

One Year of Monthly Beach Morphological Changes in Mariakerke (Oostende) Related to their Forcing Factors

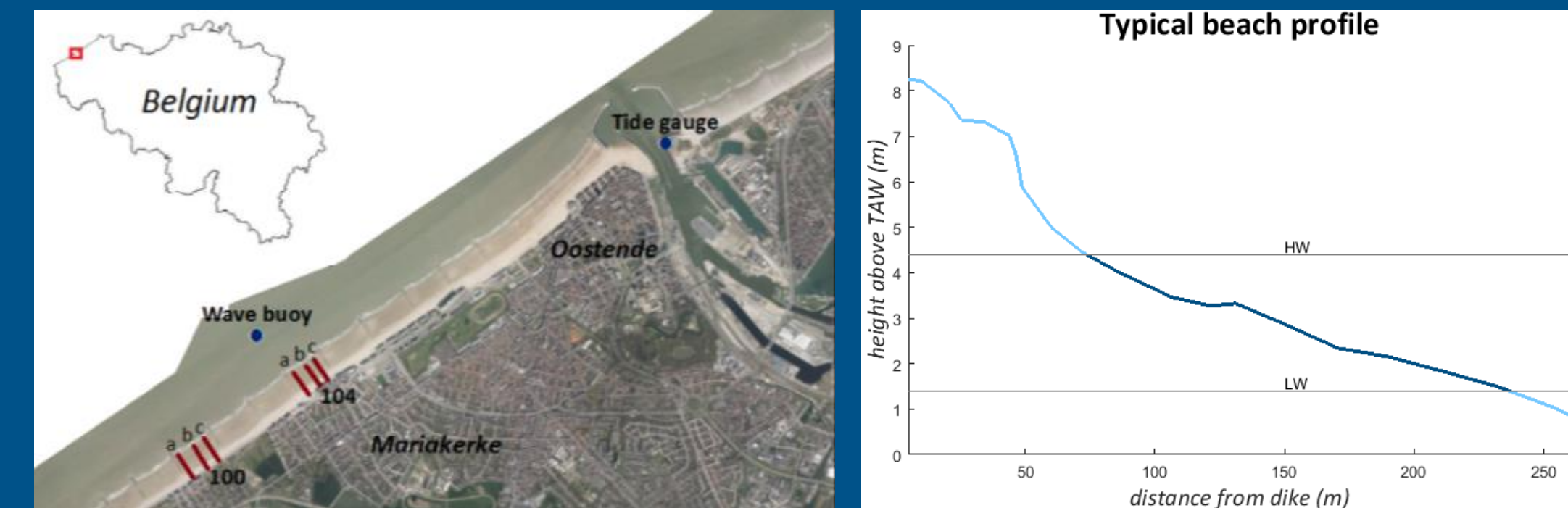
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Introduction

Aim: to assess the morphological variability of the beach at Mariakerke over the year 2016 and to relate morphological changes to meteo-marine forcing factors.

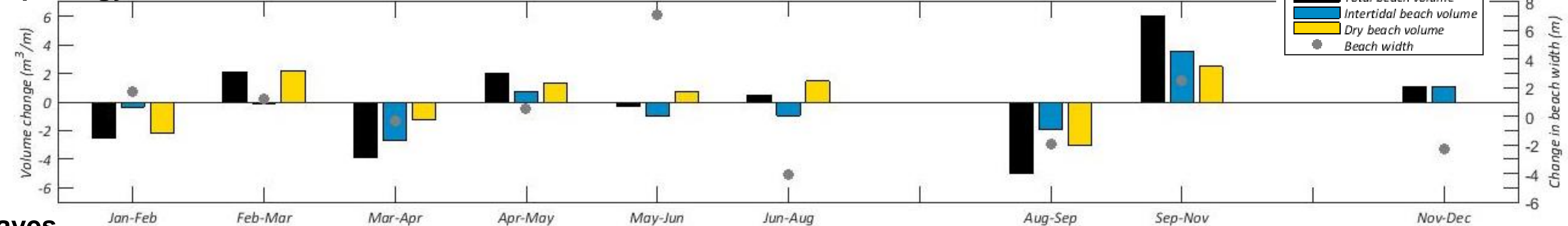
Why? Due to sea level rise and climate change coastal protection needs to be improved in the future. This can only be done if the natural morphodynamics is understood.



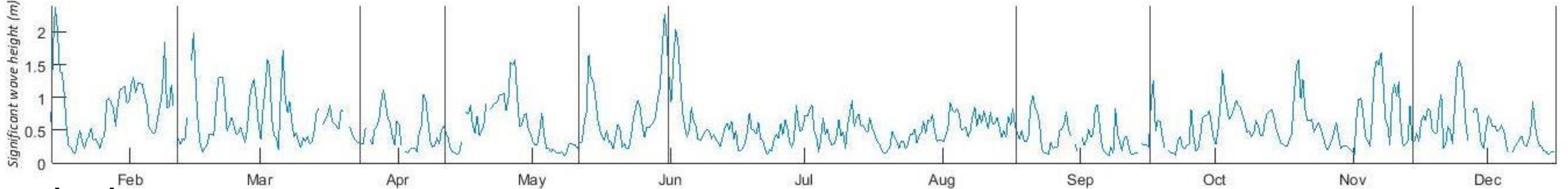
Results

The beach was subject to erosion in winter and beginning of spring. However it was stable in spring-summer and accretion occurred in autumn. There is also a clear seasonal cycle in hydrodynamics and wind, with most energetic conditions in winter and calm conditions in summer. When wave conditions were energetic ($H_s > 1.5$ m) the beach eroded (max. $-5 \text{ m}^3/\text{m}$) and widened, whereas for calm conditions it accreted (max. $+6 \text{ m}^3/\text{m}$). The relation of hydrodynamics with beach width is stronger than with beach volume. High energetic events were recorded in January and May when the wave height exceeded 2 m and the onshore (SW-W-NW) wind speed was above 10 m/s. However, the maximum water level was 5.4 m TAW in January, and only 4.5 m TAW in May. These events had different effects on beach morphology: stable in January and wider in May. We hypothesize that this is due to the difference in water level and the time for the beach to recover before the next topographic survey.

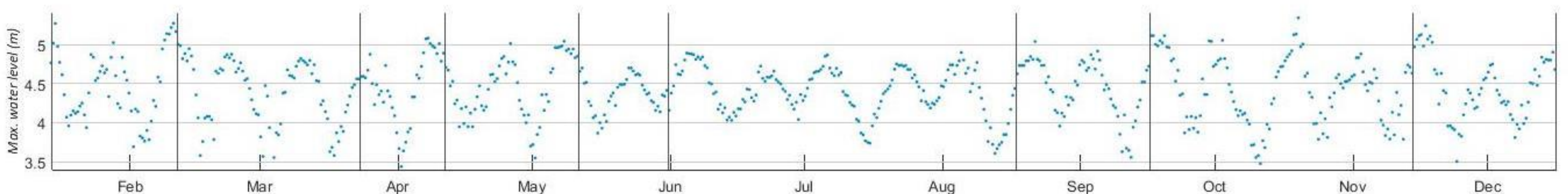
Morphology



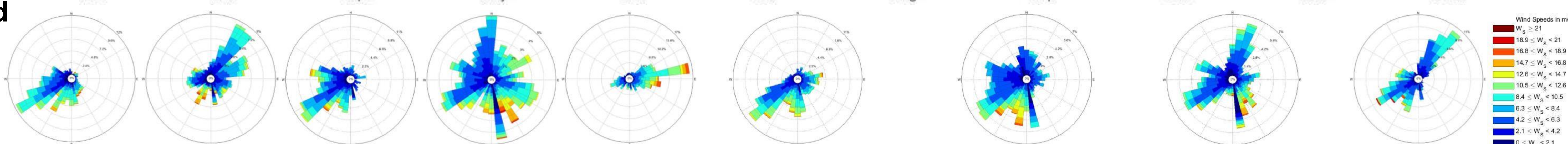
Waves



Water level



Wind



Conclusions

- There is a seasonal trend in beach morphology with erosion in winter and accretion in autumn.
- The combination of water level, wave height and onshore wind control morphological changes.
- There is a strong relation between hydrodynamics and beach width, but less with beach volume.

