



# CMS SIMULATION OF NEARSHORE NOURISHMENT

## NEARSHORE NOURISHMENT TEAM

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### District PDT Members

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## COASTAL INLETS RESEARCH PROGRAM

FY21 IN PROGRESS REVIEW

**Tiffany Burroughs**

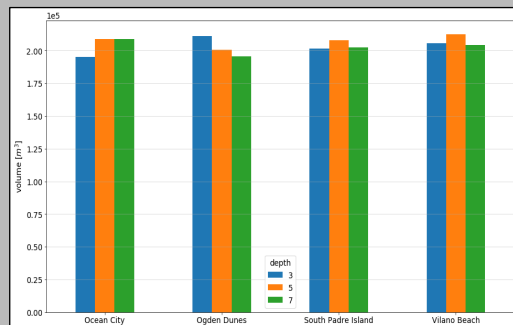
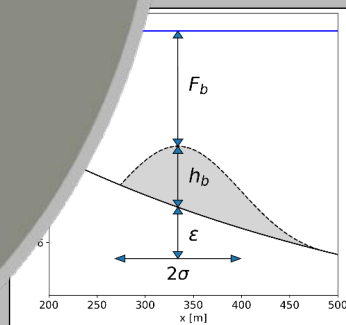
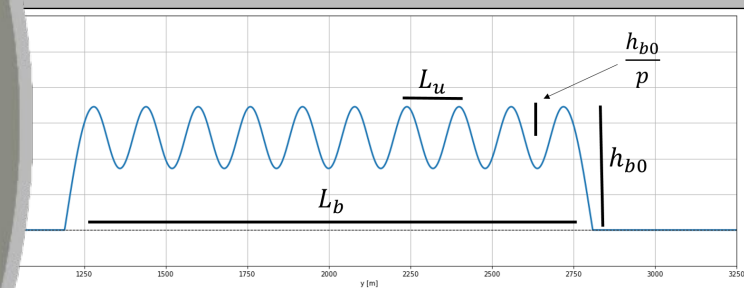
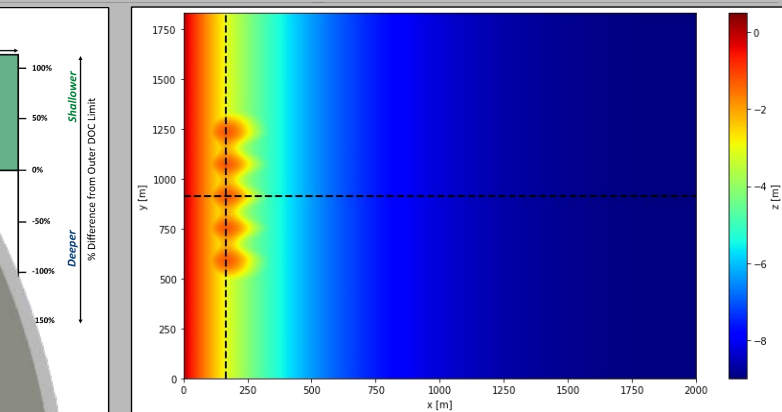
HQ Navigation Business Line Manager

**Eddie Wiggins**

Technical Director, Navigation

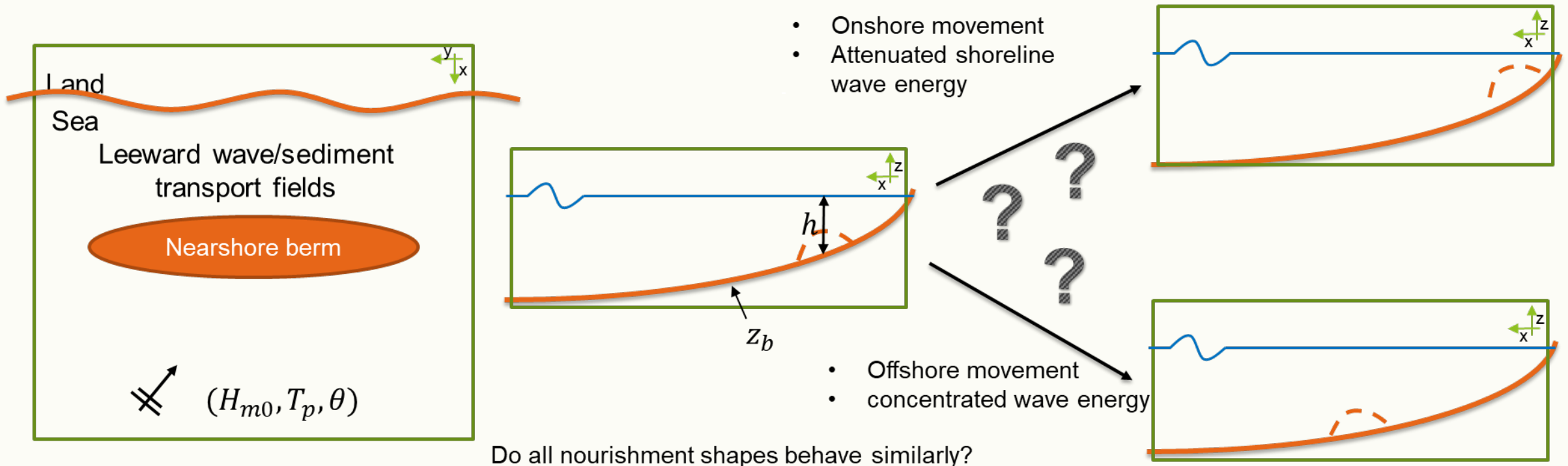
**Morgan Johnston**

Acting Associate Technical Director, Navigation



# Nearshore nourishment numerical experimentation

- What are the main effects of nearshore berm placement depth and shape on sediment transport and wave climate?
- SoNs:
  - 2020-N-1564: Increasing Beach Nourishment Lifespan with Nearshore Nourishments
  - 2020-N-1481: Improving scoping level estimates of the lifespans and deflation rates of nearshore nourishments
  - 2019-N-1386 Strategic Nearshore Placement of Dredged Material to Sustain Coastal Beach & Dune Resilience

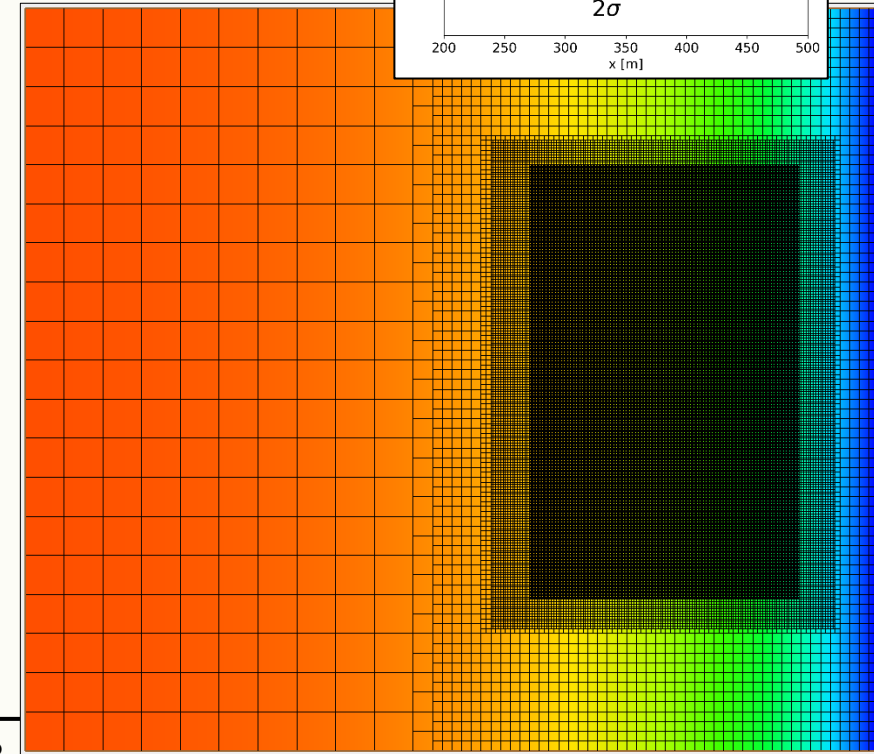
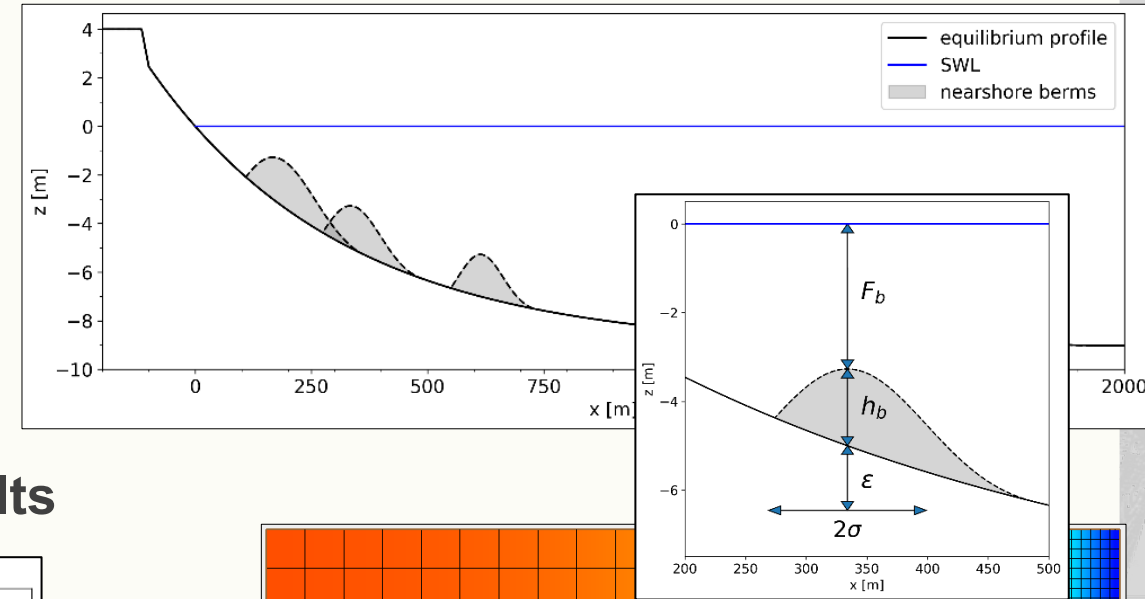
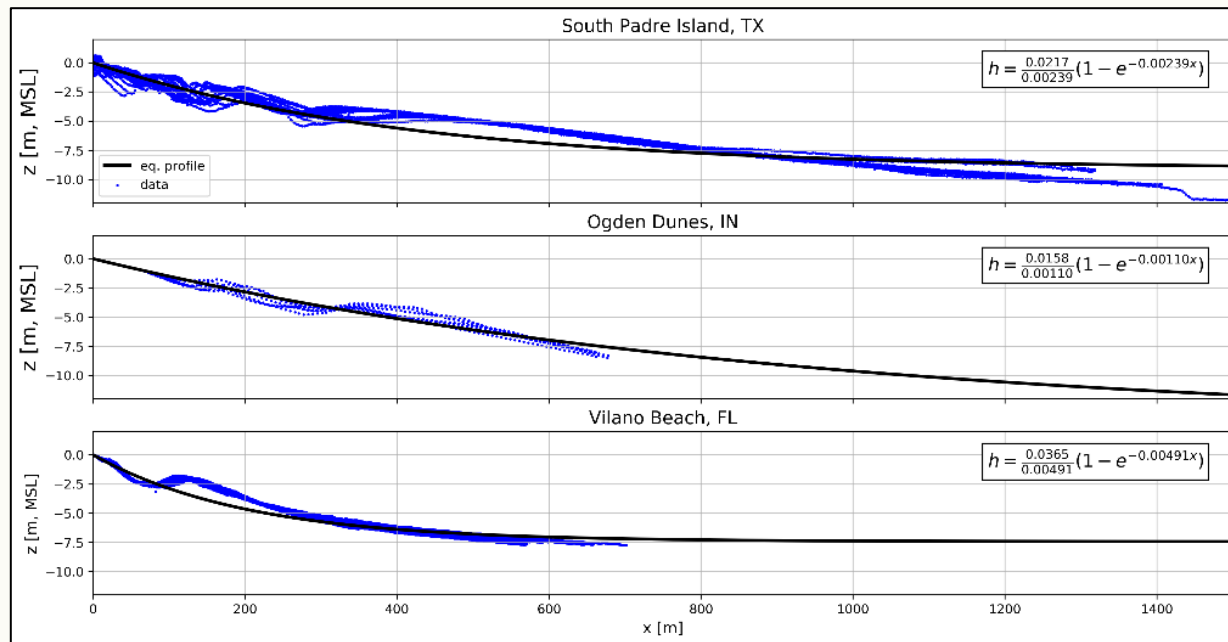


# Capability and Strategic Impact Statement

- **Quantitative evidence to support conceptual models of nearshore nourishment practice.**
  - **How effective are shallower berms at attenuating energy?**
  - **How much wave focusing can be introduced?**
  - **How much can nearshore berm longevity be increased?**
  - **How does the shape impact the energy attenuation and nourishment longevity?**
  - **How do nourishments behave in different wave climates?**
- **Re-usable Python scripts/Jupyter notebooks for nearshore berm modeling and analysis.**

# Numerical experiments

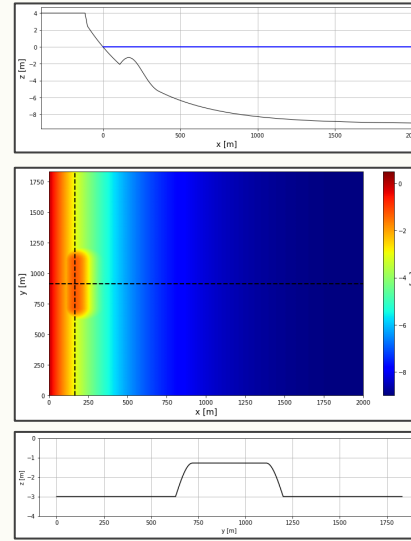
- Coastal Modeling System (CMS) Flow, Wave, and Sediment Transport/Morphology simulations
- Representative nearshore profiles and berms
- Markov-chain models of co-located WIS hindcast sea-states
- Jupyter notebooks for post-processing CMS results



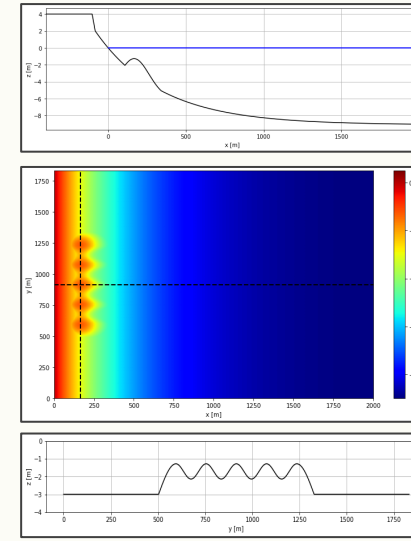
# Numerical experiments



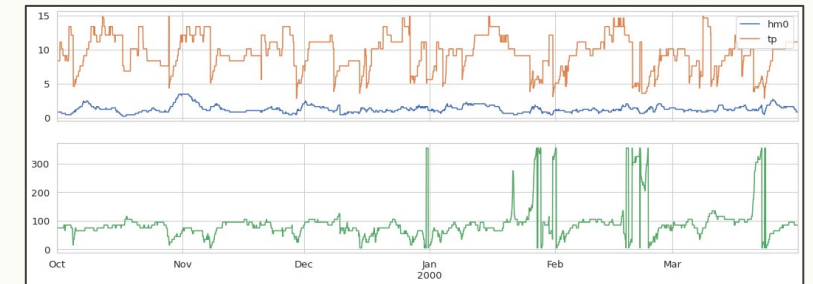
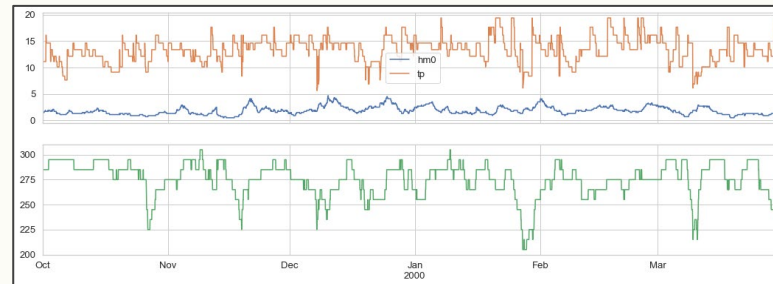
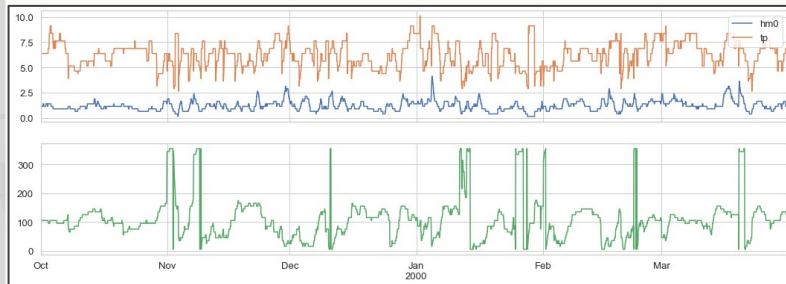
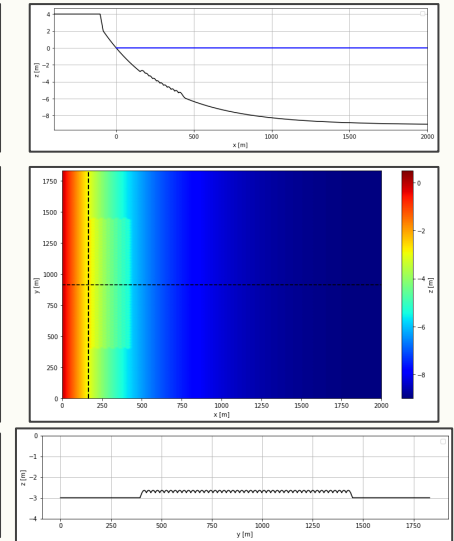
Linear Berm



Undulated Berm



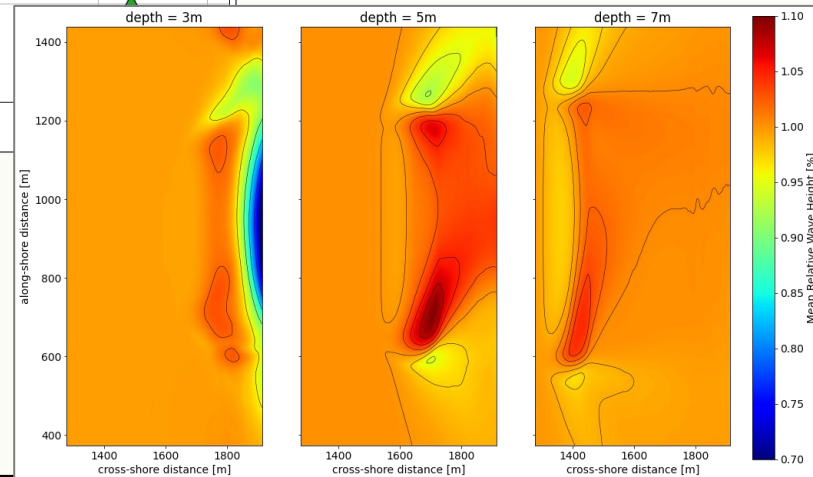
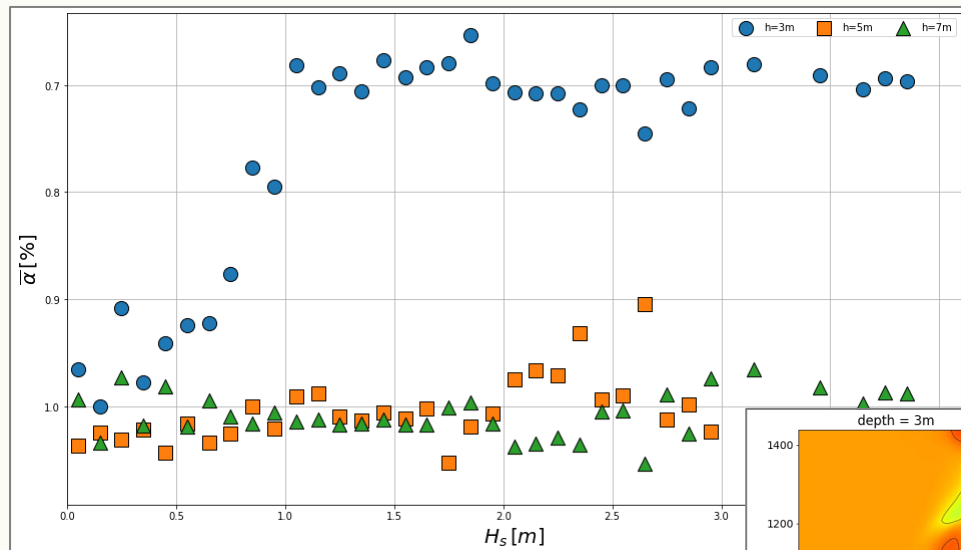
Discrete Mounds



# Summary

## FY21 Major Advances in Capability

- All model scenarios completed
- Journal publication drafted



## FY21 Major Products & Collaborations

- Tentatively accepted in a Special Issue of Journal of Marine Science and Engineering: “Sediment Transport and Morphological Response to Nearshore Nourishment Projects”

