






Human versus natural mud fluxes in the Scheldt estuary

Are they significant and if so, how can they best be optimised?

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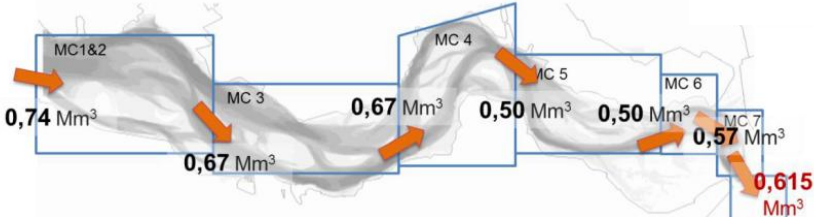
IAHR conference, 29 June, 2015

Mud balance





Some ballpark numbers:

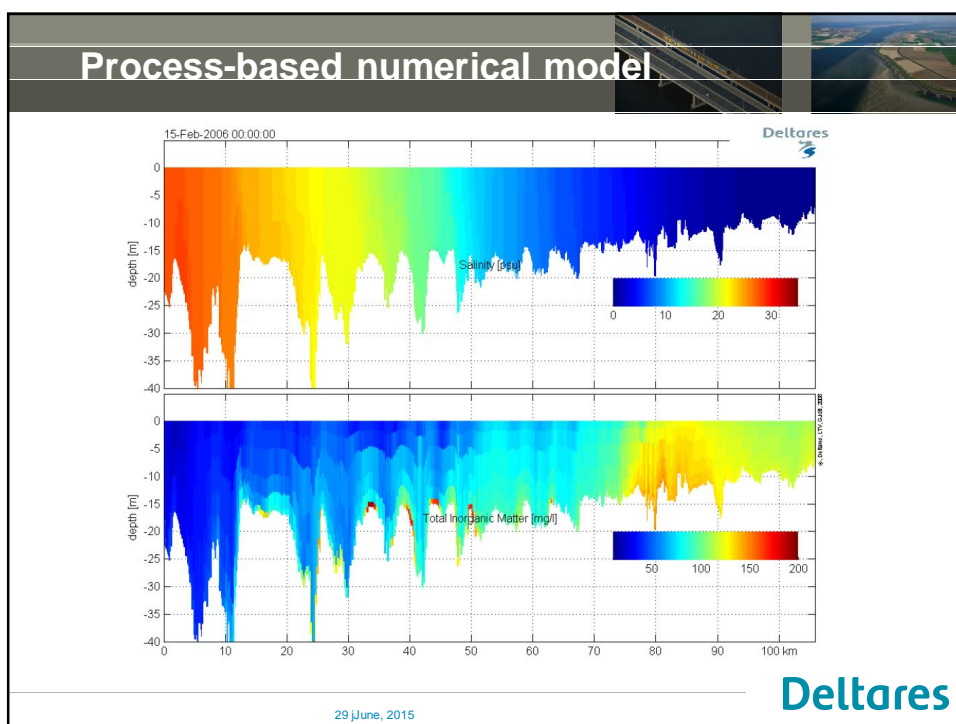
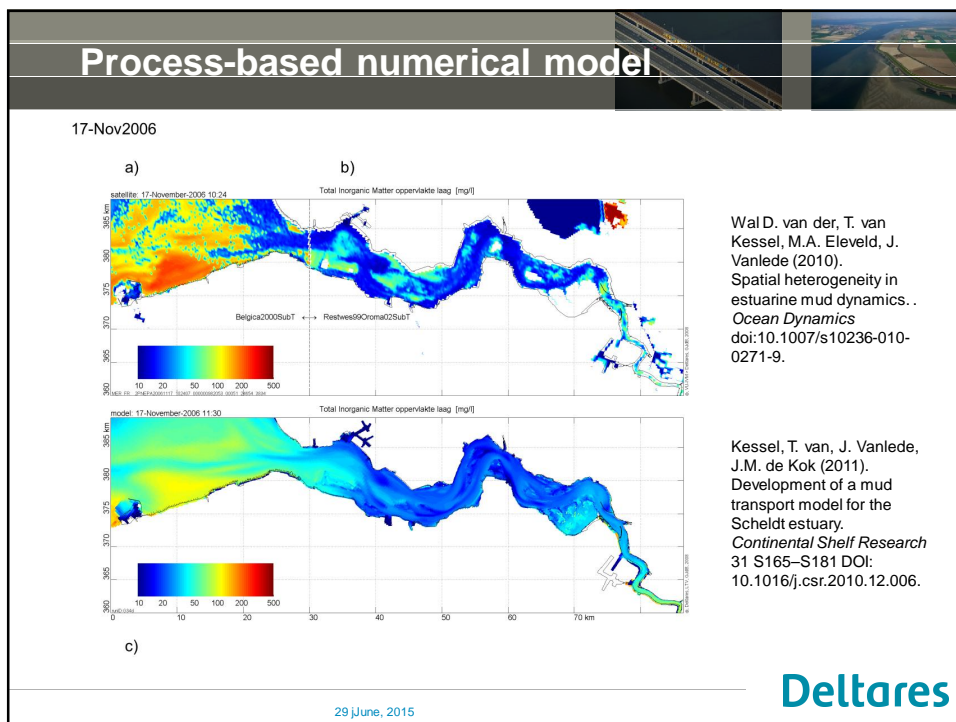
- $C_{\text{mud}} = 50\text{-}100 \text{ mg/l}$, $V_{\text{tide}} = 10^9 \text{ m}^3$, $A_{\text{tidal}} = 45 \text{ Mm}^2$
- Gross import = 50 MT/year, net import = 0.5 MT/year
- $S_{\text{marsh}} = 1 \text{ cm/year}$ (0.5 MT), $S_{\text{harb}} = 1 \text{ cm/day}$ ($1 + 1 = 2 \text{ MT}$)
- $K = S_{\text{harb}}/S_{\text{marsh}} = 4 > 1$ (human impact on mud balance expected)



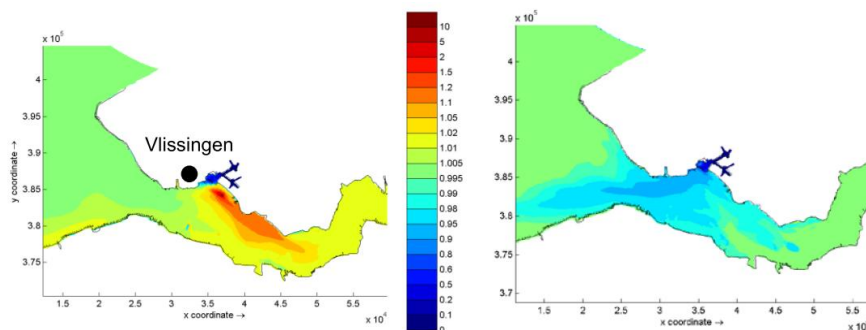
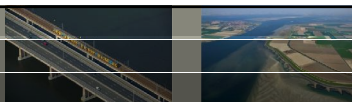
Source: Arcadis (2013)



29 june, 2015



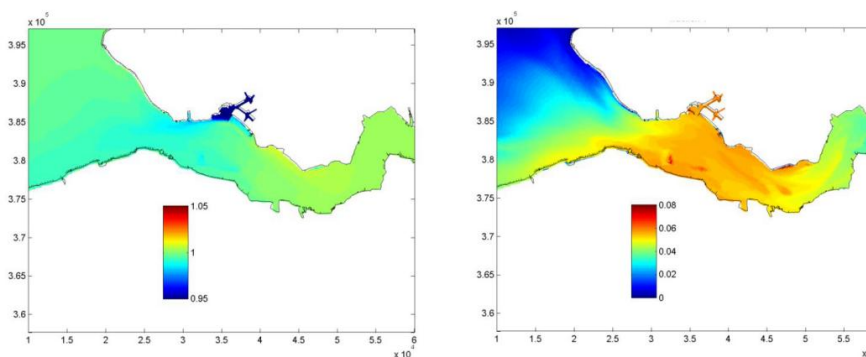
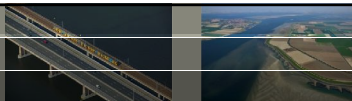
Effect of Sloe harbour (1)



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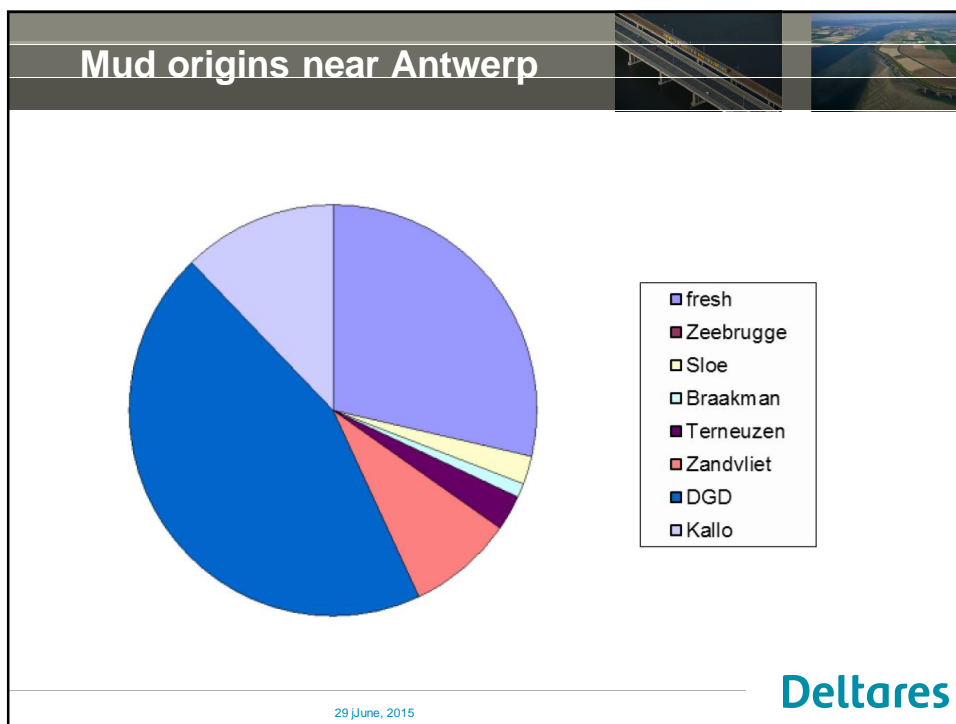
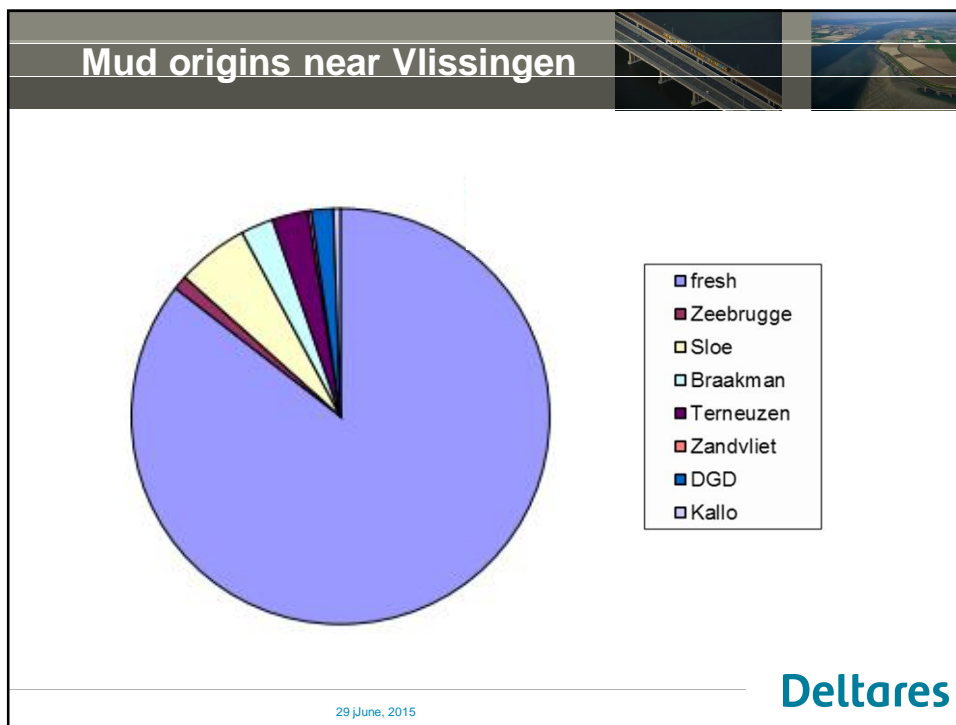
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Effect of Sloe harbour (2)



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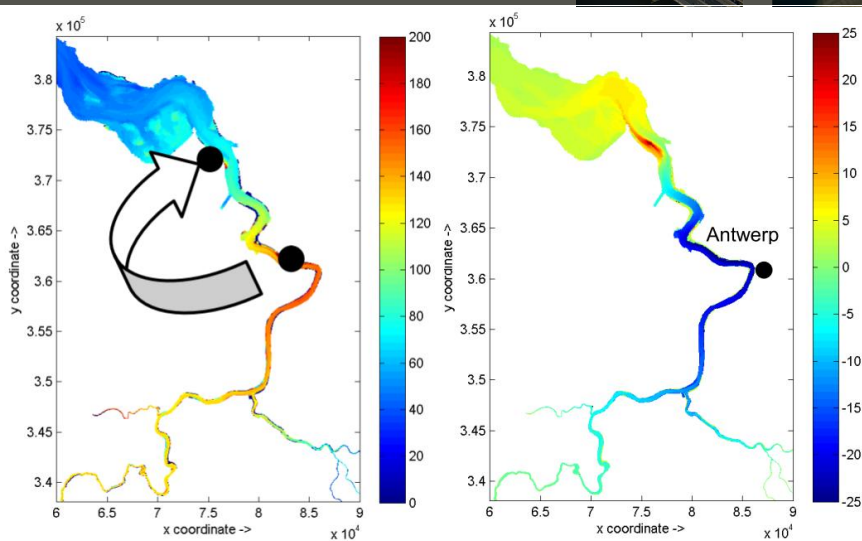
Explanation of issues at Antwerp

- Narrower estuary
- ETM formation, location dependent on freshwater discharge
- Construction of DGD
- Deepening
- Possibly increasing trend SPM
- High maintenance volumes and cost

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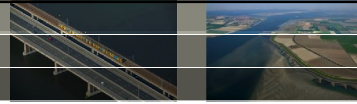
Shift of release location



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Conclusions



- 'Human' fluxes small compared to gross natural mud fluxes
- But significant compared to net fluxes
- Siltation in harbours and access channels >> accretion tidal flats and saltmarshes
- A large part of the mud in the Scheldt is 'second hand'
- This percentage increases from the mouth to Antwerp
- Both concentration in water column and siltation rate can be influenced significantly by adapting the maintenance strategy
- A down-estuary shift of release locations reduces both mud concentration and siltation

29 June, 2015

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