

Kauai Wave Climate

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Kauai Wave Climate Overview

- Study Regions
- WIS Hindcast Data & Analysis
- Wave Transformation
- Nearshore Wave Climate

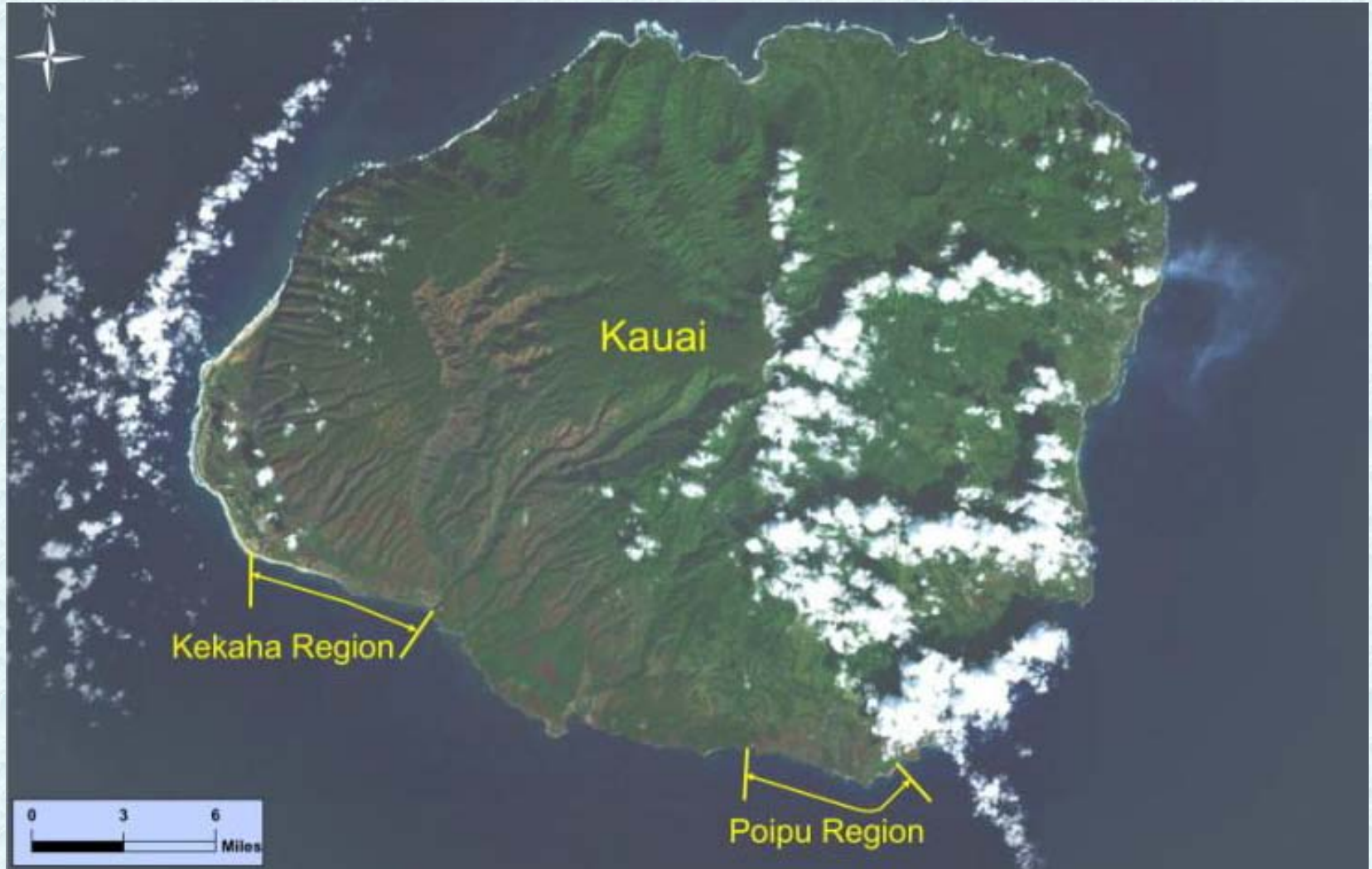
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Kauai Study Regions



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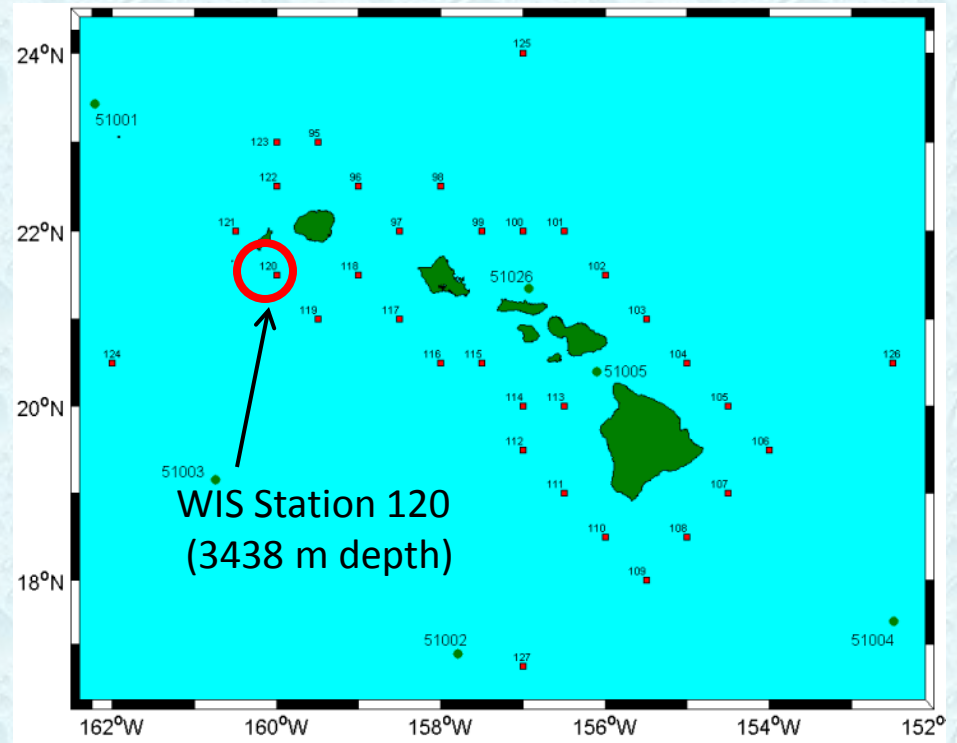
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Kekaha Wave Climate

Wave Information Study (WIS) Hindcast:

- Pacific Hindcast provides hourly wave parameters for 24 years (1980 – 2004)
- Generated using computer models and observed wind fields
- Compared with actual wave gage data for accuracy
- Provides a much longer term data set useful in establishing wave climate
- Station 120 selected for Kekaha



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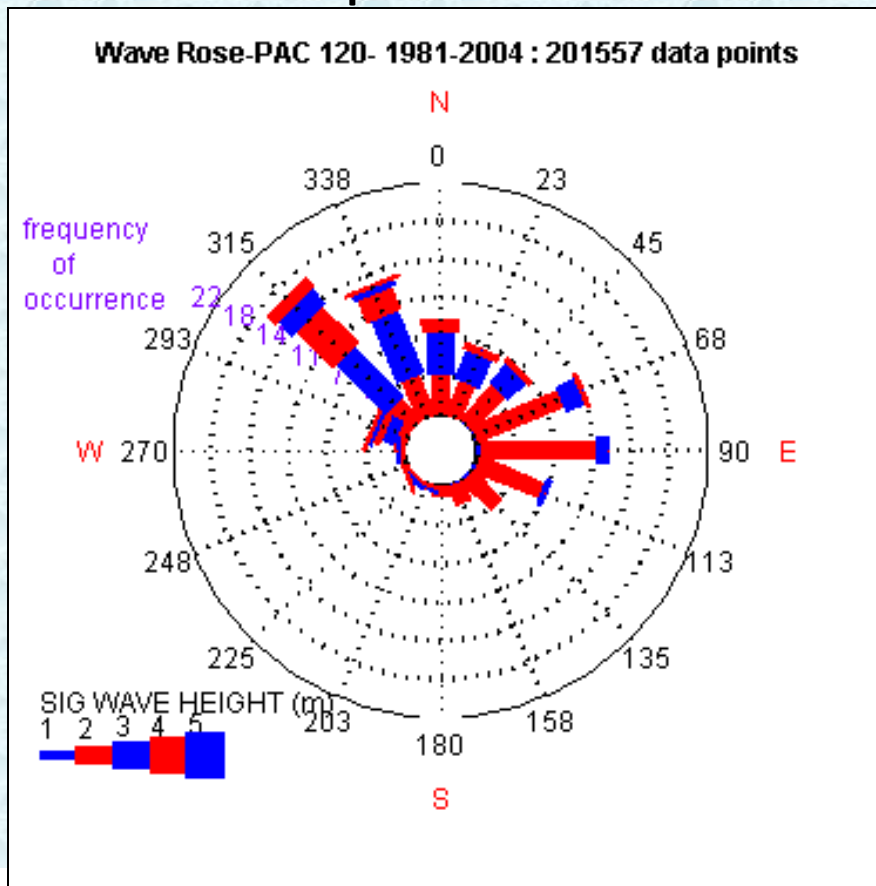
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Kekaha Wave Climate

Kekaha deep water WIS Station:



- Waves from all directions (NW and trades dominate) and large variation in wave height (2-6m)
- Captures both tradewind seas (ENE direction) and long-period swells (N&NW as well as South directions)
- Data was truncated to capture only energy moving toward island (280 ° through 100 °)
- Three representative years (1984, 1992, 1994) transformed to 100m contour using linear shoaling & diffraction then analyzed for to select most common wave cases (H/T/θ)

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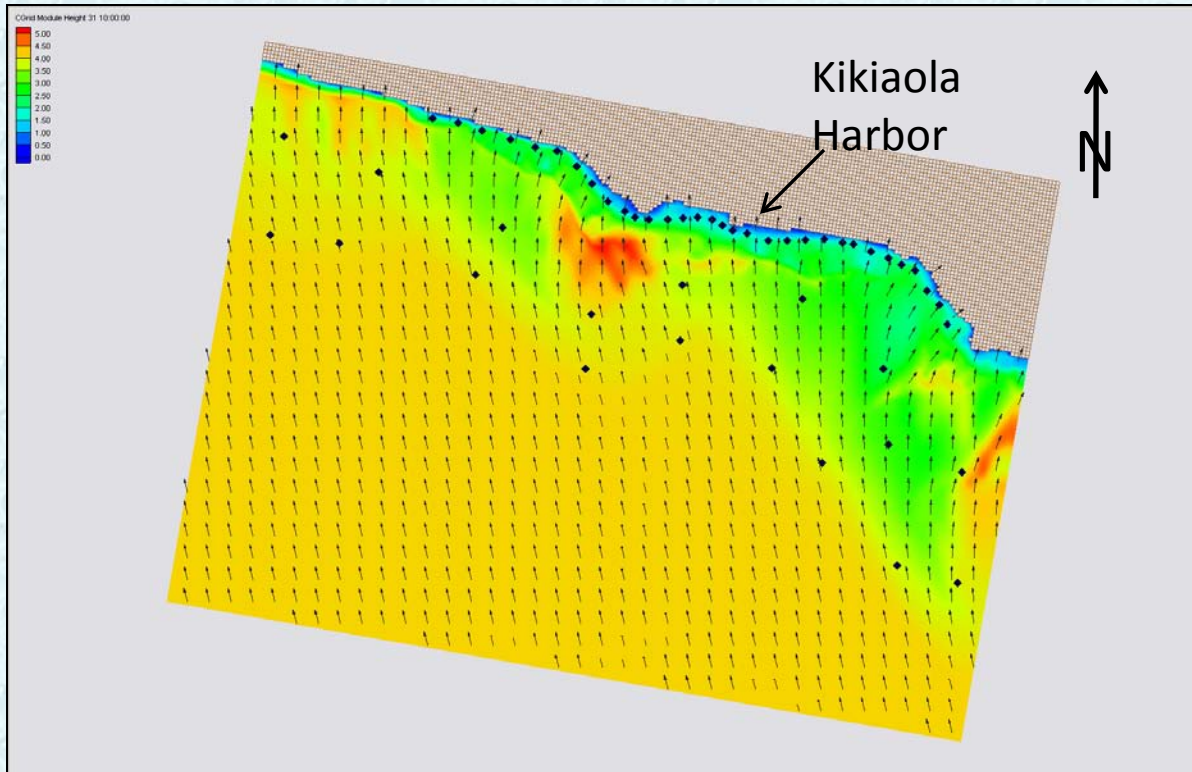
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Kekaha Wave Climate

Typical STWAVE Output : Wave Height (m)



- Used STWAVE to transform selected wave cases to shoreline (326 discrete cases for Kekaha)
- Wave data saved at specific nearshore “save points” along coastline at areas of interest
- Results used to develop relationship between offshore/nearshore wave conditions
- Nearshore time series created using WIS data for 3 selected years and STWAVE results

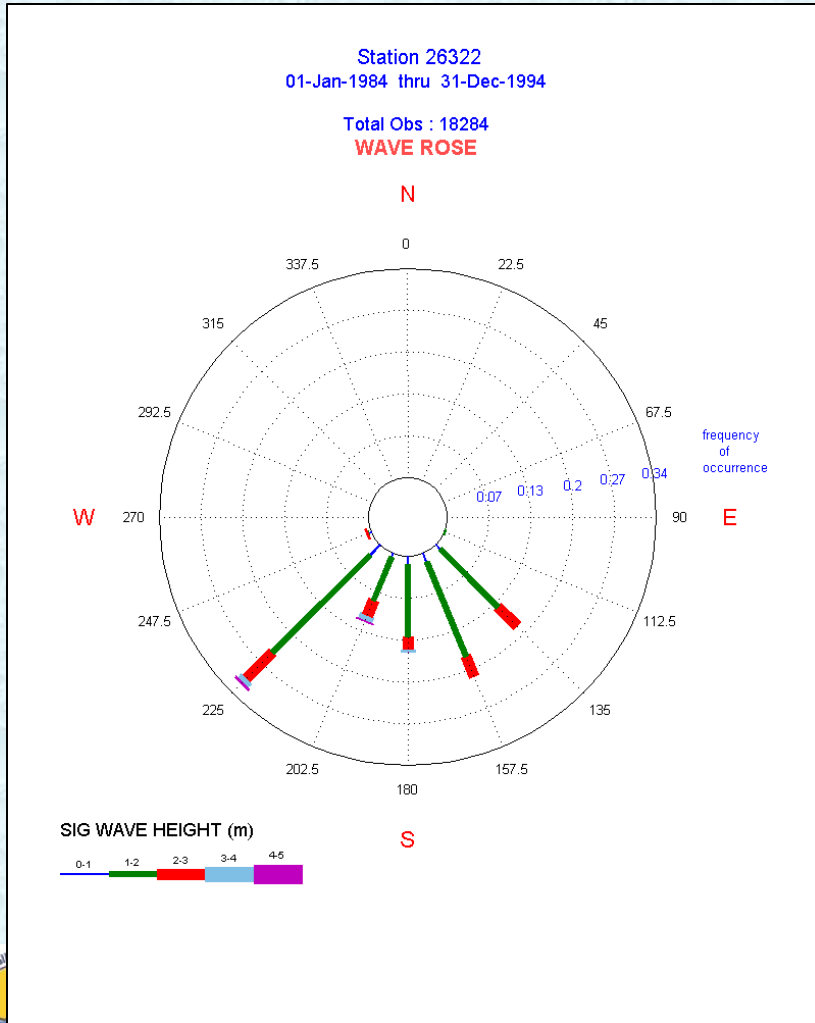
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Kekaha Wave Climate



- Wave Rose developed for nearshore locations will help to determine dominant wave direction
- From this, we can estimate direction of longshore sediment transport at locations along the study region
- Will add information to sediment budget

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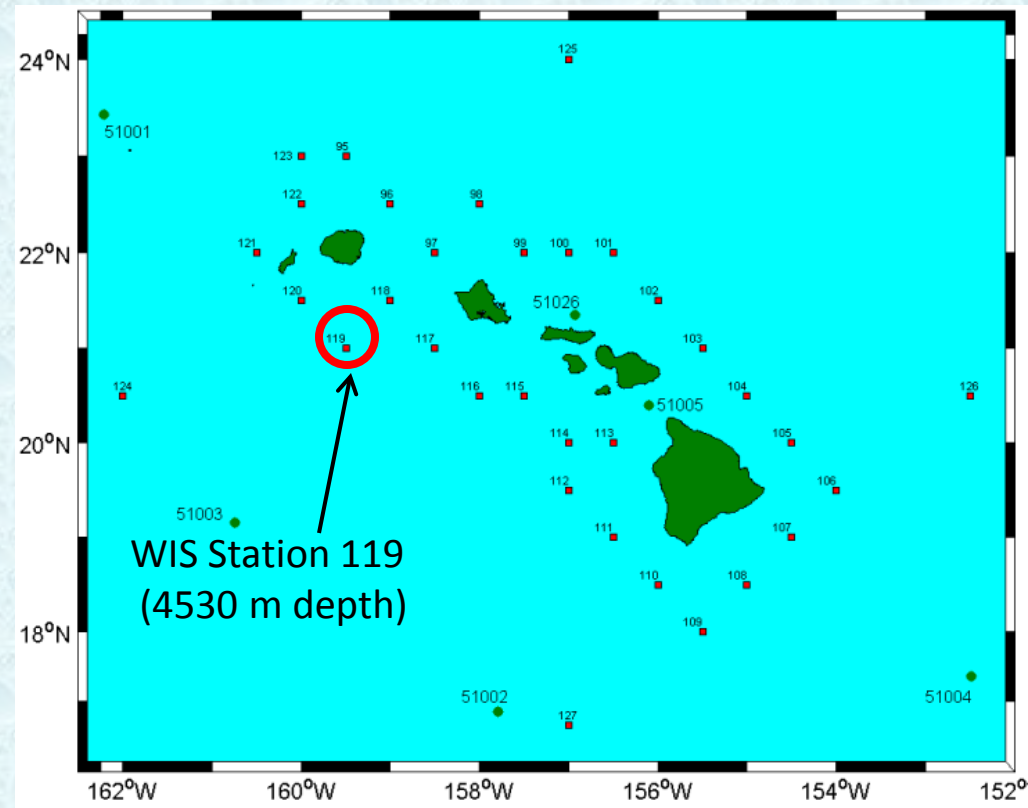
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Poipu Wave Climate

Wave Information Study (WIS) Hindcast:

- Station 119 selected for Kihei
- Same 24-year period of record
- WIS station is much more exposed than Poipu area



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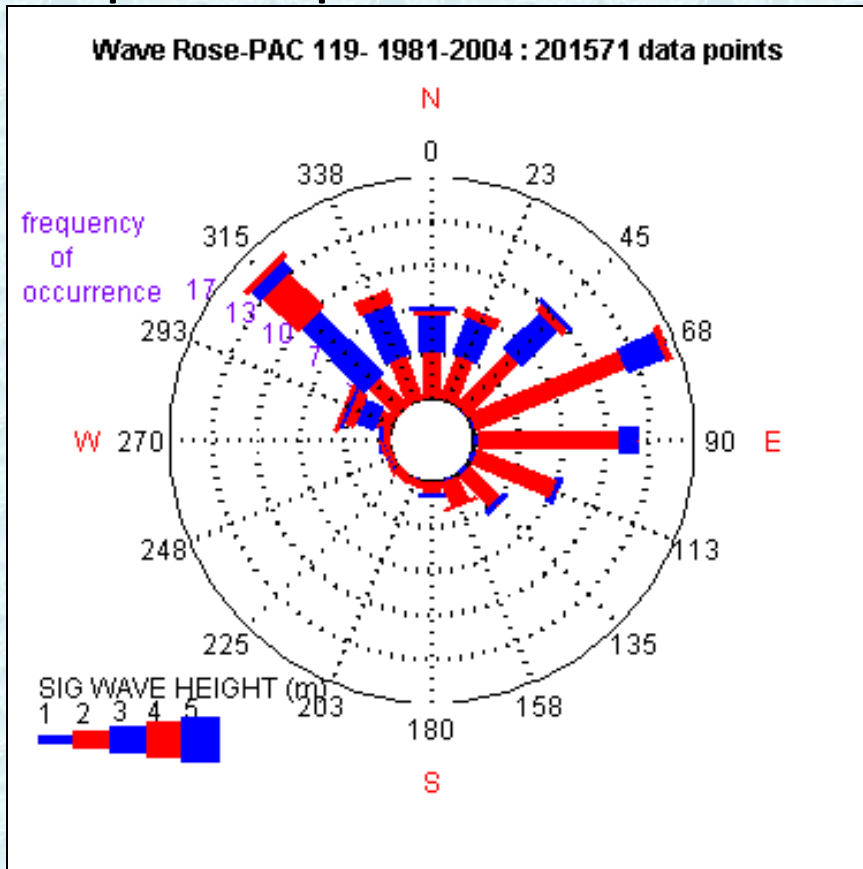
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Poipu Wave Climate

Poipu deep water WIS Station:



- Waves from all directions and mid-range wave heights (2-3m) from most directions
- Captures both tradewind seas (ENE direction) and long-period swells (N&NW directions and South)
- Data was truncated to capture only energy moving toward island (90 ° through 270 °)
- Three representative years (1984, 1992, 1994) transformed to 100m contour using linear shoaling & diffraction then analyzed for to select most common wave cases (H/T/θ)

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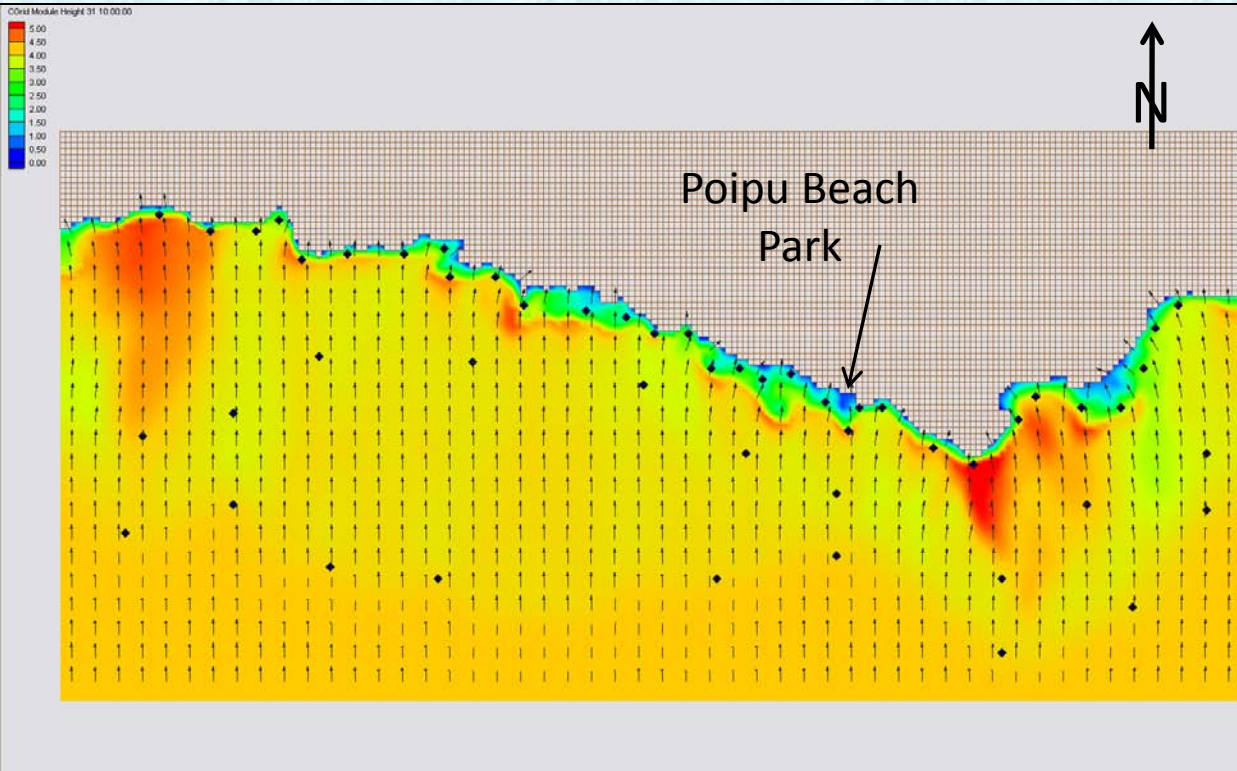
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Poipu Wave Climate

Typical STWAVE Output : Wave Height (m)



- Used STWAVE to transform selected wave cases to shoreline (379 discrete cases for Poipu)
- Wave data saved at specific nearshore “save points” along coastline at areas of interest
- Results used to develop relationship between offshore/nearshore wave conditions
- Nearshore time series created using WIS data for 3 selected years and STWAVE results

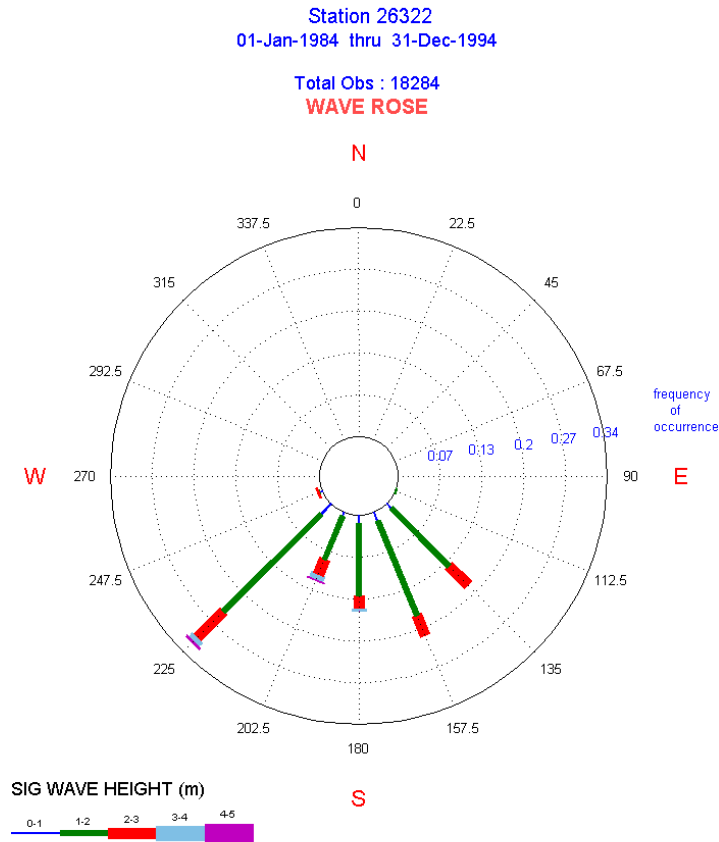
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