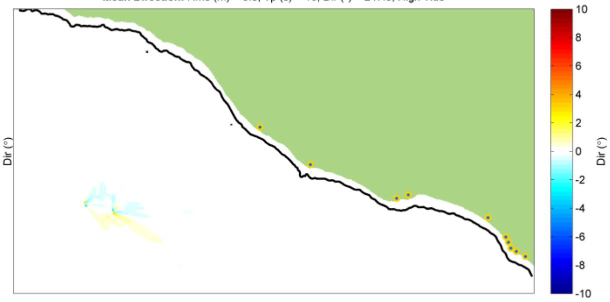
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Low Tide



Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Mid Tide

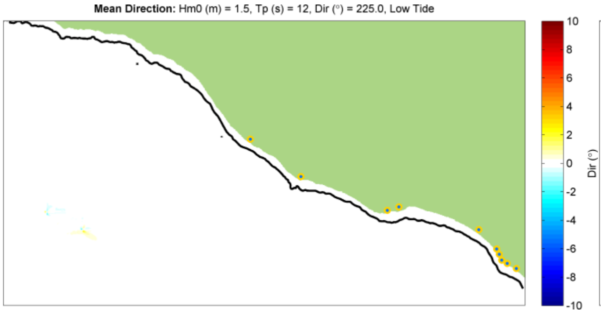


Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, High Tide

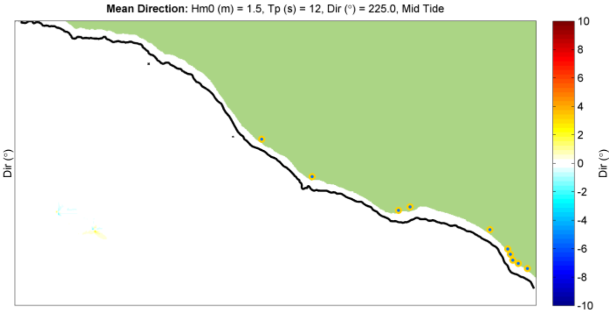


Scenario 8

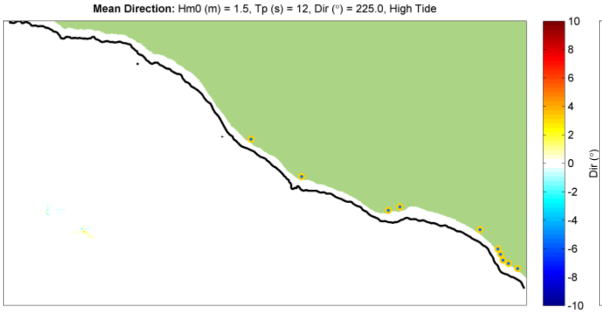
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Low Tide



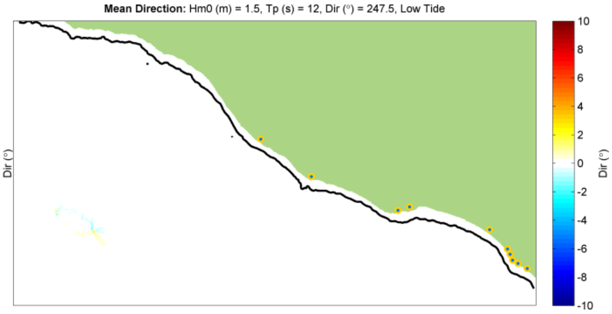
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, Mid Tide



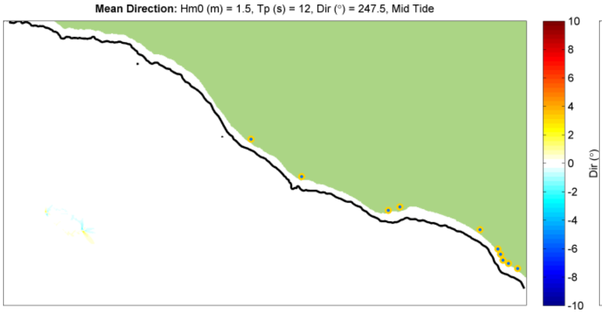
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 225.0, High Tide



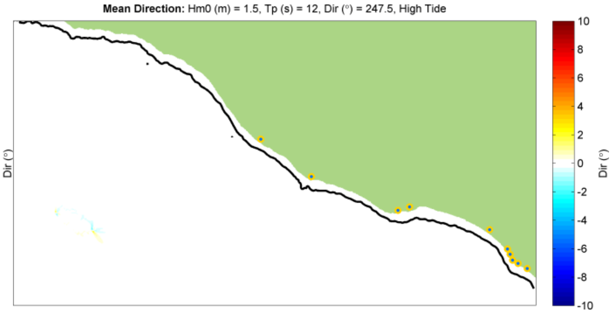
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Low Tide

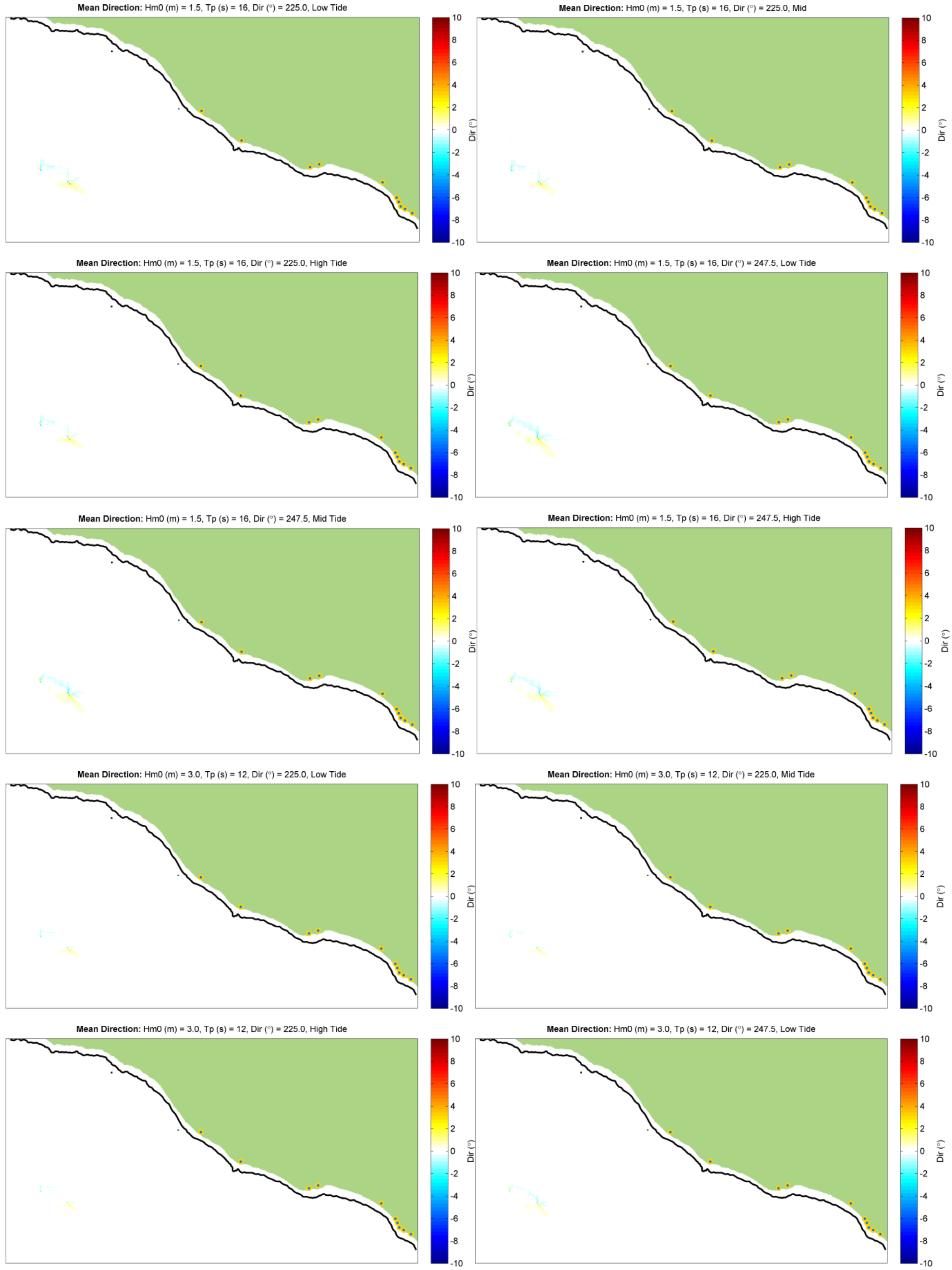


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, Mid Tide

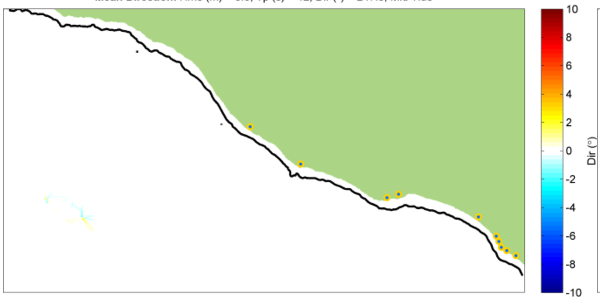


Mean Direction: Hm0 (m) = 1.5, Tp (s) = 12, Dir (°) = 247.5, High Tide




Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, Mid
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Low Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, Mid Tide
Mean Direction: Hm0 (m) = 1.5, Tp (s) = 16, Dir (°) = 247.5, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Low Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, Mid Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 225.0, High Tide
Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Low Tide
Dir (°)
10
8
6
4
2
0
-2
-4
-6
-8
-10

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, Mid Tide

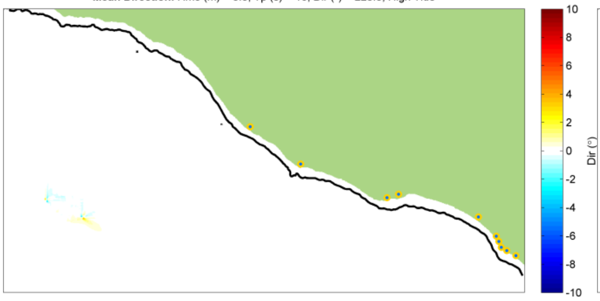


Mean Direction: Hm0 (m) = 3.0, Tp (s) = 12, Dir (°) = 247.5, High Tide

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Low Tide

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, Mid Tide

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 225.0, High Tide



Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Low Tide

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, Mid Tide

Mean Direction: Hm0 (m) = 3.0, Tp (s) = 16, Dir (°) = 247.5, High Tide