




Historical Evolution of Mud deposition
and erosion in intertidal areas of the
Scheldt estuary

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29/06/2015
IAHR Scheldt Session

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Historical Evolution of Mud deposition
and erosion in intertidal areas of the
Scheldt estuary

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Inhoud

- Study Framework
- Methodology
- Results
 - Saeftinghe
 - General mass balance


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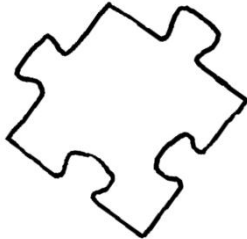
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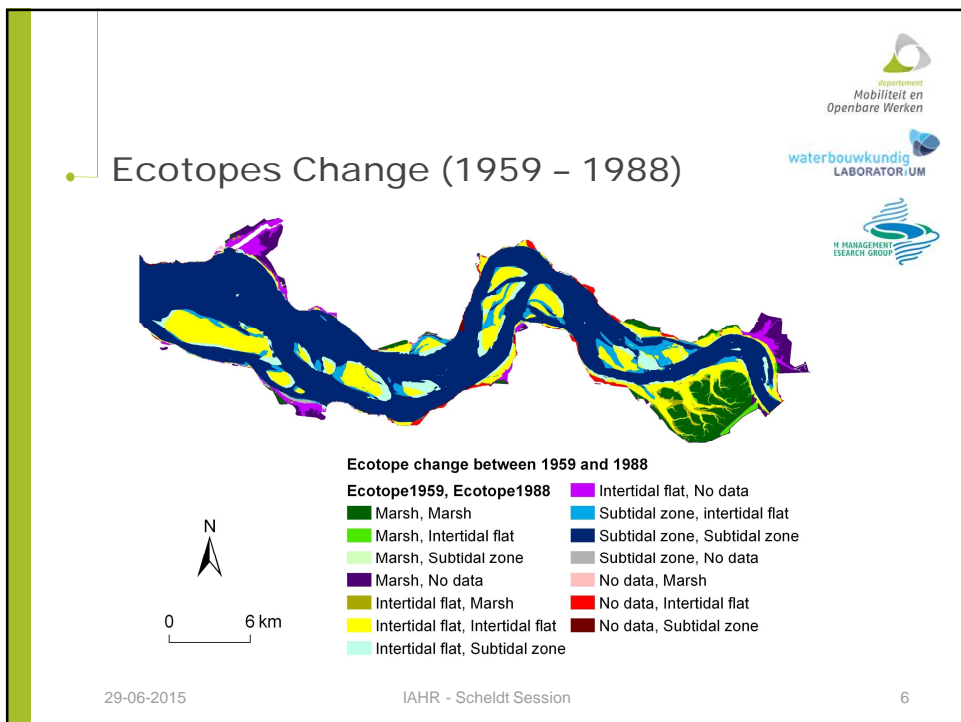
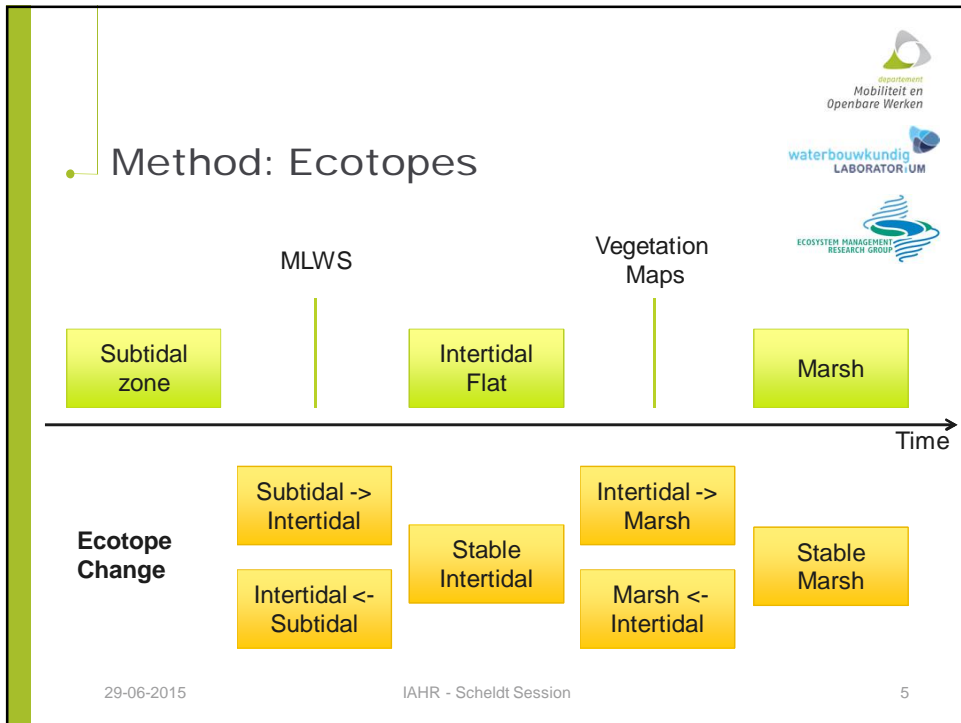
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Study Framework

- Mud Balance of the Sea Scheldt
 - Historical evolution
 - Mass Balance [TDM/yr]
- Historical Evolution of Mud deposition and erosion in intertidal areas of the Scheldt estuary
 - How much sediment is stored /yr in intertidal areas?
 - 1 consistent methodology over entire estuary






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Method: Zonation

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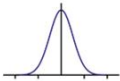

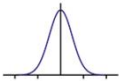
Method: overview

Zone (13)

Period (4)




Ecotope Change class (6)

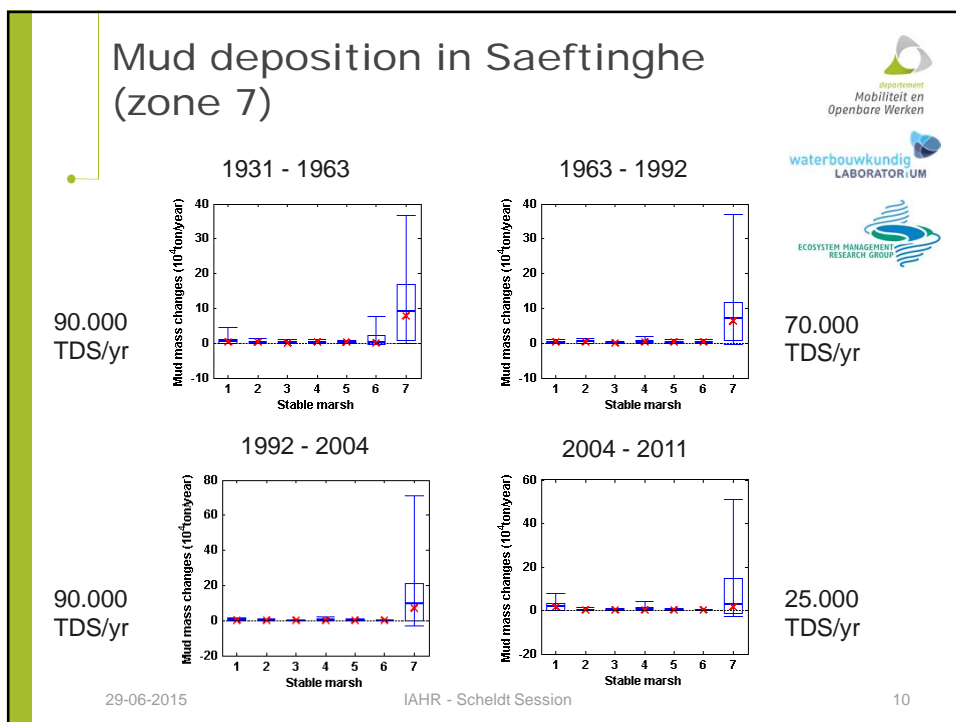
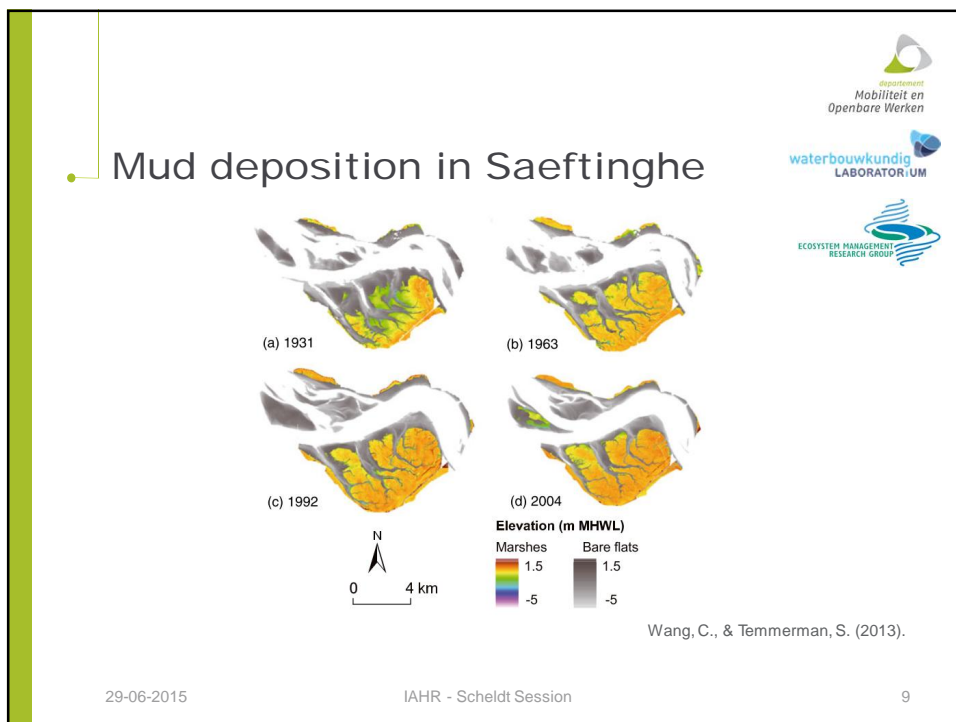
$$\Delta \text{ Mud Mass [TDM]} = \Delta \text{ Height [m]} \times \text{Area [m}^2\text{]} \times \text{Mud content [\%]} \times \text{P Dry Bulk [kg/m}^3\text{]}$$

500 +/- 100 kg/m³

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Mud deposition and erosion in intertidal areas

Mass (ton/year)

Location	Stable marsh	Stable intertidal flat	Marsh -> Intertidal flat	Intertidal flat -> Marsh	Intertidal flat -> Subtidal zone	Subtidal zone -> Intertidal flat	All intertidal areas
Western Scheldt (1931-2010)	69,000	43,000	-11,000	22,000	-308,000	227,000	43,000
Sea Scheldt (1930-2011)	44,000	-5,000	1,000	20	-11,000	7,000	36,000

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Conclusions

- Intertidal areas are a net sink of mud in both the Western Scheldt and Sea Scheldt
 - 43,000 TDM/yr for Western Scheldt
 - 36,000 TDM/yr for Sea Scheldt
- Important dynamics between intertidal & subtidal zone in the Western Scheldt
 - Gross mass fluxes one order of magnitude bigger than total net flux
- Accuracy of the method is limited in the Sea Scheldt, due to data availability

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Conclusions

- A stable marsh captures about 4x more sediment TDS/ha than a stable intertidal flat
 - Sedimentation on stable marches (Saeftinghe!) is more important (x1,6) than sedimentation on stable intertidal flats in the Western Scheldt.
 - But there's 2,5 times more surface area of intertidal flats on average.
- After 2004, most of the marshes in Saeftinghe are above MHWL and close to the upper limit in elevation, resulting in a slower increase in elevation and less mud deposition

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Technical Report

Wang, C.; Temmerman, S.; Vanlede, J.; Vandenbruwaene, W.; Verwaest, T.; Mostaert, F. (2014). **Mud balance Sea Scheldt: Subreport 6 - Historical evolution (1930-2011) of mud deposition/erosion in the intertidal areas of the Scheldt estuary.** Version 4.0. WL Rapporten, 00_029. Flanders Hydraulics Research & University of Antwerp, Ecosystem Management research group: Antwerp, Belgium.

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