Medium-term survey of rapid morphodynamic evolution of a gravel barrier spit during storm event (Sillon de Talbert in Brittany, France)

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cross-shore dynamic



rollover process

1 - storm + high spring tide induce catastrophic overwash and crest erosion; sediments are transfered to the back barrier \Rightarrow crest lowering + landward spit migration



2 – calm periods induce crest elevation due to the erosion of the seaward beach face \Rightarrow sediments eroded to the beach face are transfered on the top ridge



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Preventing and managing erosion

between 1970s and 1980s \Rightarrow hard structures to combat the spit retreating

2000, the Sillon de Talbert became the property of the "Conservatoire du Littoral" ⇒ new coastal management strategy

2004, major part of the riprap of the median section was removed \Rightarrow spit barrier returned to its natural morphological functioning

2002, topo-morphological survey was undertaken

Stéphan et al., 2012 (Shore & Beach)

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Stéphan et al., 2018 (Ocean & Coastal Management)

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back-barrier saltmarsh

100 m

50

- embankment #1

washover

fans

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Evolution of the breach between March and July 2018



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Conclusions

1. acceleration of spit retreat due to an increase of storm events



rate of spit landward displacement has increased almost twice during the last fifteen years \Rightarrow 2 m.yr⁻¹ (2002-2017) vs 1.2 m.yr⁻¹ (1930-2002)

Conclusions

2. cross-shore sediment transfers are dominant and represent 370,000 m³ \Rightarrow more than 95% of spit retreat occurred during storm events \Rightarrow a period of 50 years is required to remobilize the total volume of the Sillon de Tabert (*i.e.*, 1.2 10⁶ m³)



3. longshore sediment transfers of about 50,000 m³ from 2002 to 2017 is realized through cannibalization phenomenon due to the depletion of sediment supply \Rightarrow natural and anthropogenic effects

Conclusions

4. two options can be considered for breach management :

 \Rightarrow remove the *Chouck* groin and the rip-rap in order to restore the longshore sediment transport from the sandy to the gravel beach of the proximal section

 \Rightarrow replenishment of the breach with sediments extracted from the zones where the sediment budget is in excess (the tip of the spit)

Thank you for your attention

