Remote Sensing Data for Investigating the Morphodynamics of the Belgian Multi-barred Macro-tidal Beach (RS4MoDy)

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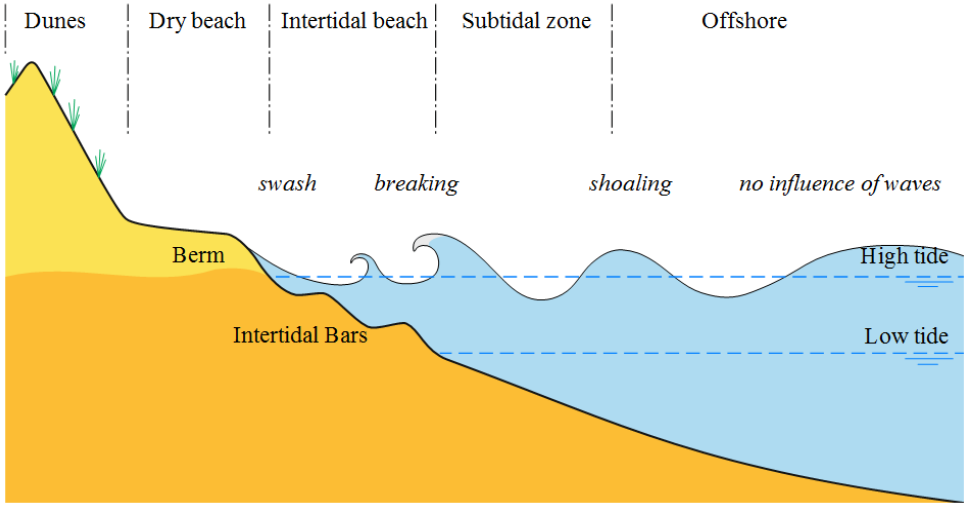
Why is a multi-barred macro-tidal beach important

Intertidal bar systems are :

→ ubiquitous features of macro-tidal sandy beach

→ morphological expressions of the interaction of waves with the beach sand

→ protection of the beach from storm erosion



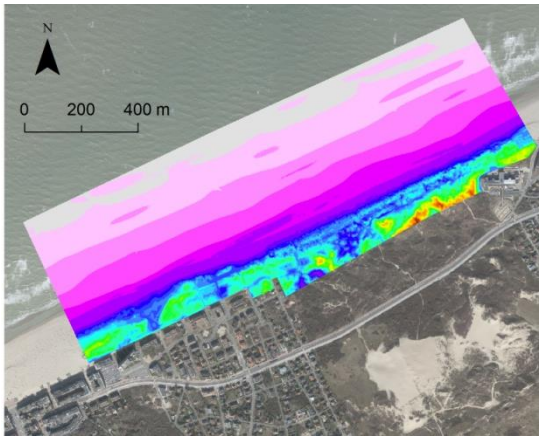
Aim

Investigate the morphodynamics of macro-tidal barred beach from short (storm event) to long-term (>25-years)

Study site: Koksijde (Belgium)

- Sandy multi-barred beach
- Macro-tidal, medium wave energy
- At least one storm/per year

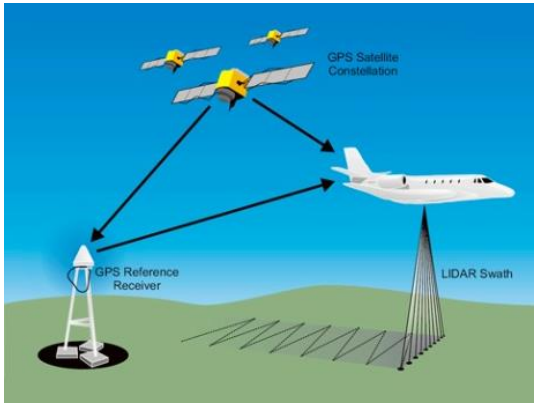
Approach

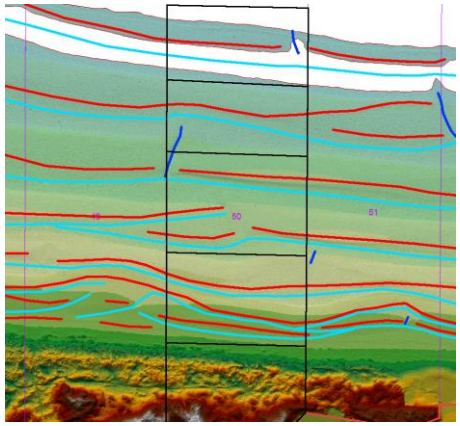


Short-term:

Two camera UAV flights:

- Before a storm event
- After a storm event
- 1-month after storm





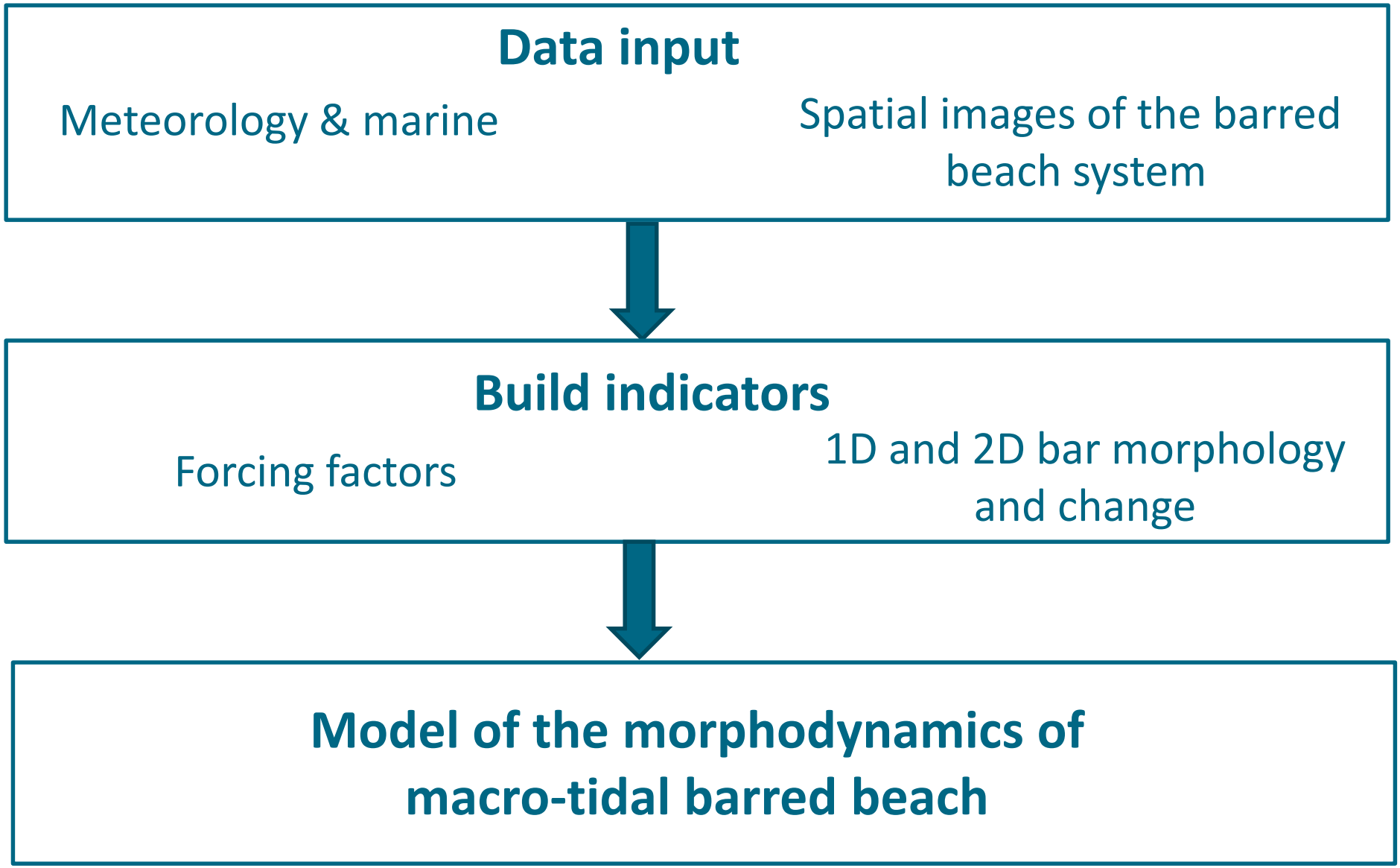
Long-term:

Historical collected dataset

1990 – 2017

- RGB digital camera
- Airborne LiDAR
  - DTM available

Modeling approach



Thanks

Anne-Lise Montreuil
anne-lise.montreuil@vub.be

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Modeling approach

Data input

Meteorological & marine forcings

Spatial images of the barred beach system

Build indicators

Yearly indicators for the forcings

Spatial maps of barred beach system

- DEM (+ classification)
- Yearly morphological change maps
- Time series of bars morphology & surface/volume changes

Linkage with statistical model

Objectives

- Realise an inventory of archive of high spatial resolution airborne data available;
- Demonstrate the use of UAV systems (Digicam & LiDAR) for accurate mapping of the intertidal bars;
- Develop an algorithm based on data fusion of a high resolution DTM for the automated extraction of beach morphology;
- Analyze and model how the intertidal bars are structured in space and time based on a statistical analysis;
- Develop a conceptual model of barred beach morphodynamics incorporating external forcing factors.