



# Wave Current Interaction in the Nearshore



Julia Hopkins

Steve Elgar

Britt Raubenheimer

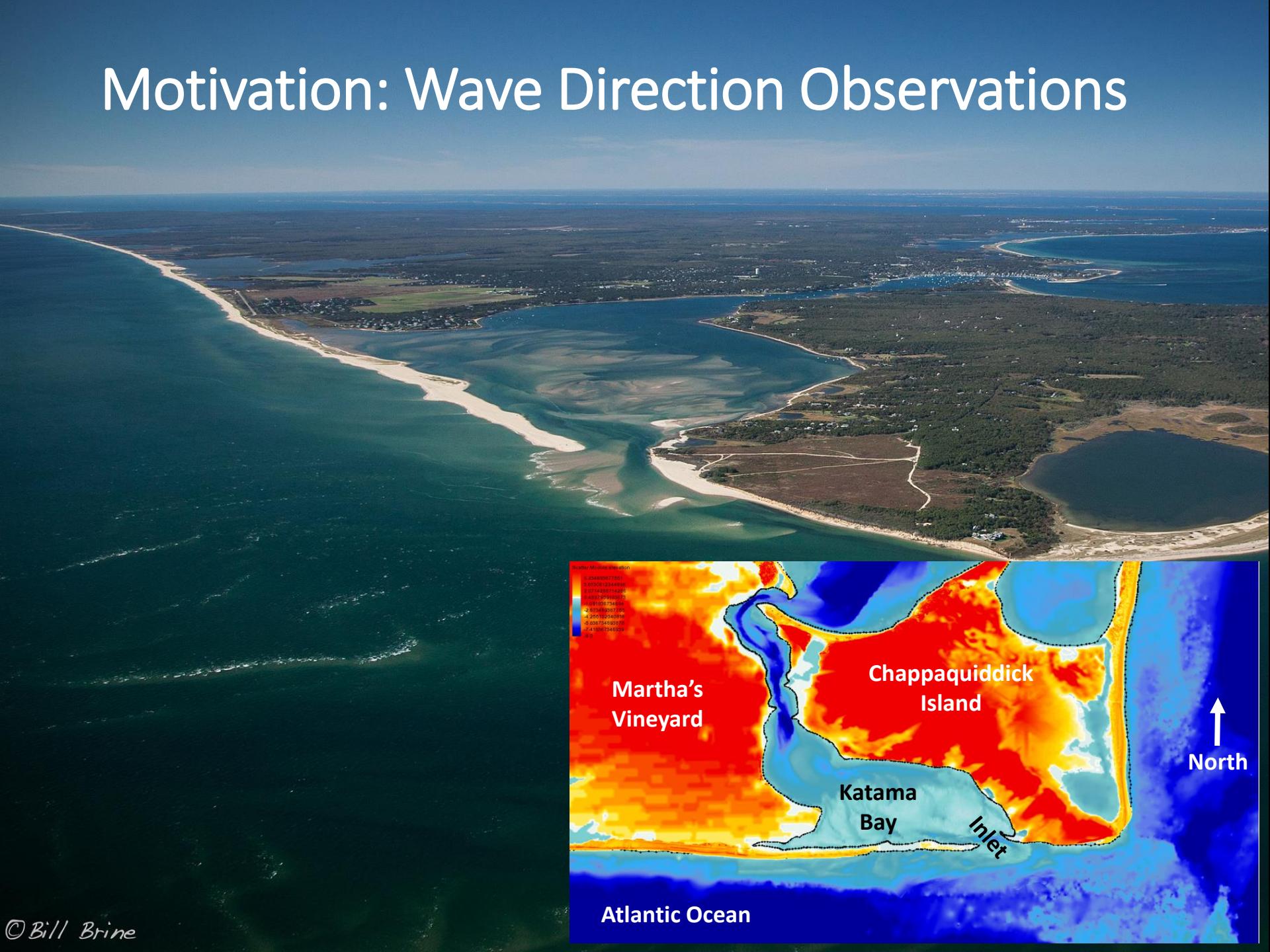


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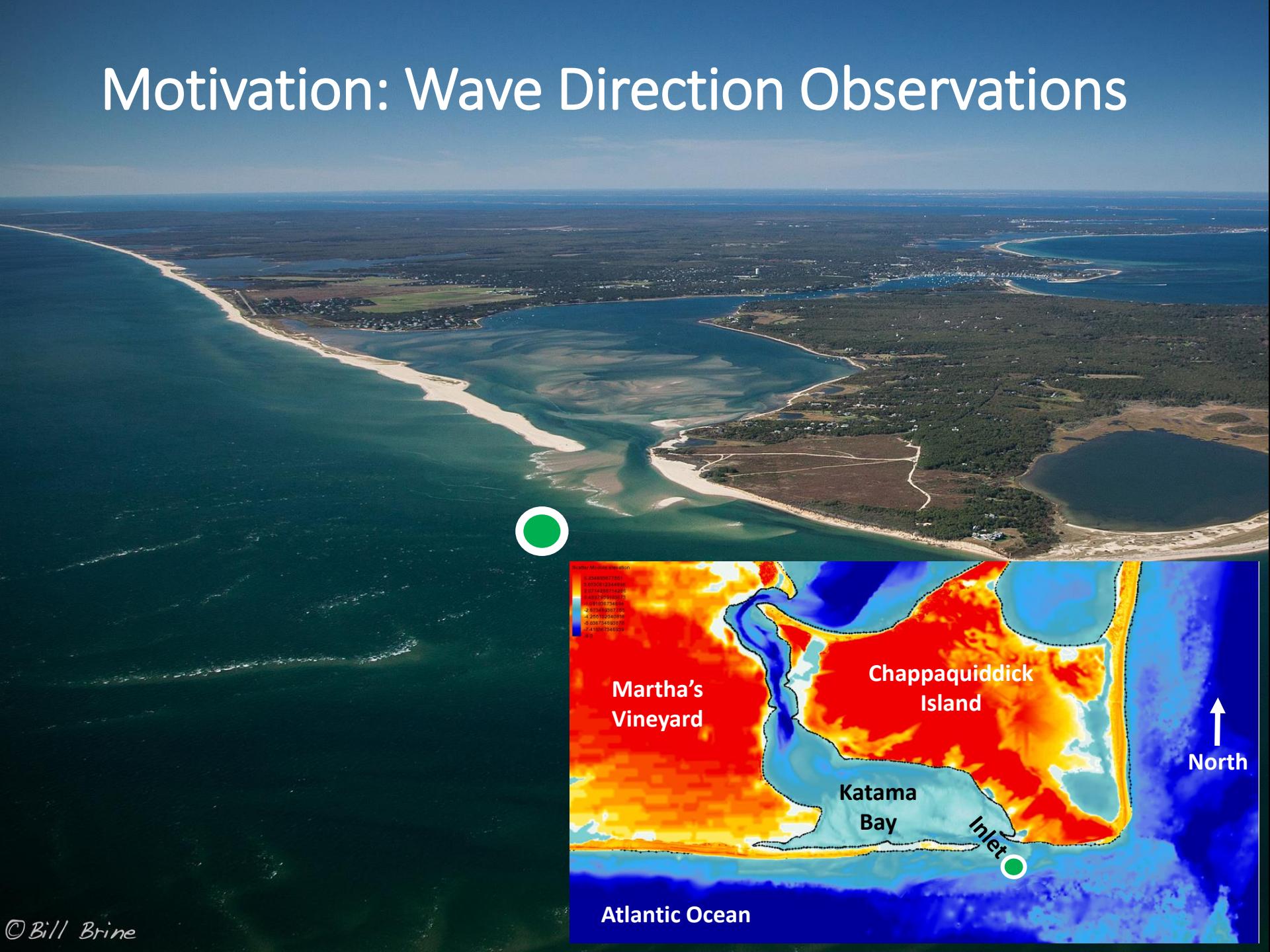
**MIT-WHOI**

JOINT PROGRAM IN OCEANOGRAPHY/APPLIED OCEAN SCIENCE & ENGINEERING

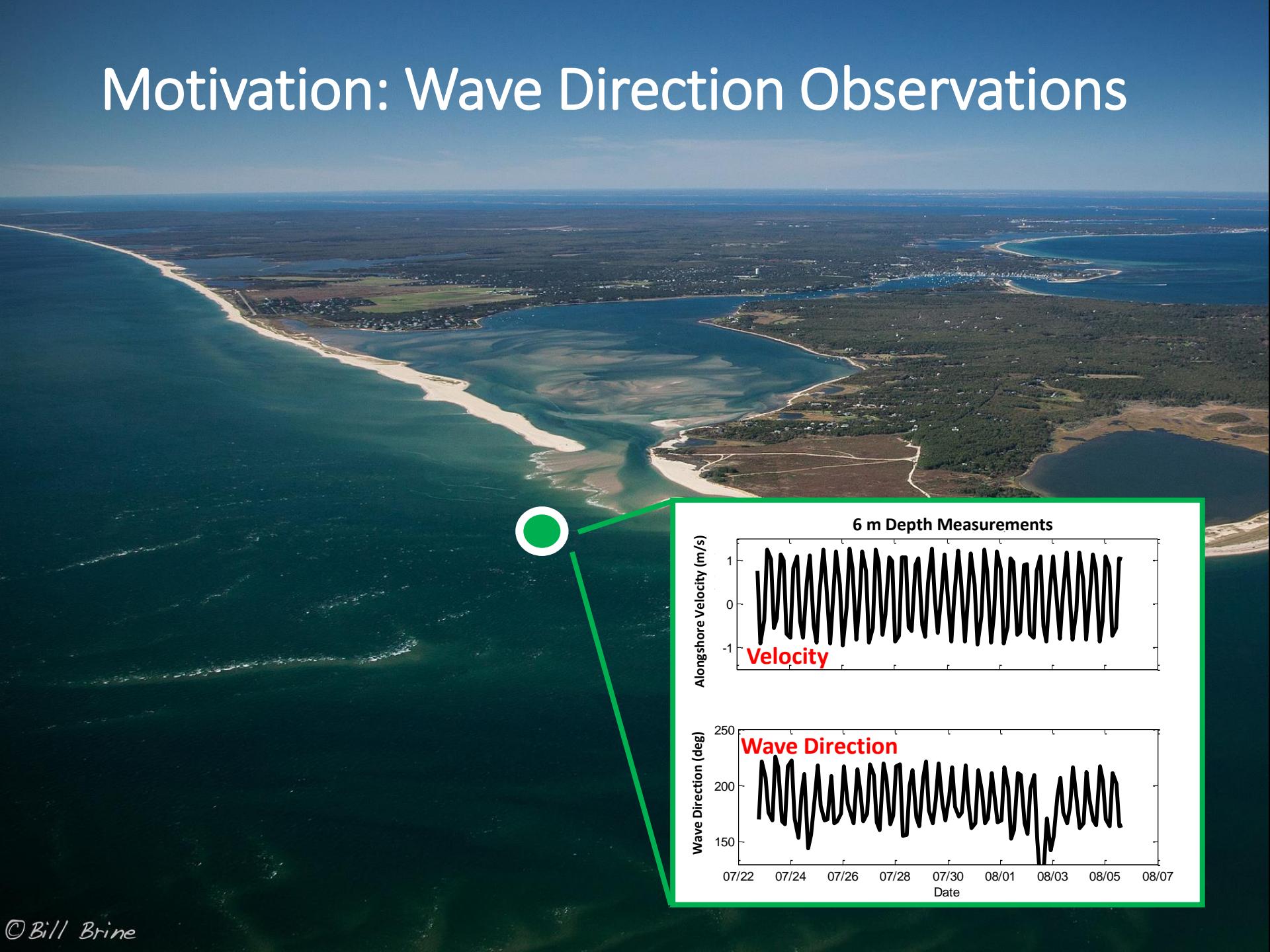
# Motivation: Wave Direction Observations



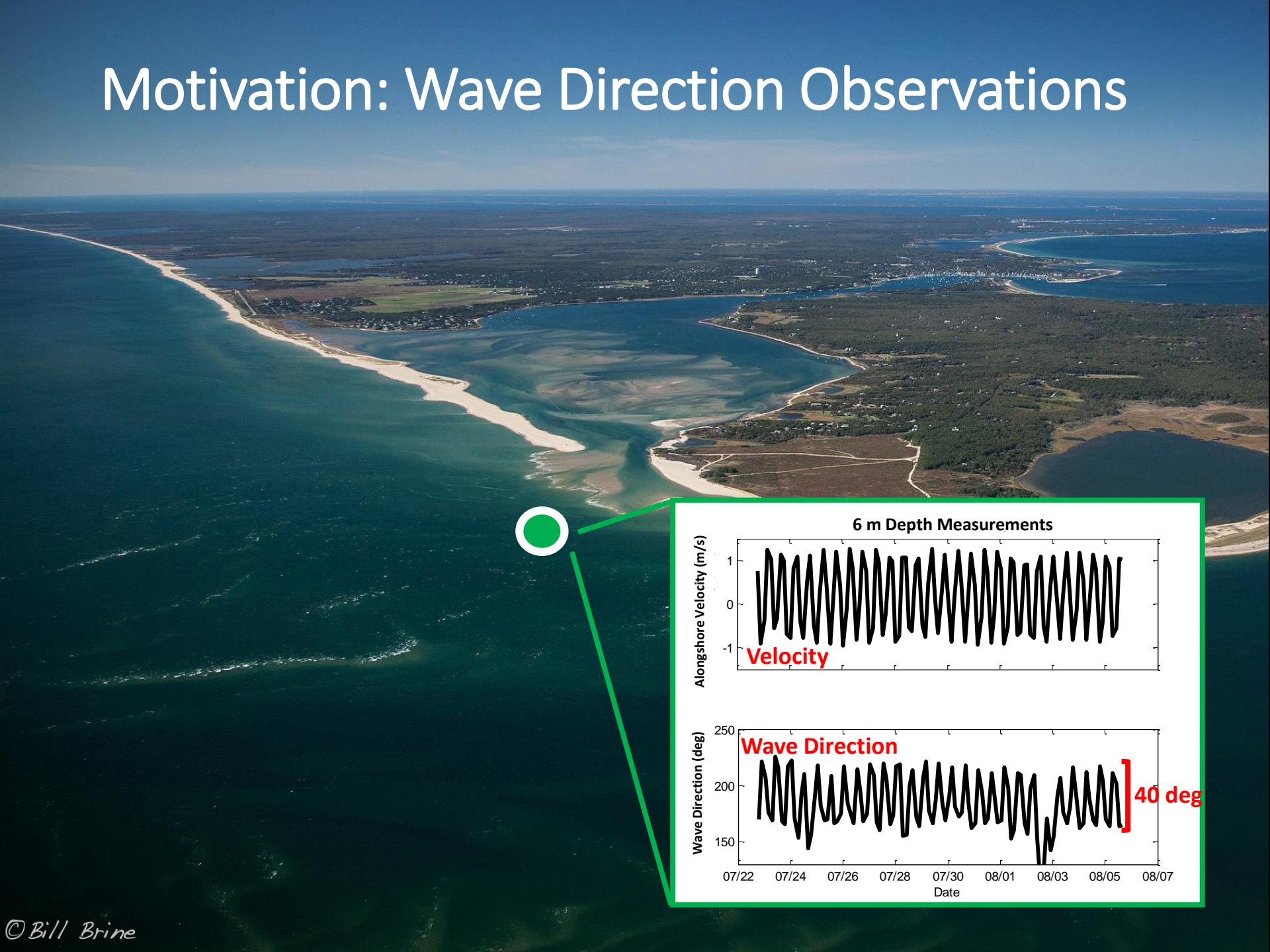
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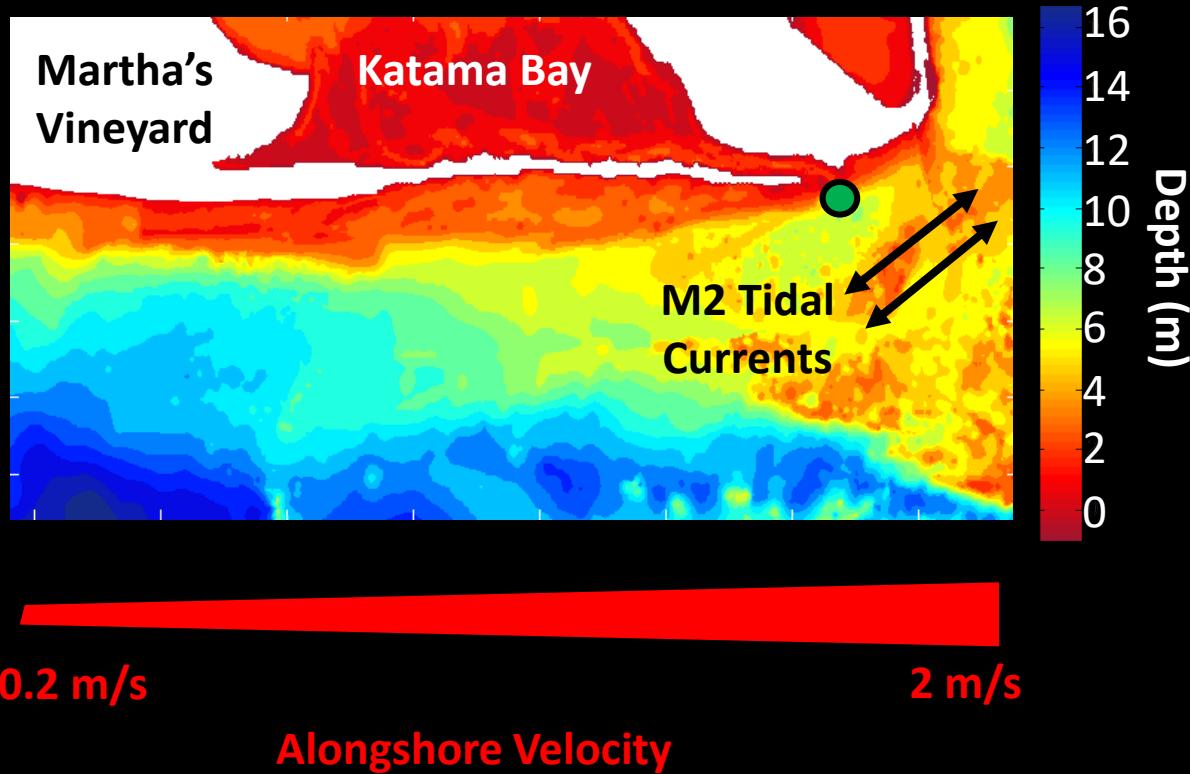
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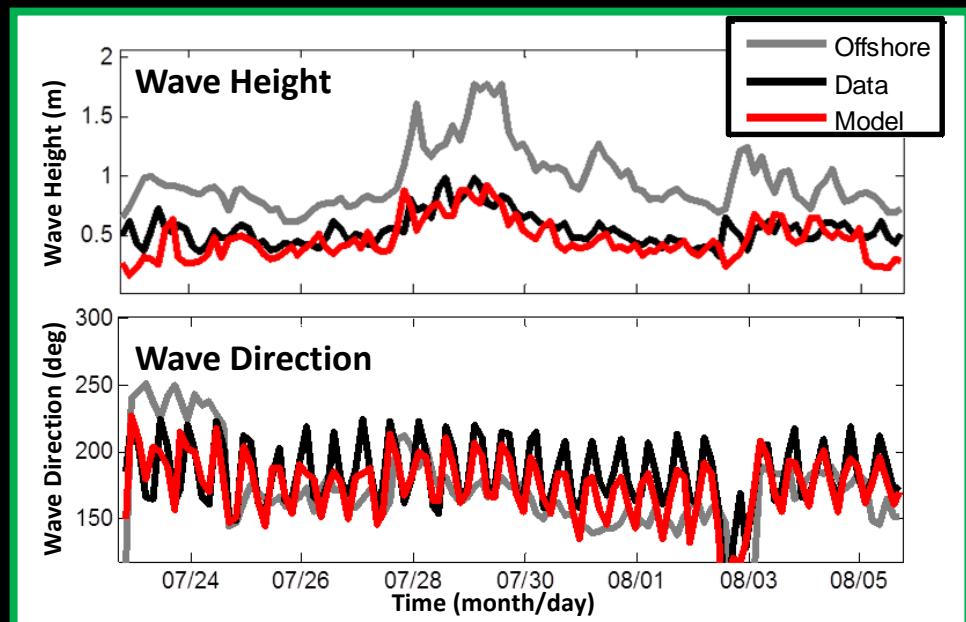
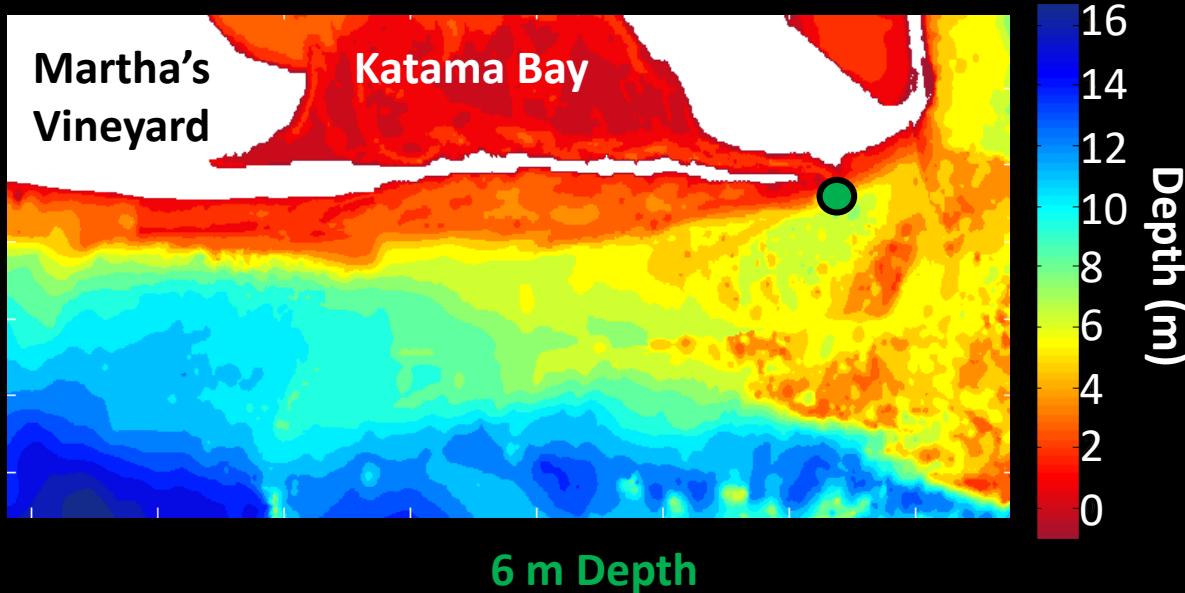
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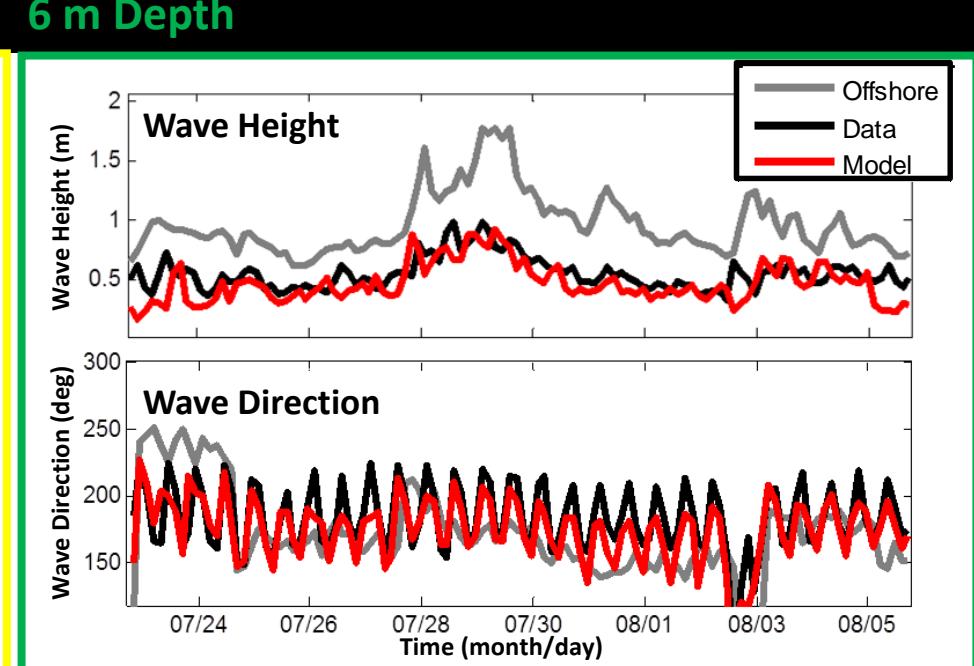
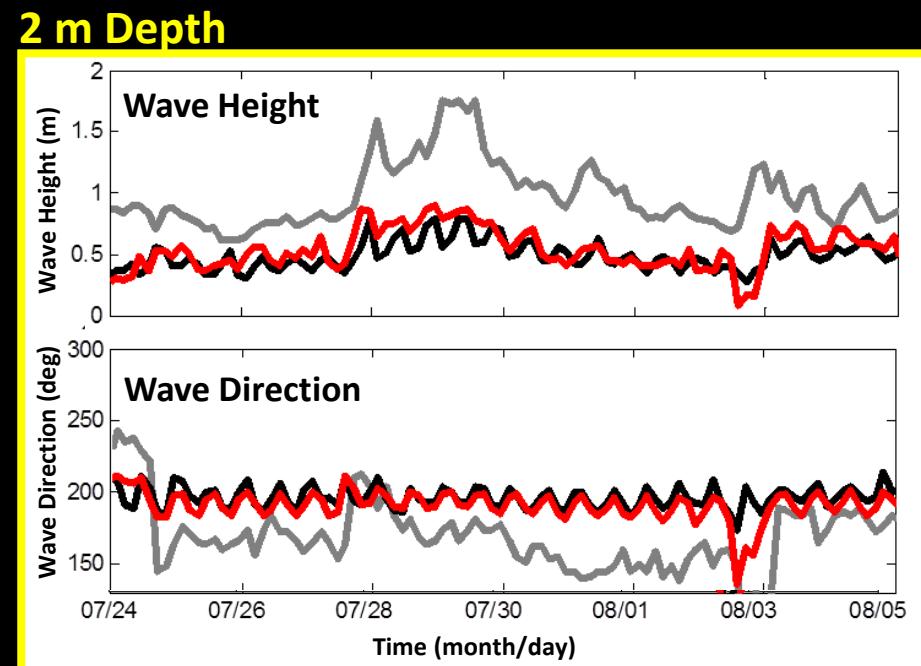
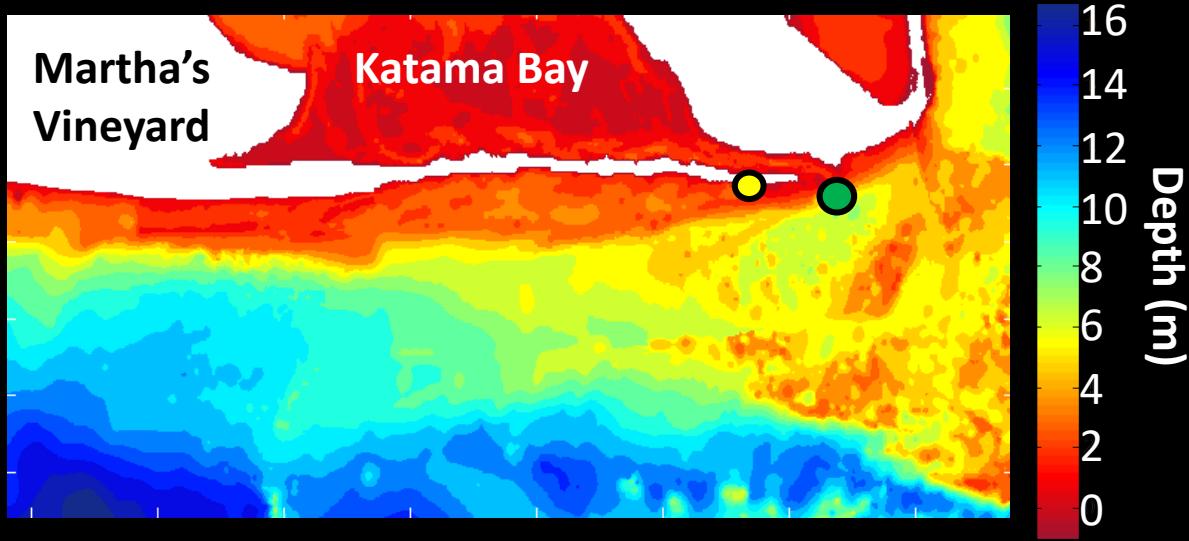
# Observations: Wave-Current Interaction



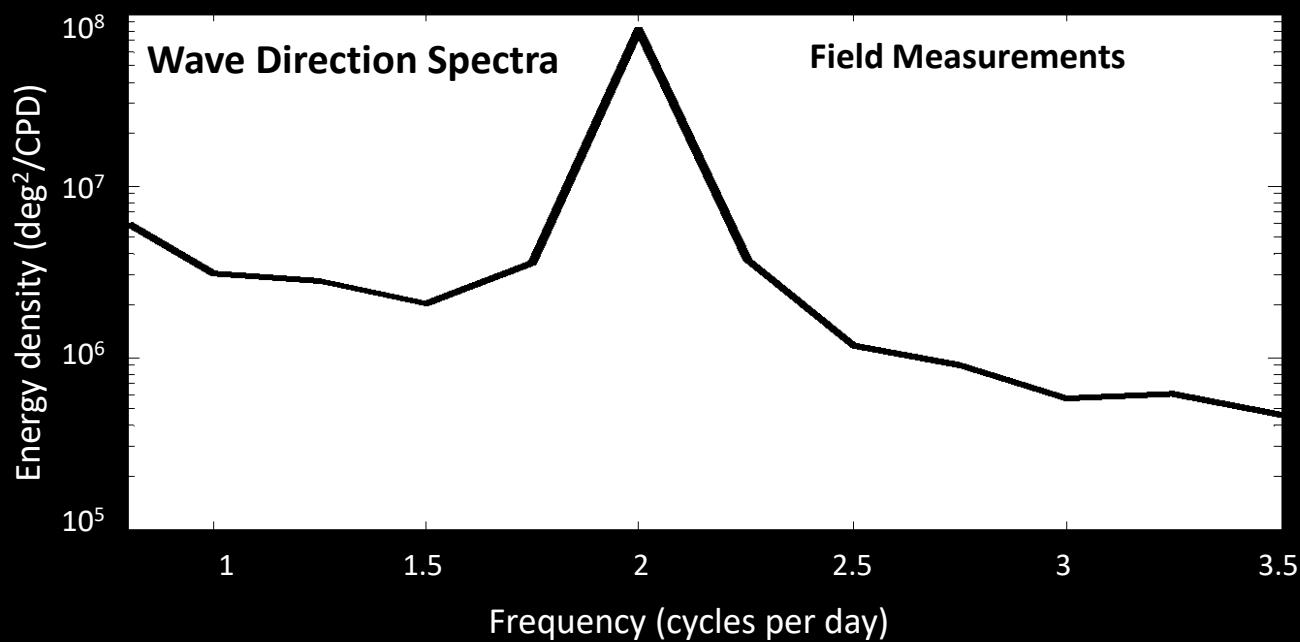
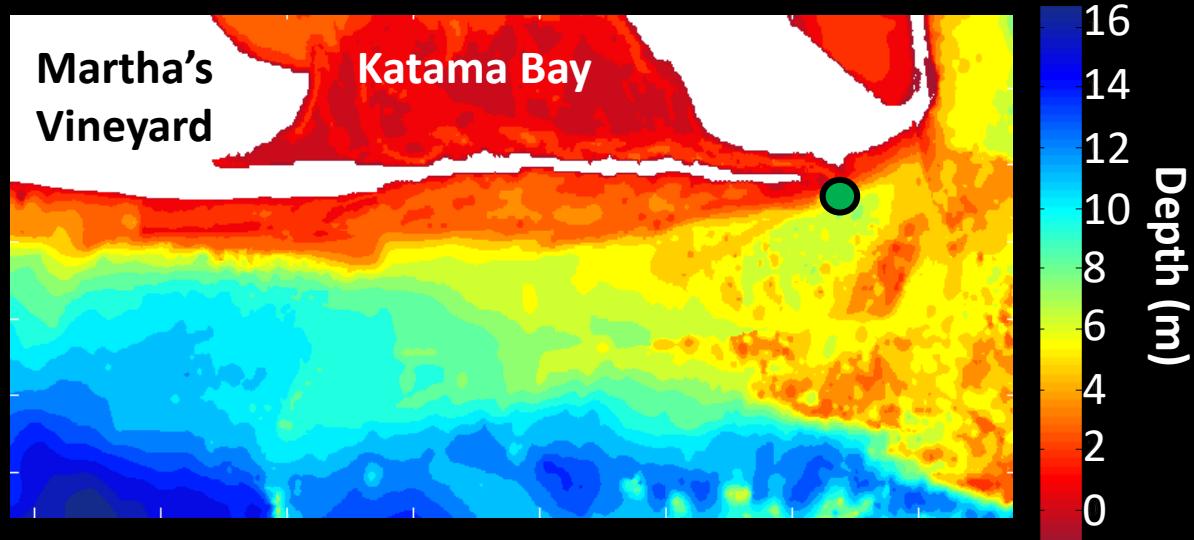
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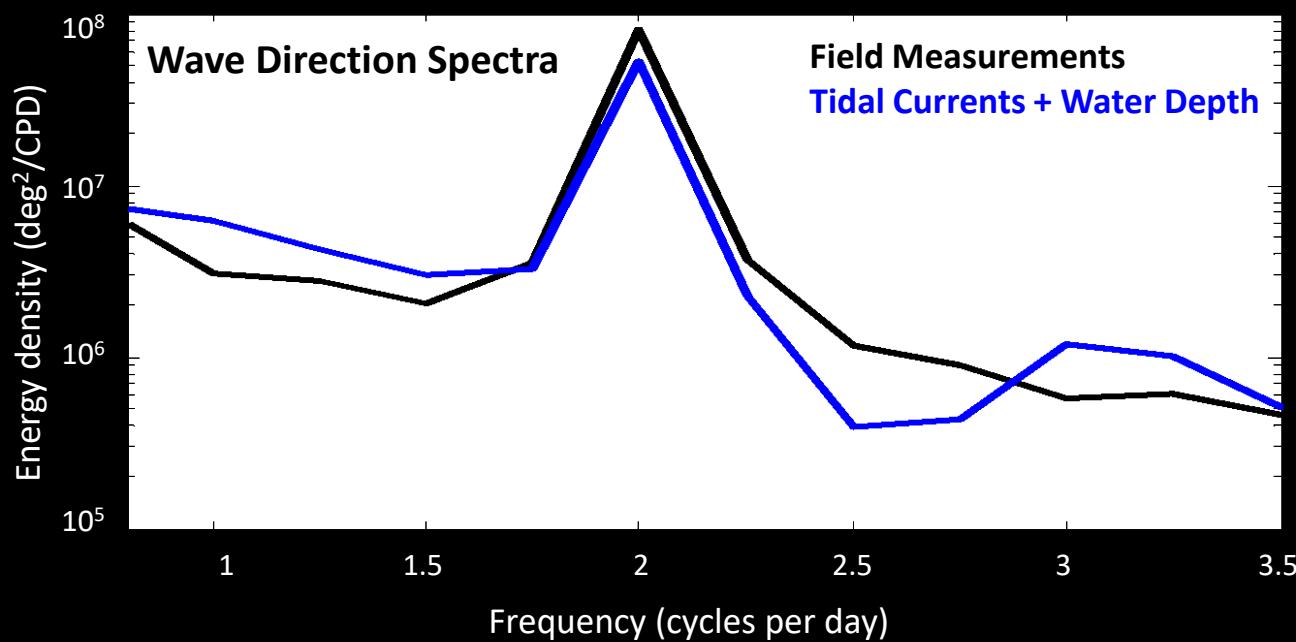
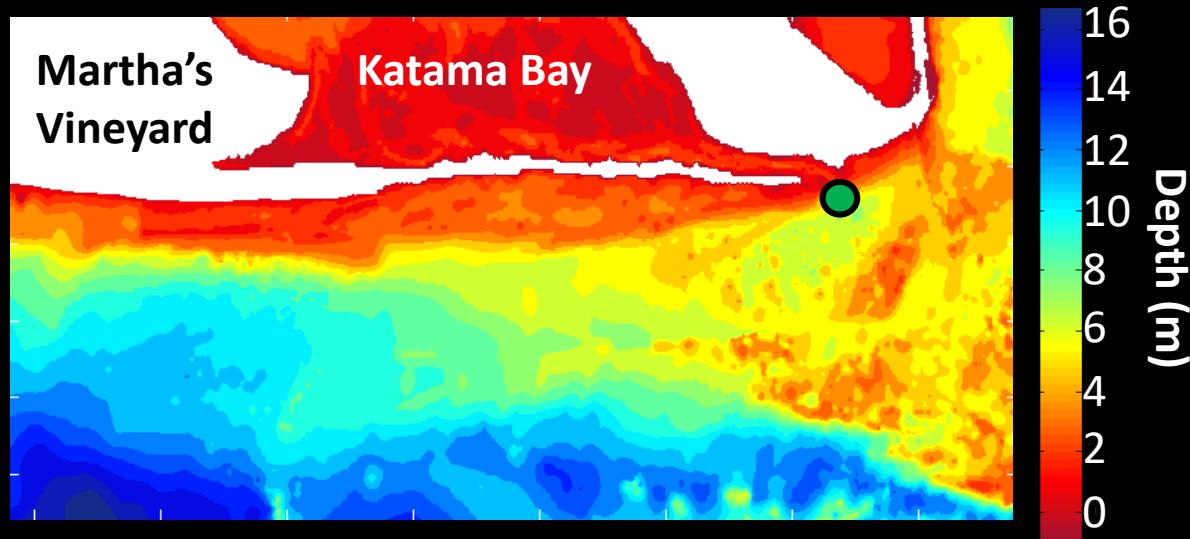
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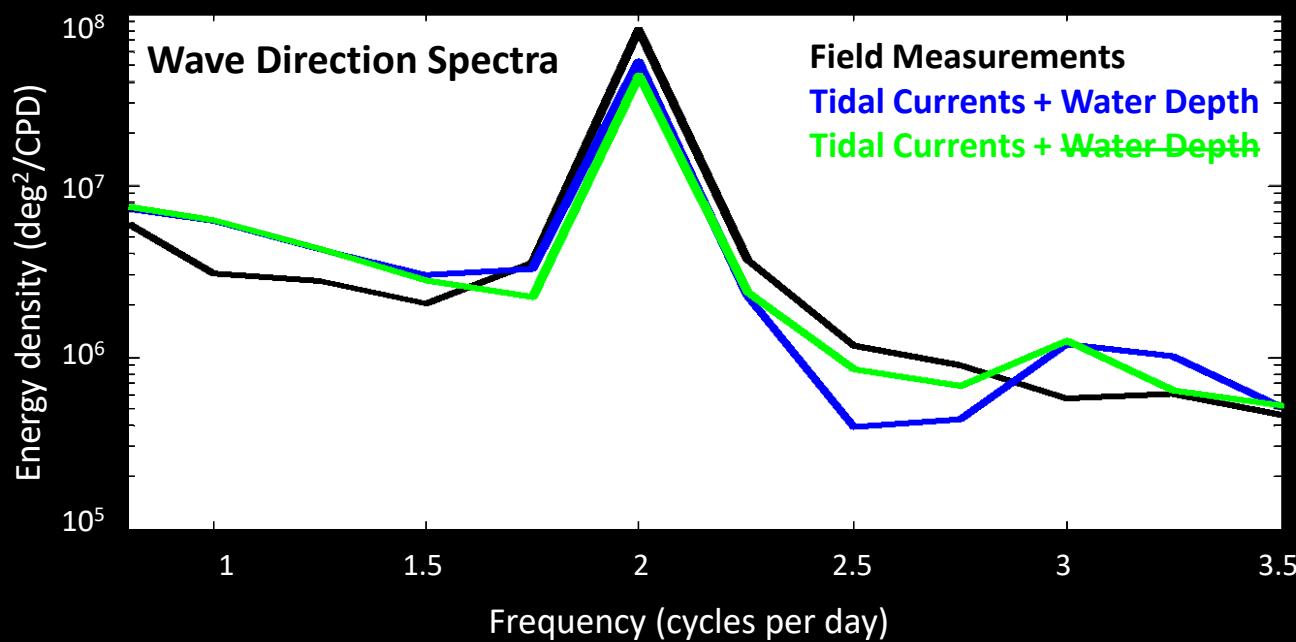
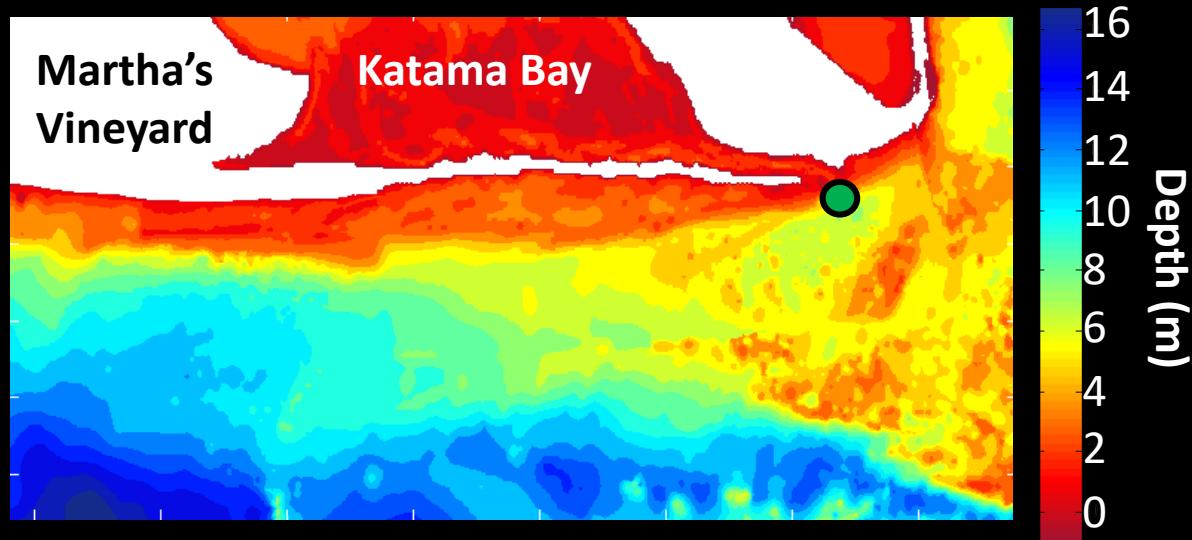
# Simulations: Wave Current Factors



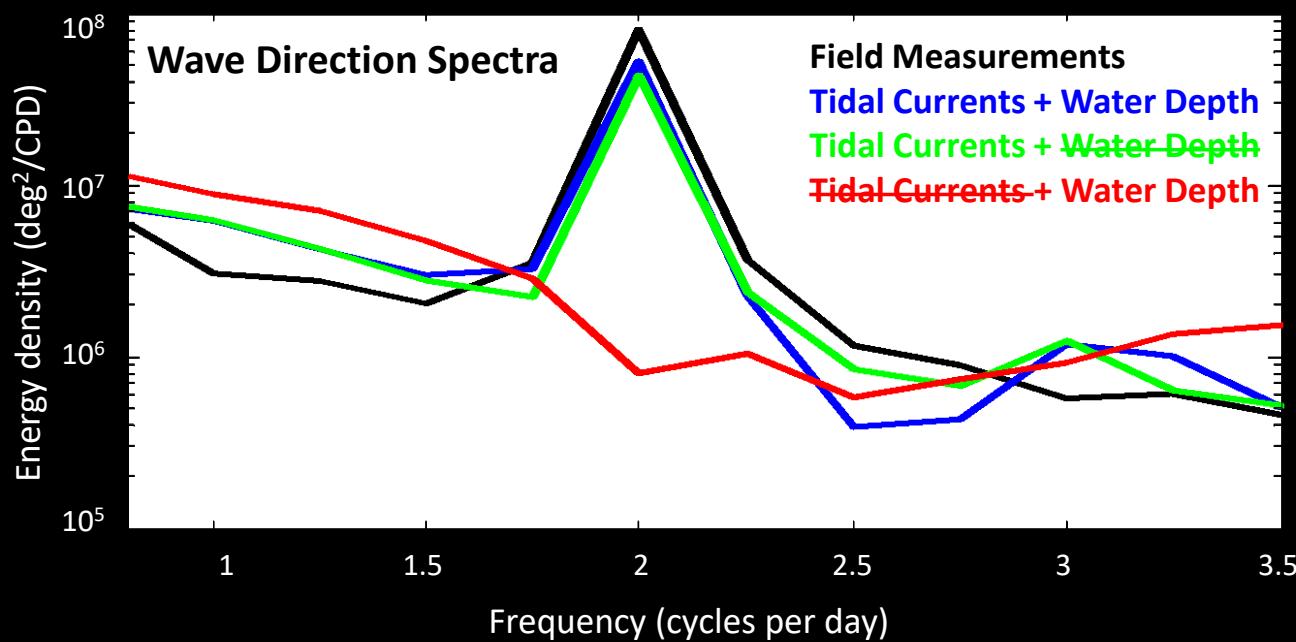
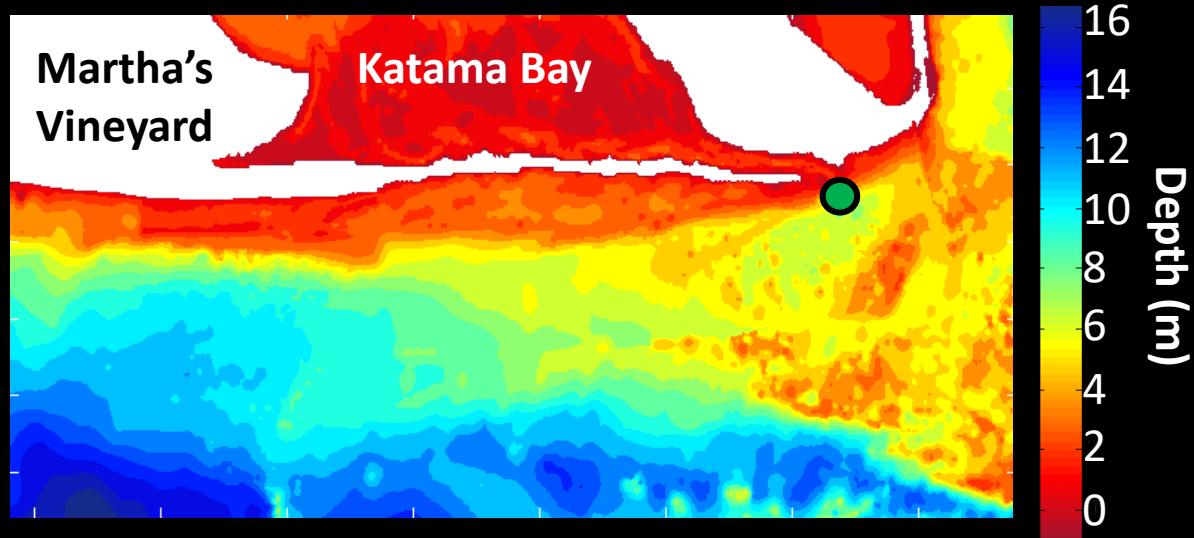
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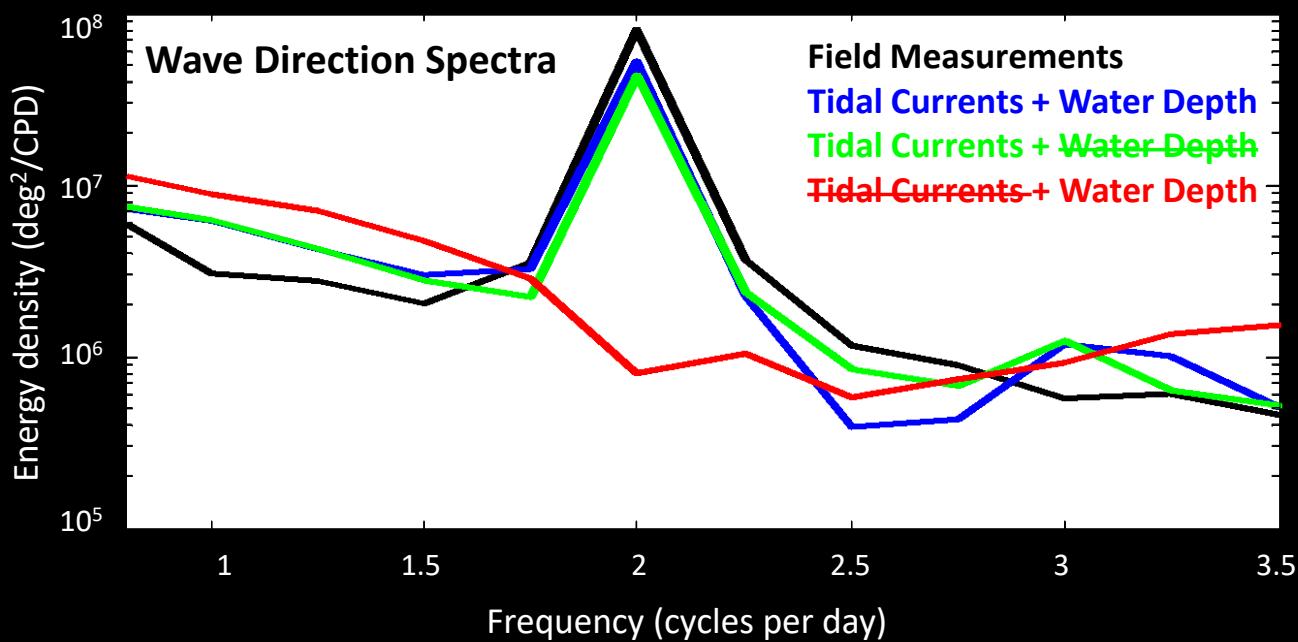
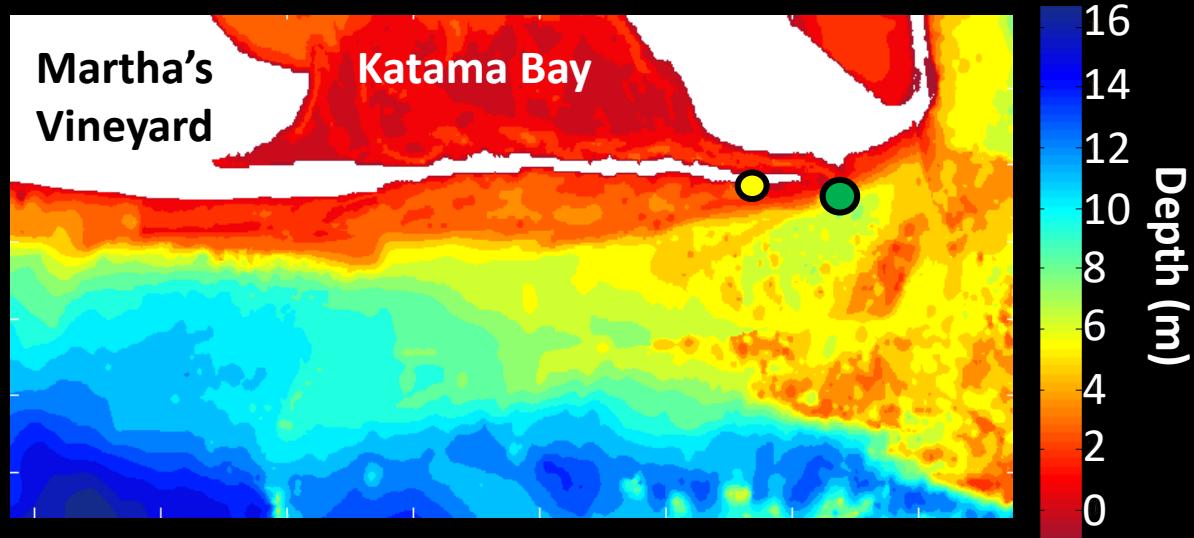
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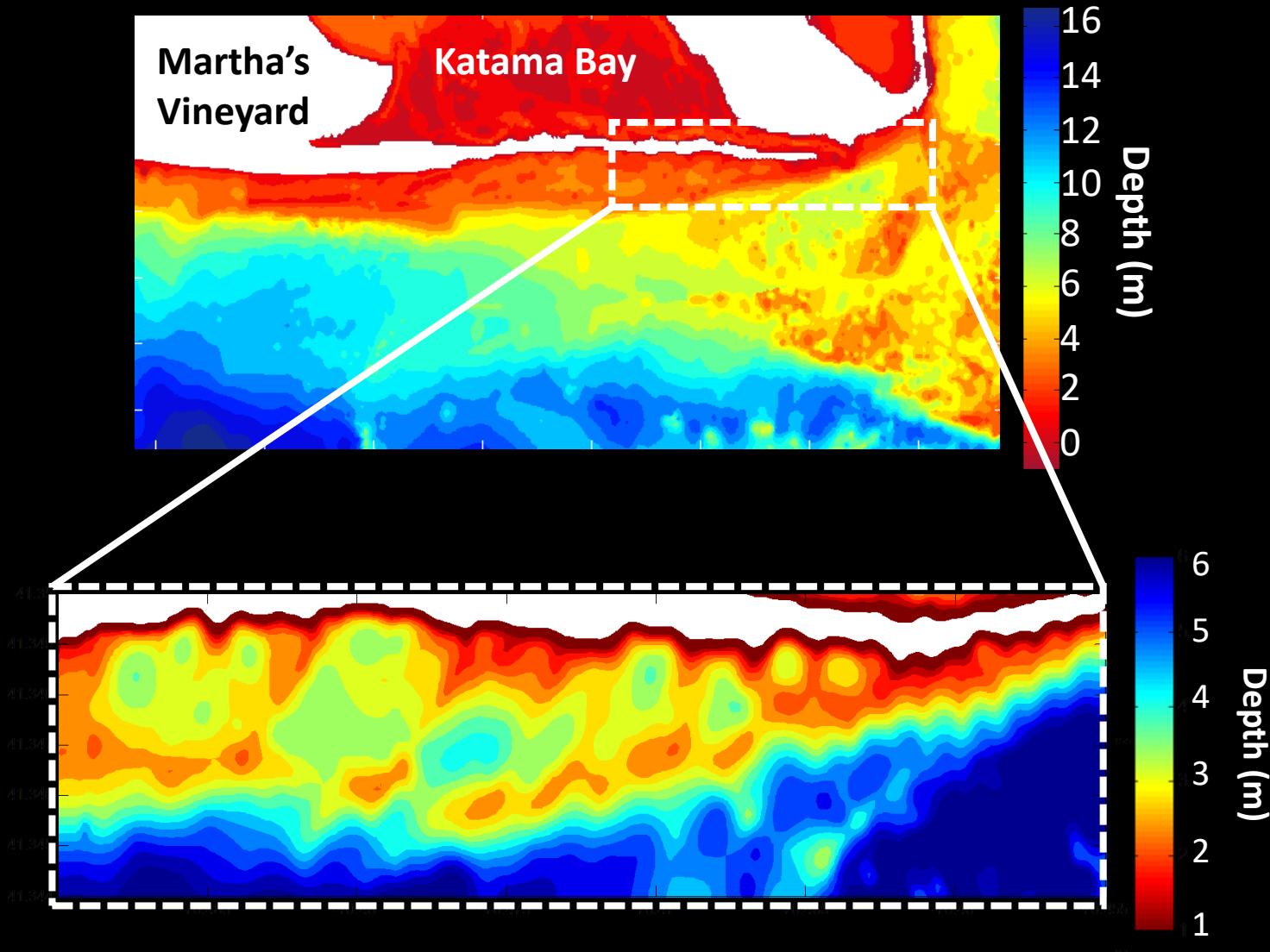
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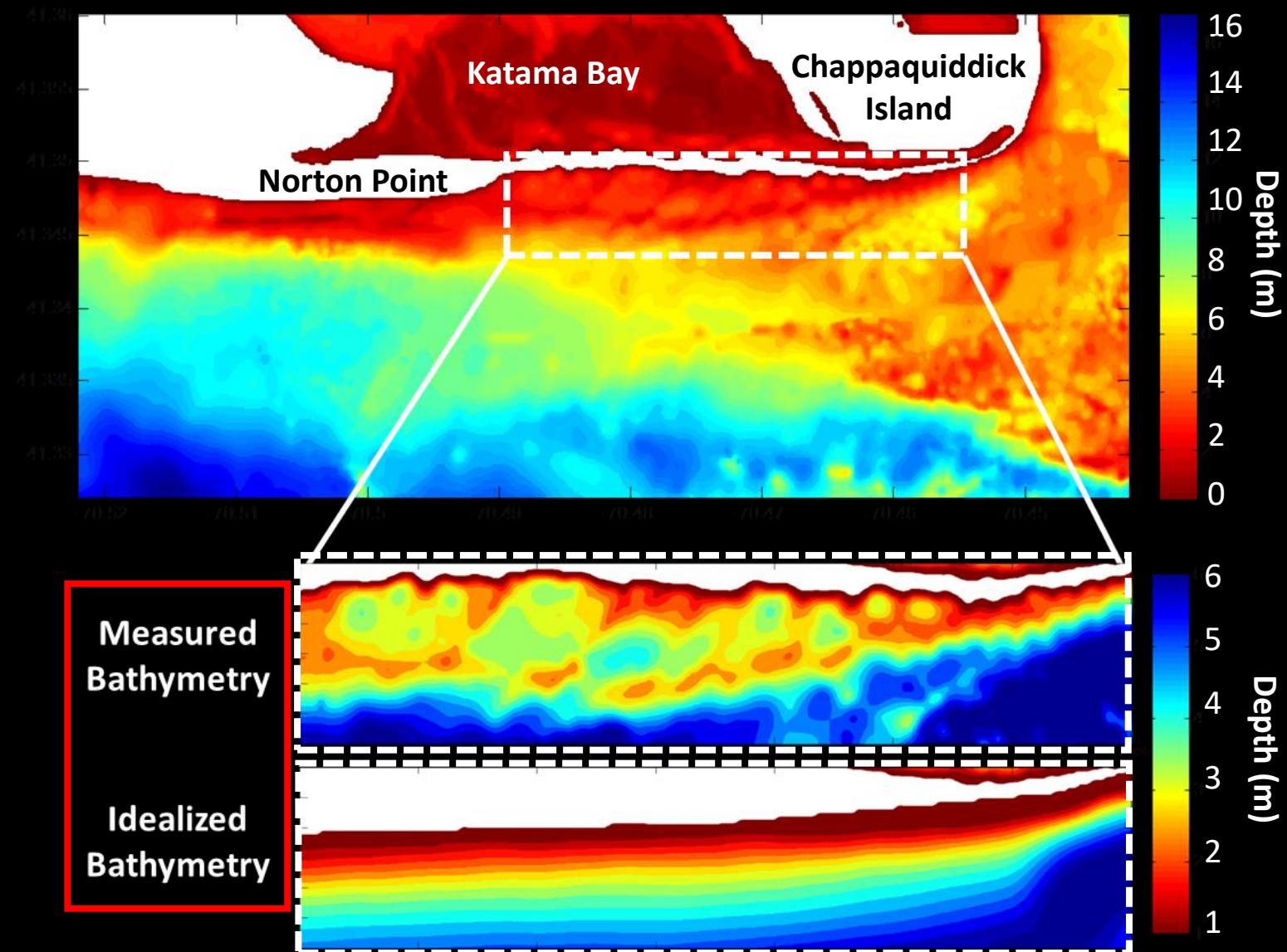
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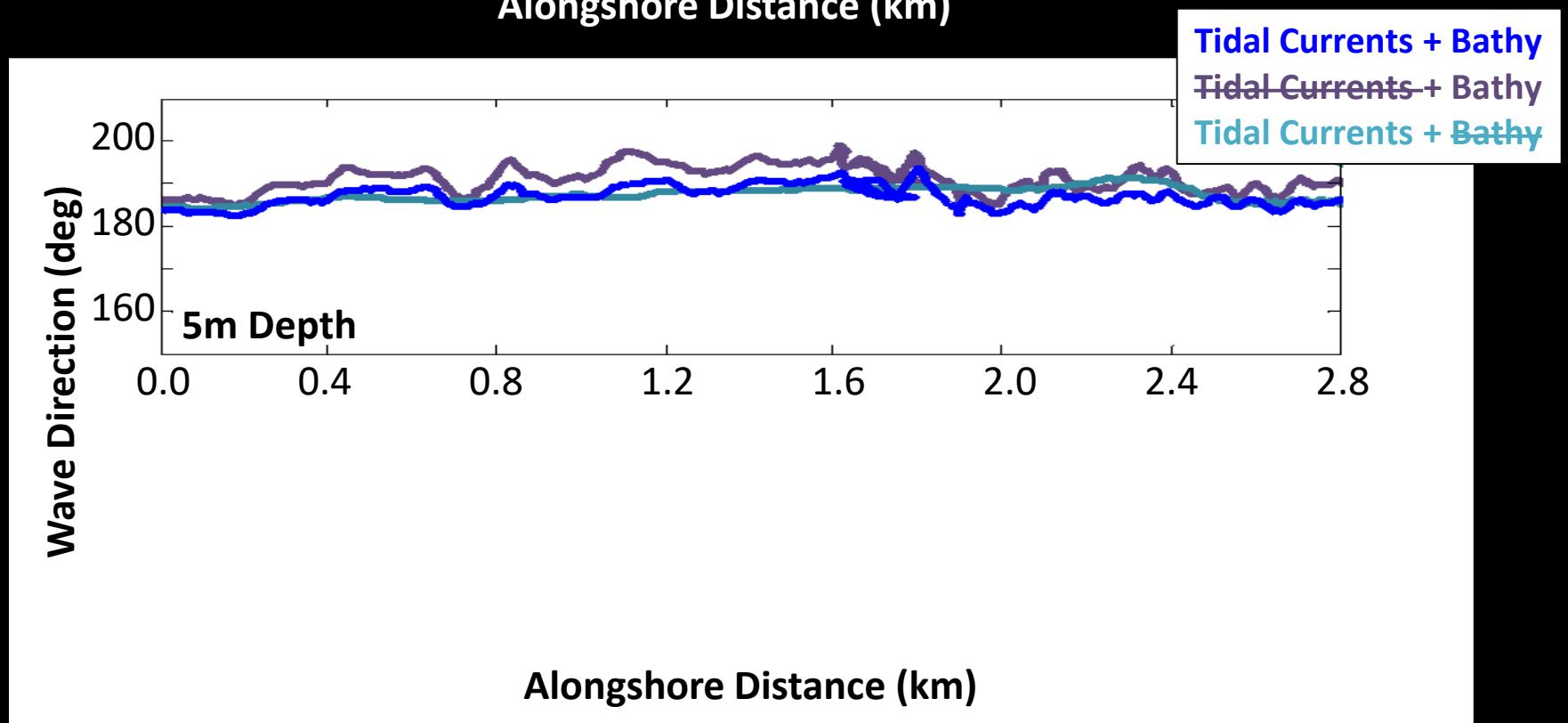
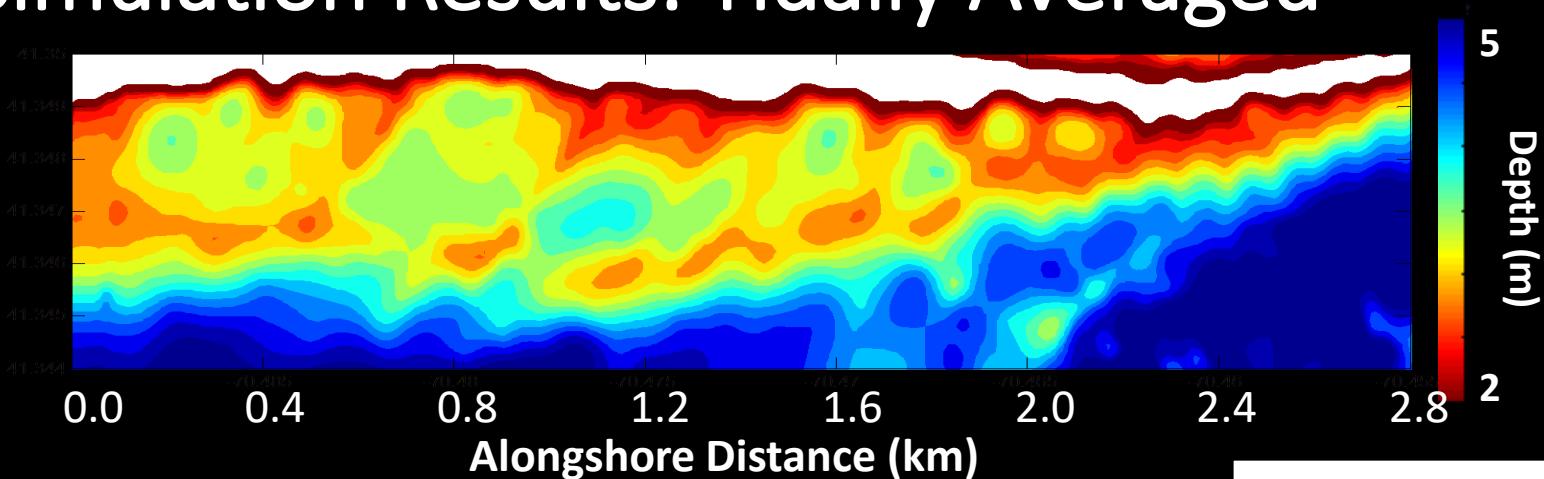
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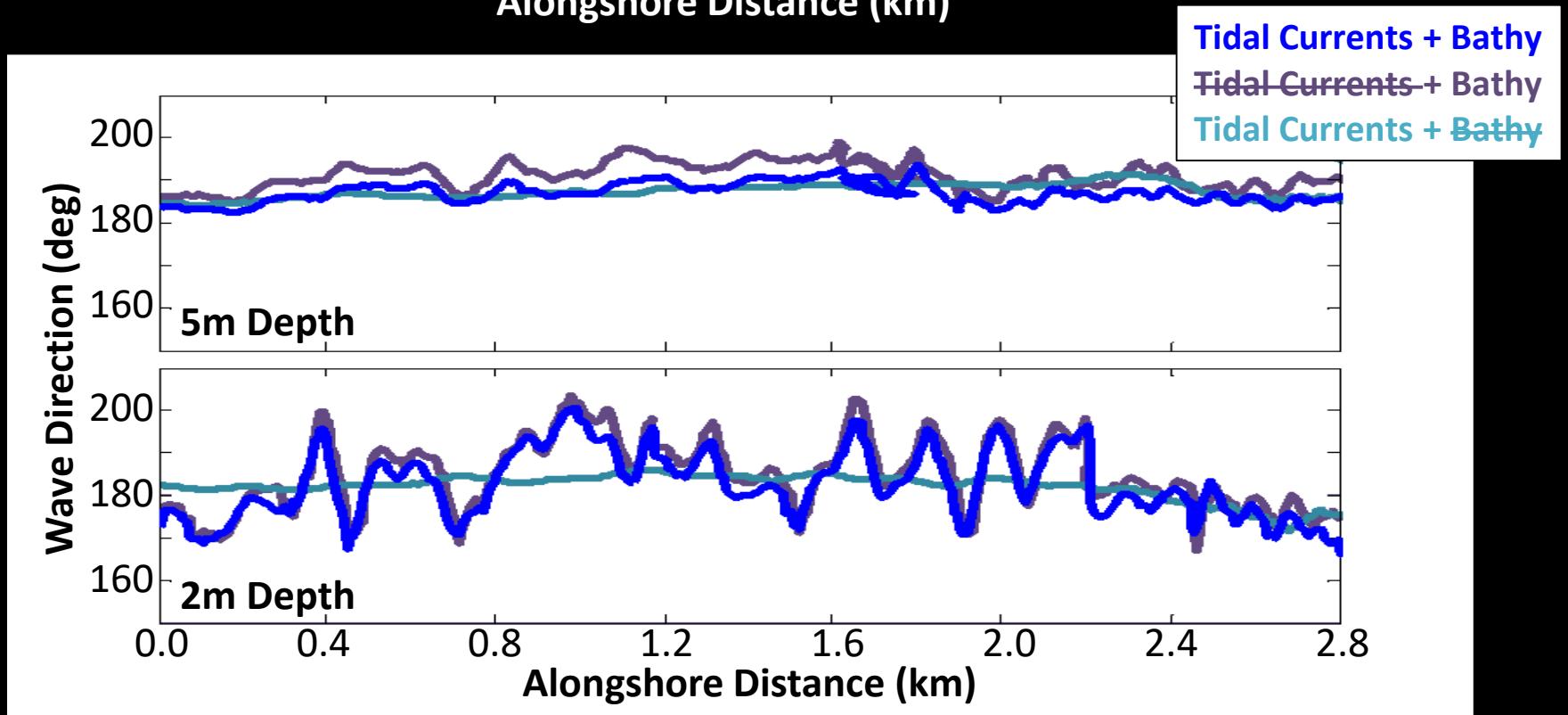
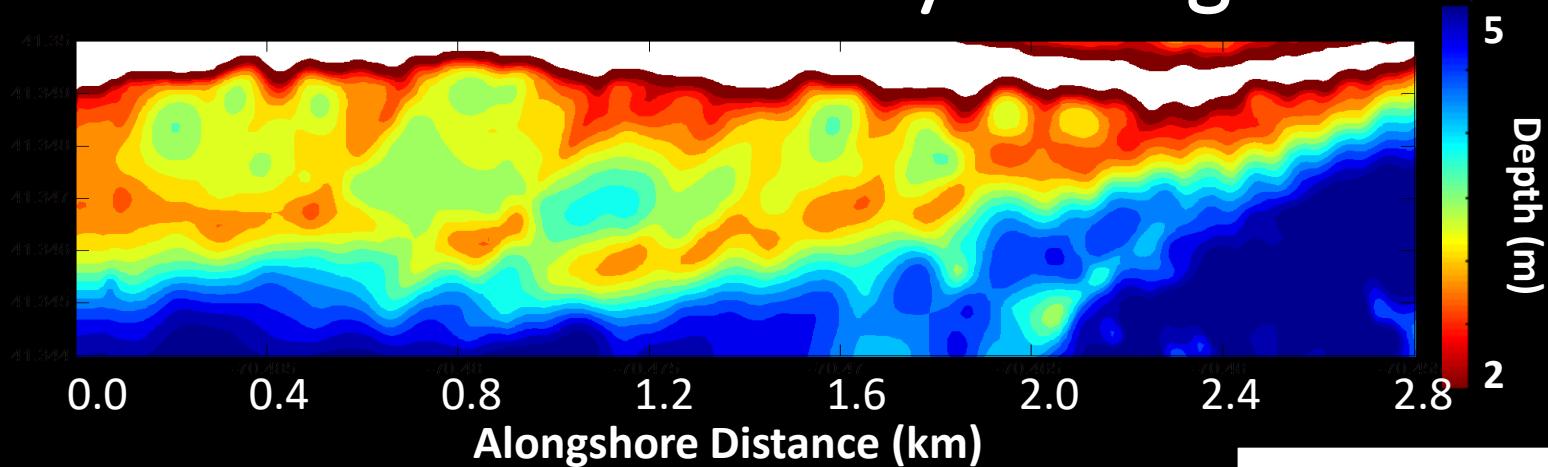
# Idealized Simulations



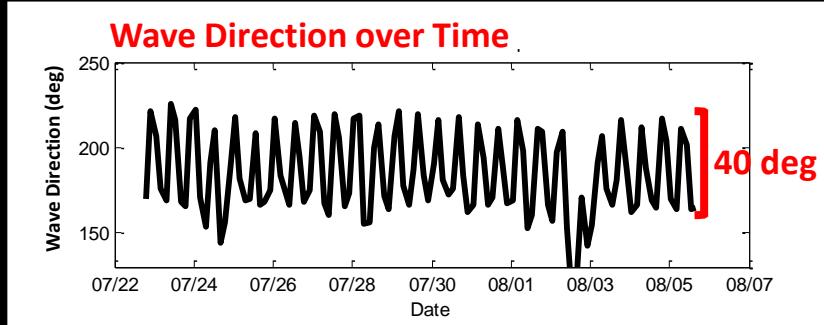
# Simulation Results: Tidally Averaged



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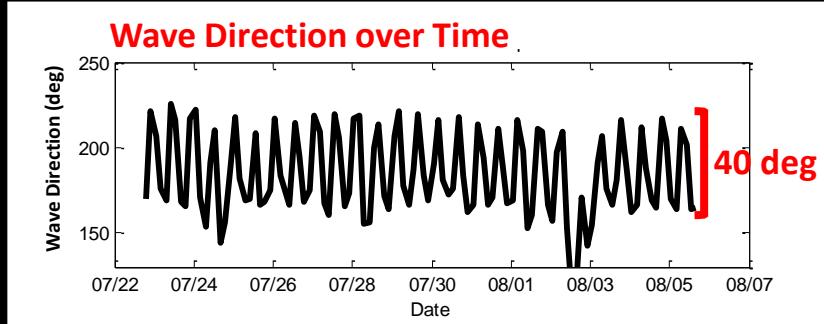


# Wave-Current Interaction and Transport



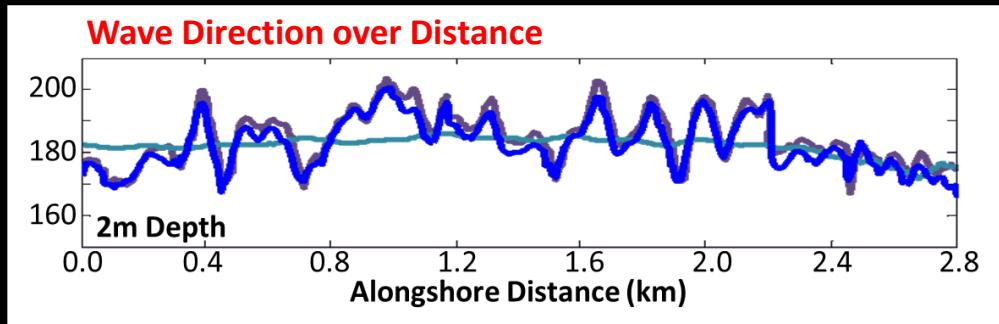
- Wave-current interaction causes direction swing in nearshore as waves shoal

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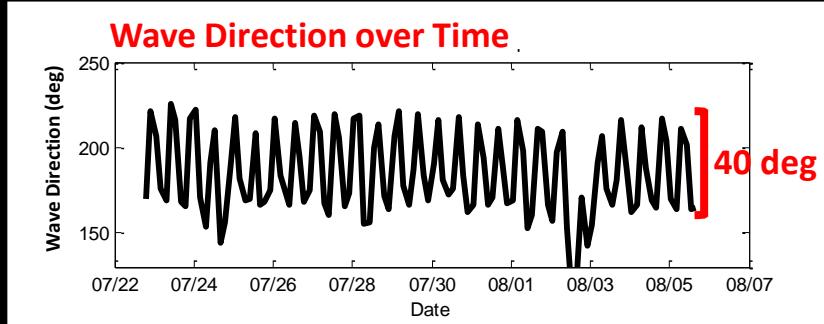
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**HOWEVER**



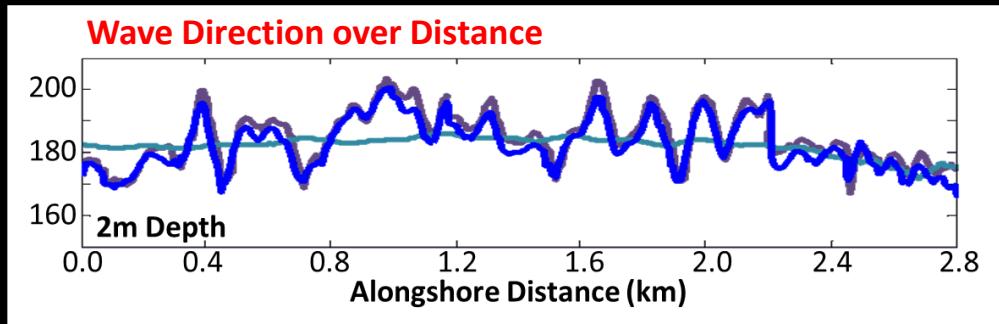
- Inhomogeneous bathymetry determines direction of tidally-averaged wave-driven sediment transport

# Wave-Current Interaction and Transport



- Wave-current interaction causes direction swing in nearshore as waves shoal

**HOWEVER**



- Inhomogeneous bathymetry determines direction of tidally-averaged wave-driven sediment transport

**Local bathymetry and local currents impact wave direction and subsequent wave-driven transport**

An aerial photograph of a coastal area featuring a long, narrow sandbar extending from the bottom right towards the top left. The sandbar is surrounded by shallow, light-colored lagoons and deeper, darker blue ocean water. To the right of the sandbar, there is a mix of green land and small bodies of water. The horizon is visible in the distance under a clear blue sky.

Thank you!  
Questions?