# Flow patterns near hummocks in intertidal mussel beds

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## Background

- Some mussel beds develop hummocks while others do not
- Highest hummocks in low lying areas
- Hummock formation has effects on:
  - Mussel bed stability
  - Local hydrodynamics

The objective is:
Determine the effects of an hummock on local hydrodynamics

*Fig 1: Mussel hummock with measurement frames*

## Method

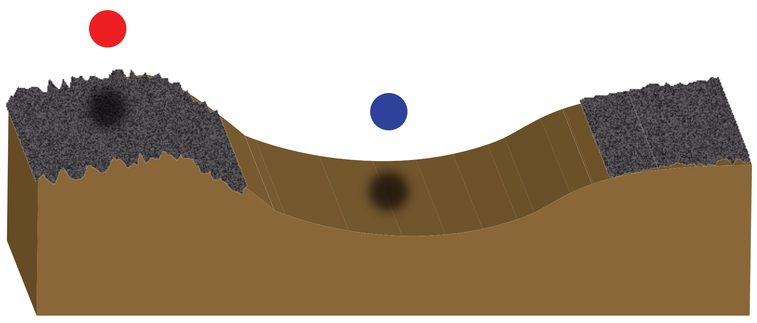

*Fig 2: Measurement setup*

Measure flow characteristics:
- On top of mussel hummock
- Next to hummock
- Measured 0.15 m above bed

Compare with model results

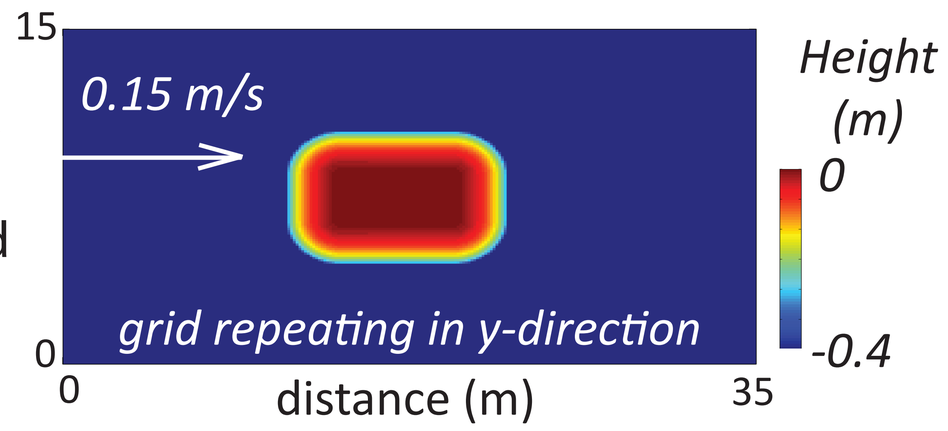


*Fig 3: Model setup (SWASH)*

## Results

Observations flow velocity (Fig 4) show:
- During high water velocities similar
- At low water acceleration over hummock (circles)
- At very low water (0.05m above patch) strong acceleration next to hummock

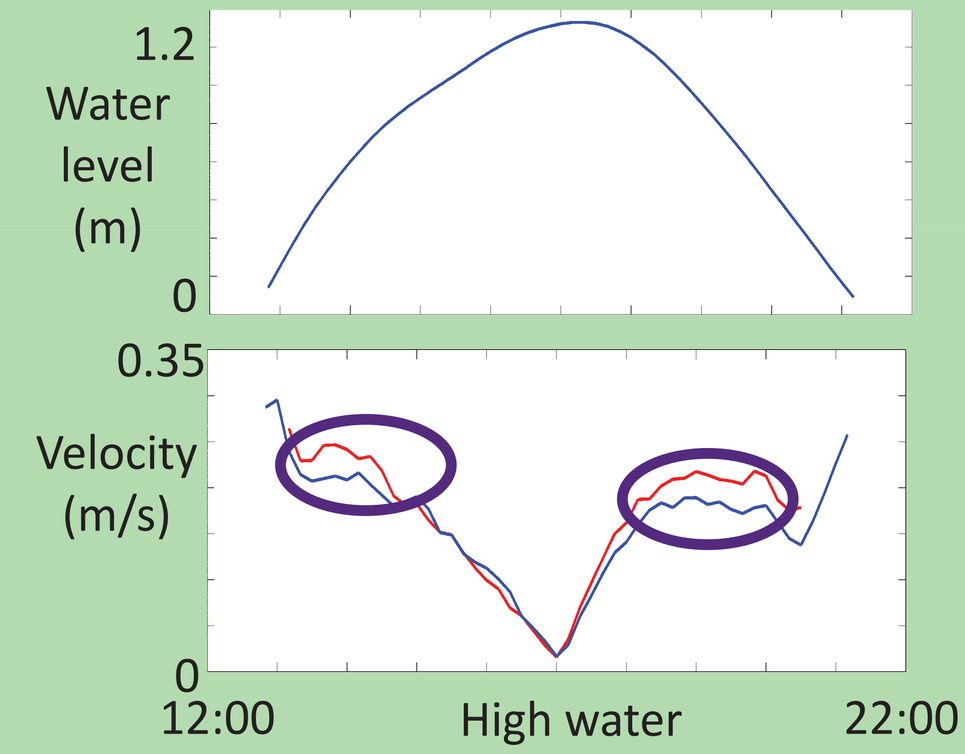


*Fig 4: Observed water level (top) and flow profiles for a typical tidal cycle*

Model results (Fig 5) show:
- At very low water (top figure):
  - Strong flow acceleration next to hummock
  - Deceleration over hummock
  - Large decrease in velocity behind hummock

At low water (bottom) velocity acceleration over patch

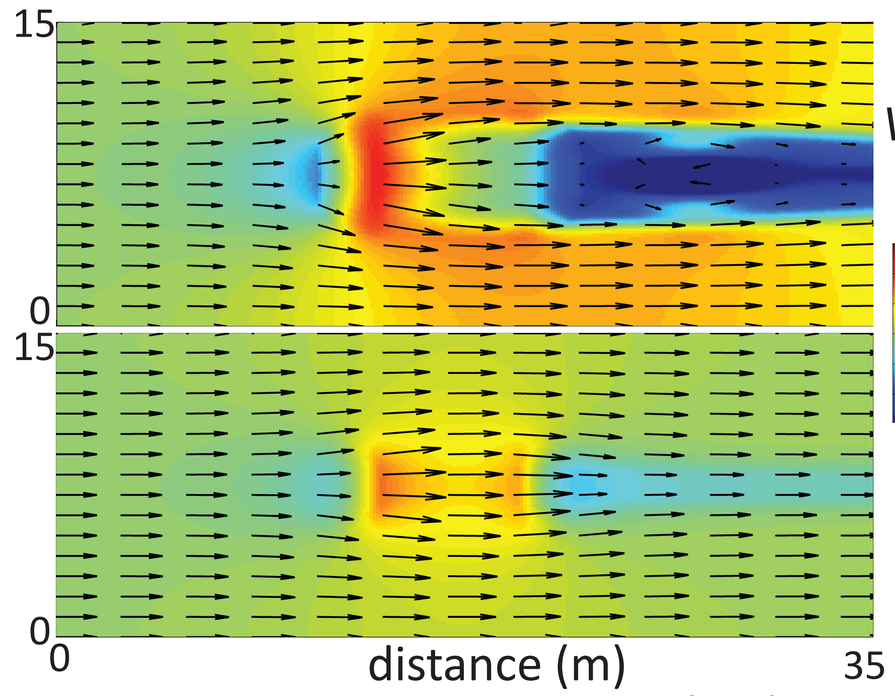


*Fig 5: Modeled velocities for 0.05 (top) and 0.15 m of water above hummock*

## Conclusions

- Strong enhancement of flow next to hummock during very low water
- Strong flow velocities can enhance erosion next to hummock
- On top of hummock forces are largest but mussels stabilize sediment and enhance deposition
- In area's with stronger flow velocities (usually lower areas) this could enhance hummock height

MOSSELWAD

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