Deltares
Enabling Delta Life

Point clouds in the Delta

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Fedor Baart

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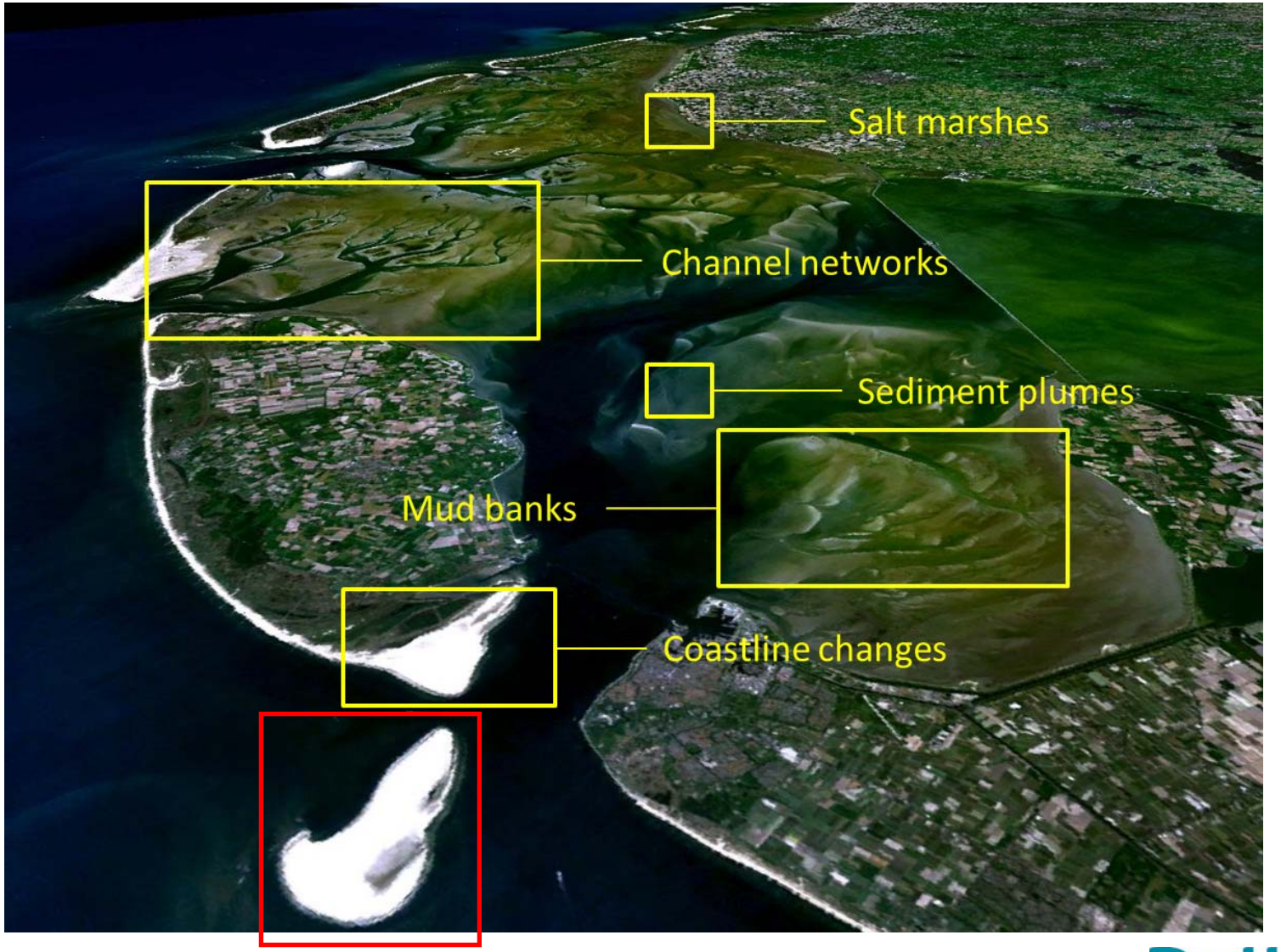
What are we studying?



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It is all about dynamics…

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On different scales…

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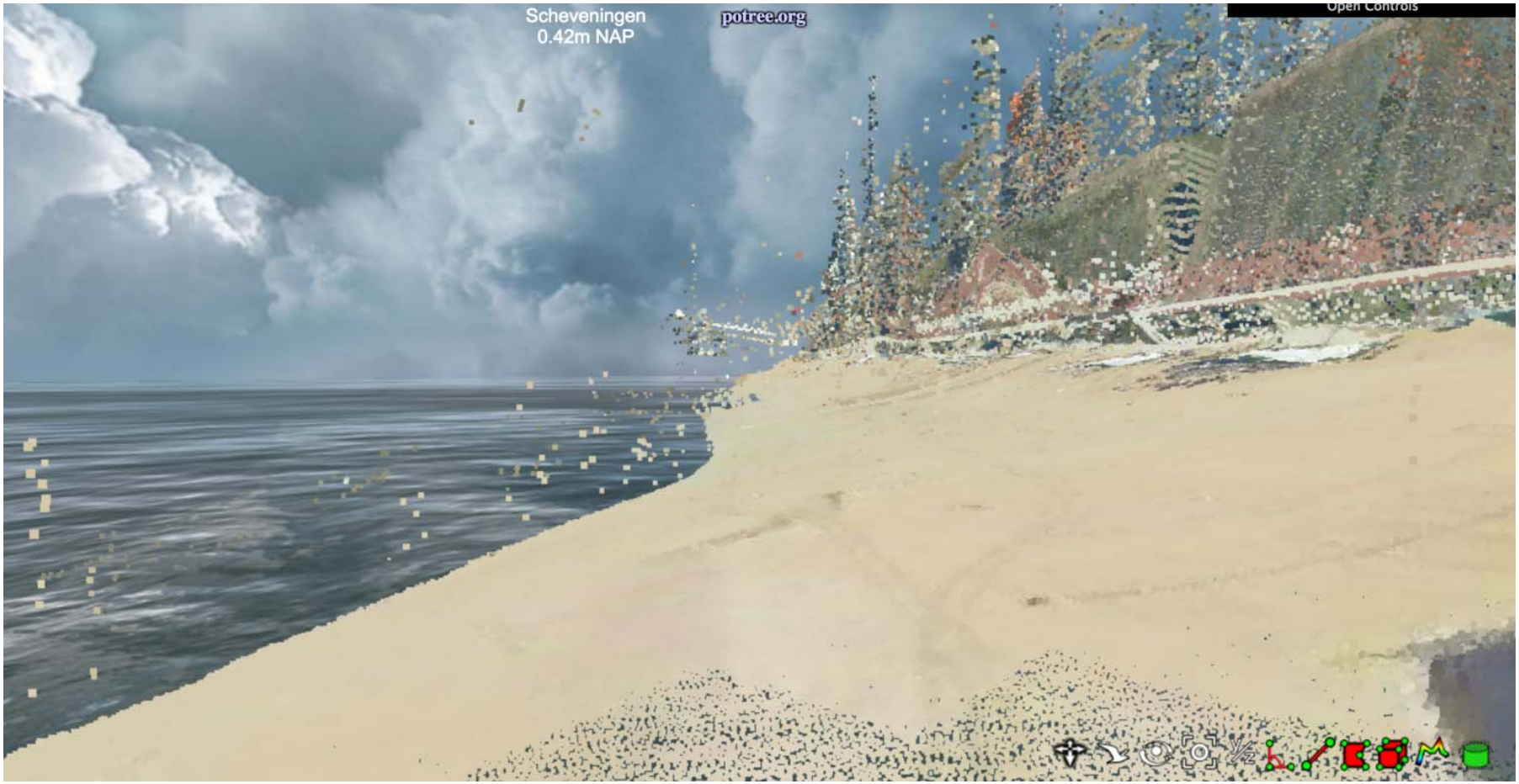
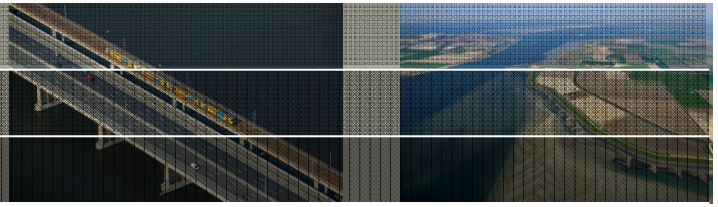
To the scale of sand grains…



Why?



- Coastal erosion/flood risk
- Dune formation/erosion
- Scour around constructions (nearshore/offshore)
- Burial depth of cables and pipelines
- Sedimentation of ports and navigation channels
- Planning and impacts of dredging activities
- …

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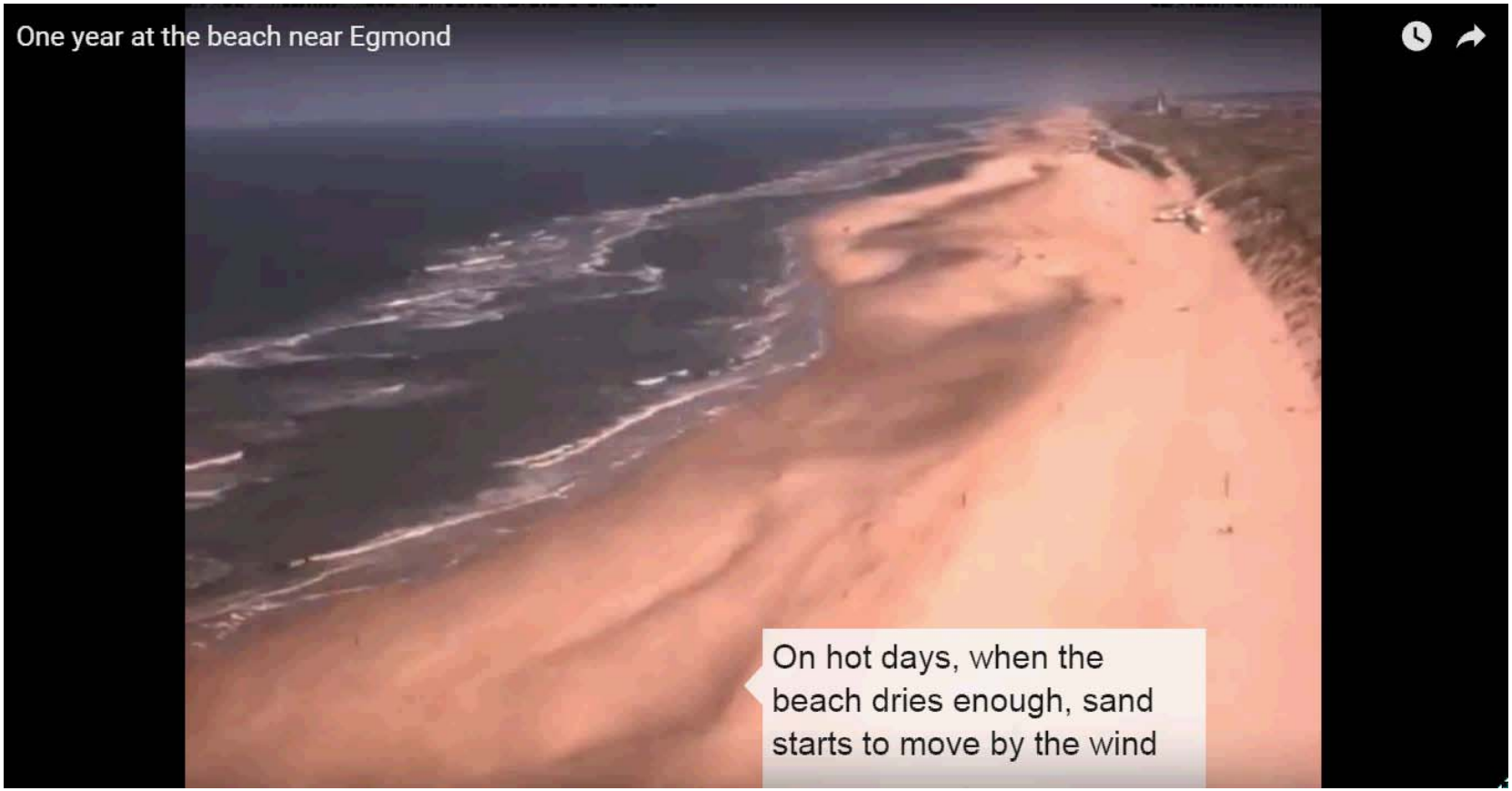
Understanding dune development…



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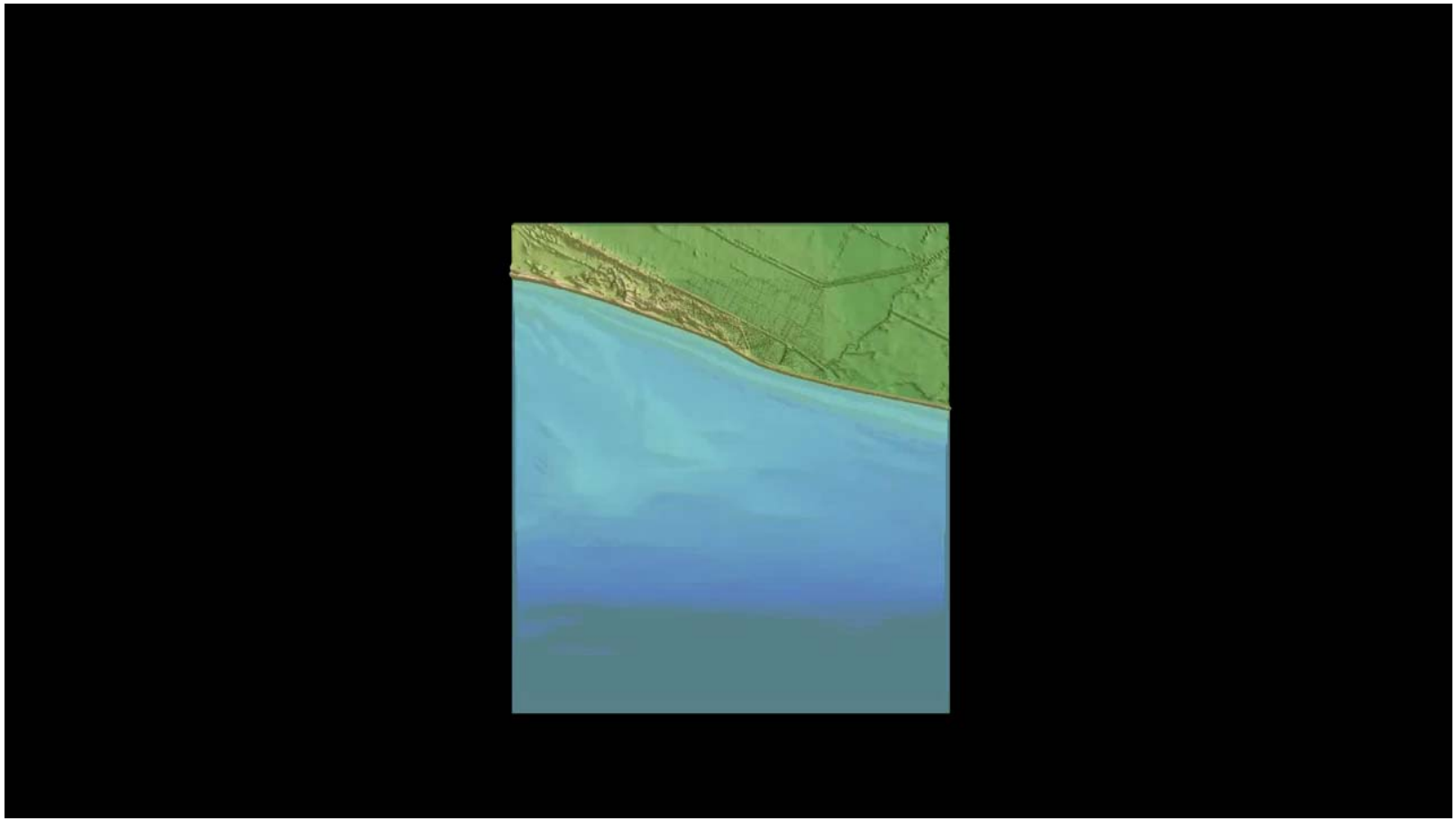
Modeling dune development/storm impacts



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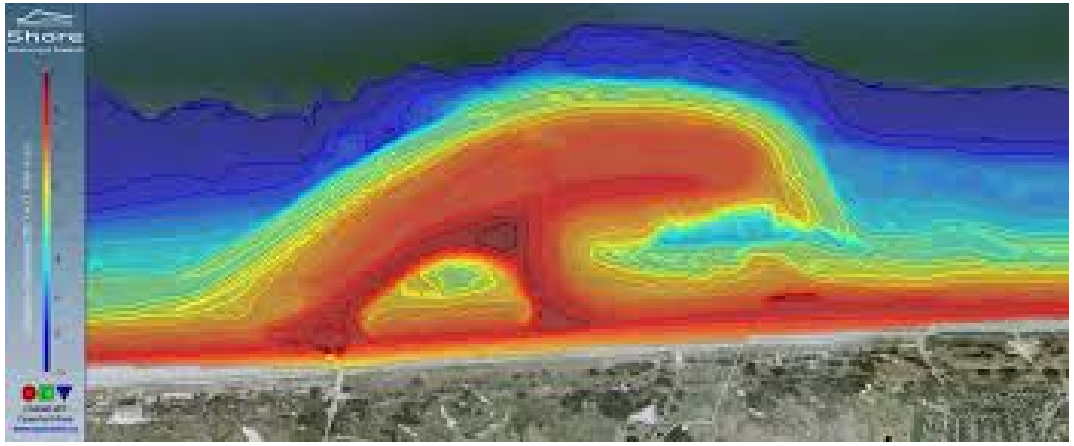
Point clouds in the Delta

More and more continuously measured…

Courtesy TU Delft

Courtesy Ridderinkhof (NIOZ)



Courtesy www.dezandmotor.nl

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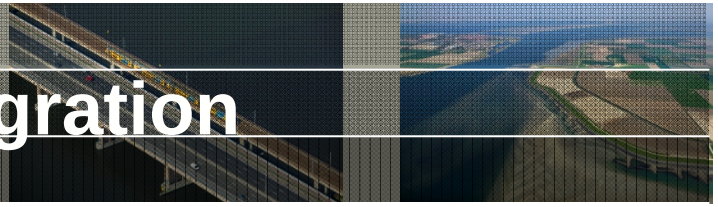
Challenge #1: topo-bathy integration



Topo-bathy integration:

- Different time stamps
- Different reference levels
- Different coordinate systems
- Colors not measured subsurface

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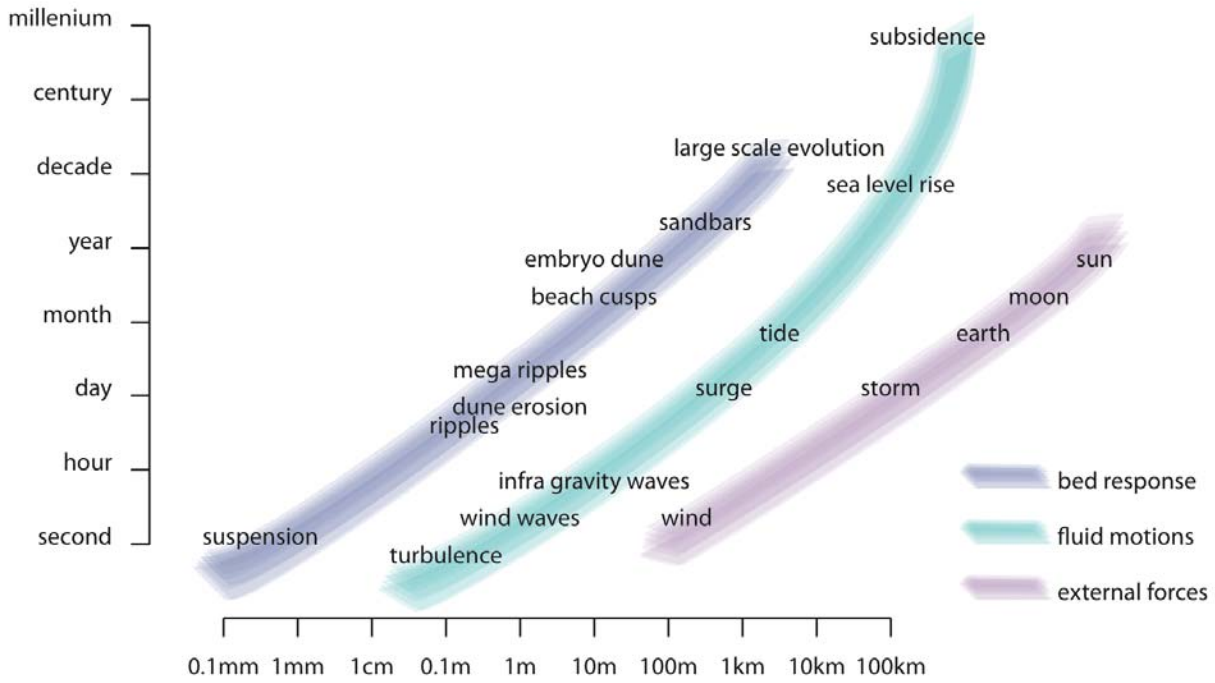
Challenge #2: time dimension

Dynamic point clouds:

- Time as main dimension (x,y,z,t)
  – often not accounted for in data formats (only time stamp)
- “Zoomable” in space (mm to 100 kms) and time (days to centuries)



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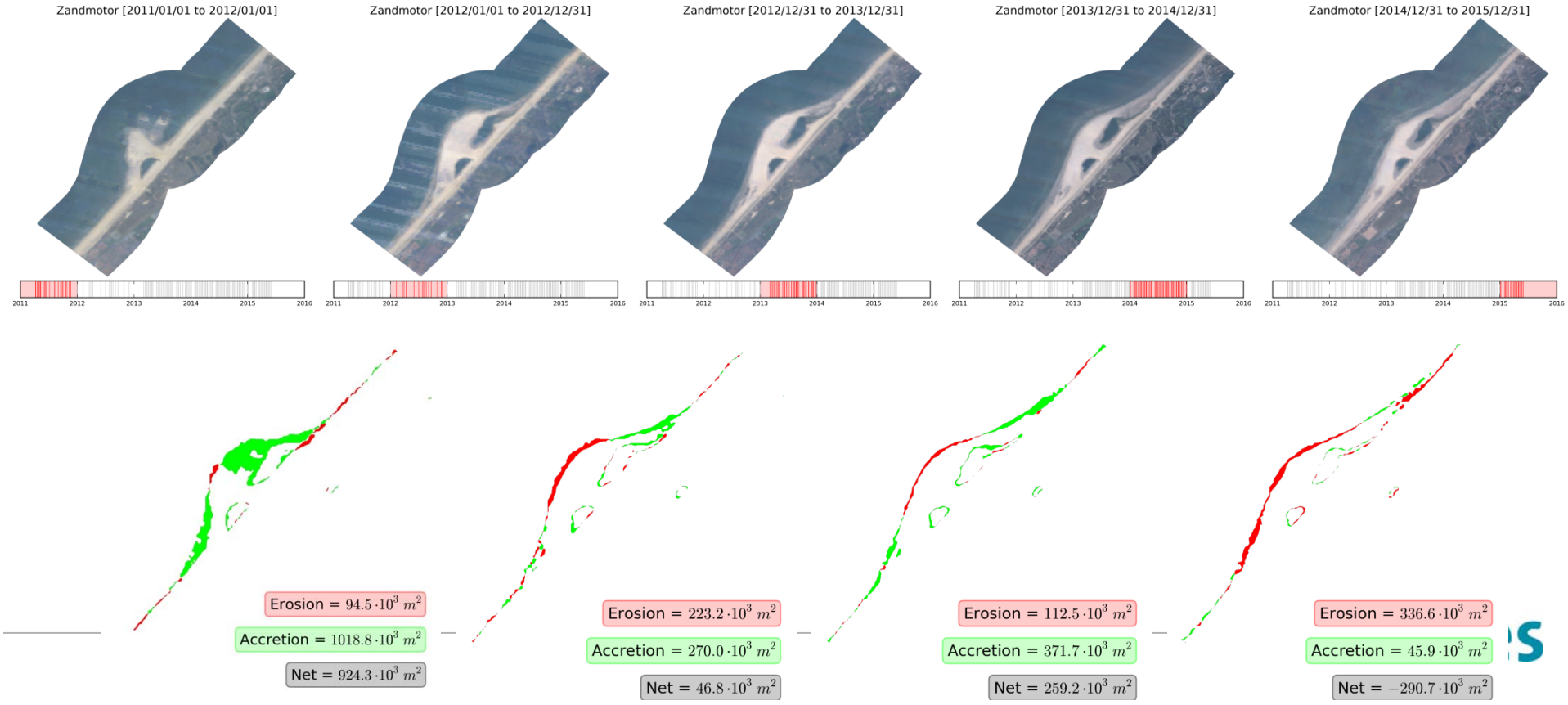
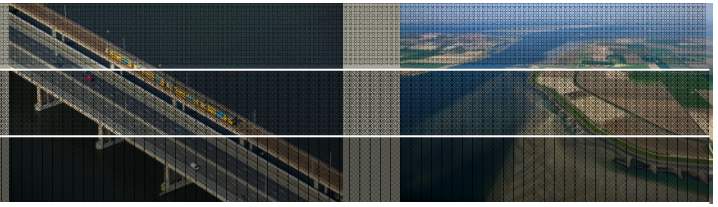
Challenge #3: spatial operations

Point cloud A – Point cloud B

- Detect new features
- Volume changes
- Trends (erosion/deposition)



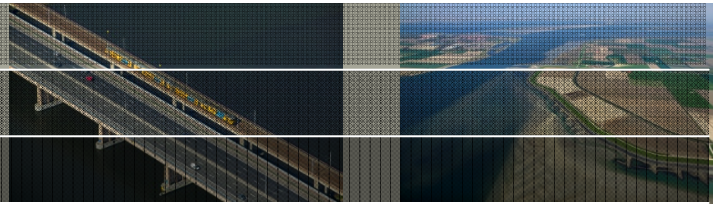
Now quick fixes



Regrid to netcdf:

- Solve subtraction problem
- Reduce storage
- Time dimension explicitly accounted for
- Slices in time and space
- BUT: not for “ragged” arrays (unequally sized data sets)
  - > Measurements taken at different moments in time
  - > Gaps in measurements
  - > …

Current research



Stella Psomadaki (MSc)

- Efficient data handling/storage of point clouds in time

eScience center/CWI (Commit-proposal)

- Scalability of geospatial operations
- Topo-bathy integration

Gerben Hagenaars (Internship)

- Visualization of point clouds with real-time water data (measurements)

Real-time models with point clouds measurements

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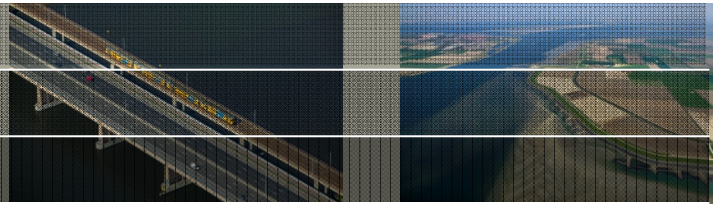
Questions/suggestions?



Questions?

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