Impact of ice on intertidal mussel beds

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Background
- After cold winters losses in mussel areal are observed.
- Drift tracks are found in mussel beds (a).
- Small holes are found inside the bed (a,b).
- Drift ice found with mussels frozen into it (b).
- This suggests 2 mechanisms play a role, Ice drift (a) and bouyancy(b).

Goal: determine which mechanism is most important, and which areas are most vulnerable

Mechanisms

a) Drift
- Ice forced over mussel bed
- Forced by wind and ice
Leads to:
- Damage to higher areas
- Mussels are dispalced
- Drift tracks through bed

b) Bouyancy
During low water
- Water ponds freeze
During Flood
- Ice with mussels is picked up
Leads to:
- Damage to isolated lower areas
- Mussels in ice
- Small holes in bed

Method
Determine which mechanism results in the most damage, and which areas are most exposed.
- Constant monitoring of bed to determine when losses occured.
- Camera system
- During winter 2011/2012
- Determine height variations
  - 3D laserscanner
  - DEM before measurements
  - Multiple DEMs after ice period.

Also recovery of mussel bed from ice forcing is recorded.

Results

Before

After

Difference

Conclusions
- Higher parts of the mussel bed are hit by ice drag.
- Mussel attachment strong enough to withstand bouyancy force.
- Ice drift mechanism causes most damage to mussel bed
- Mussel beds with more height variation more exposed to ice drag.