

# Morphodynamic developments in distributary channel networks

## Impacts on flood hazards in the Rotterdam-Rijnmond channel network and the Pearl River Delta

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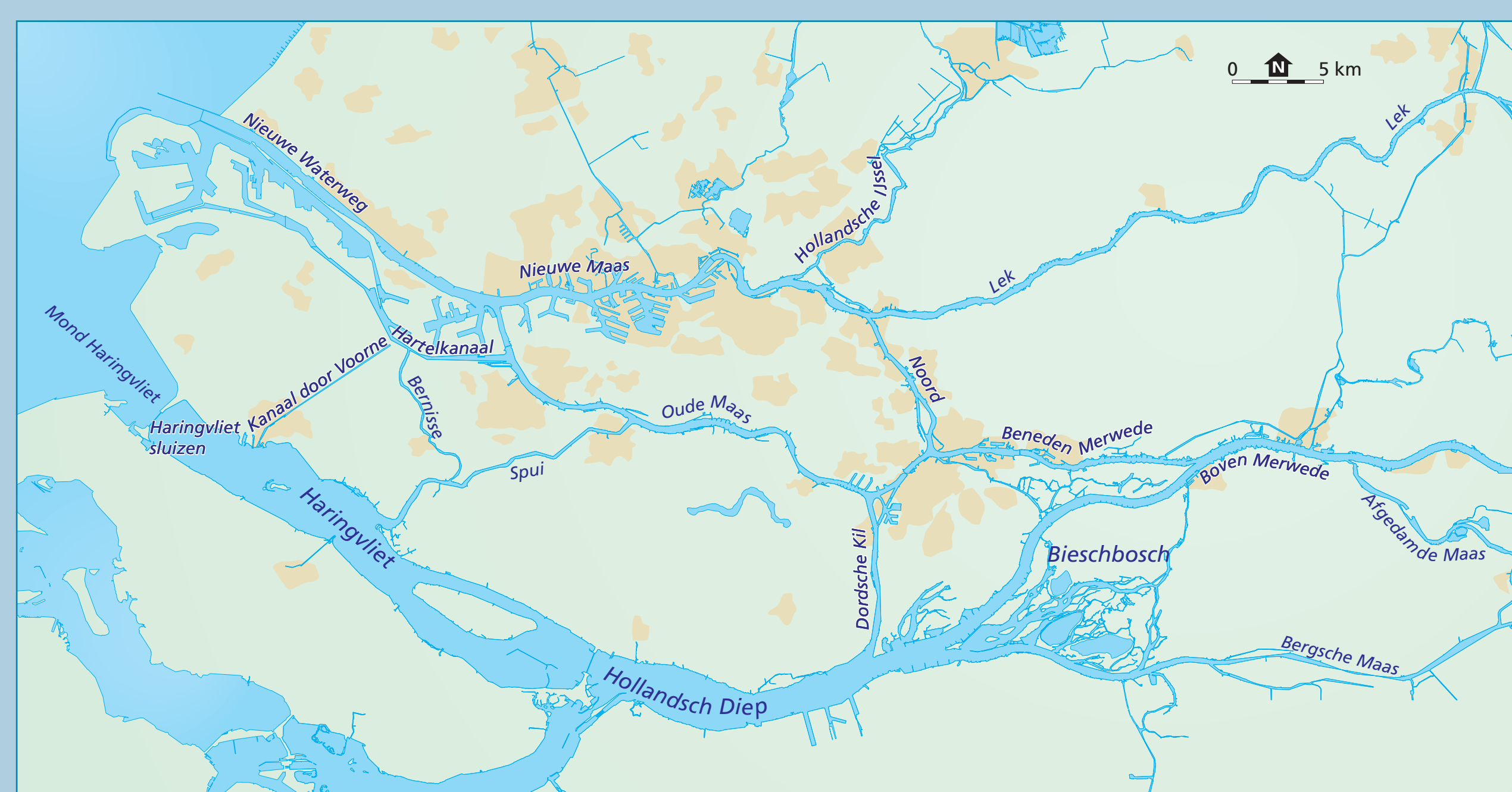
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### Research questions

- How do changing boundary conditions influence morphology and sediment transport in tidal river networks?
- What is the influence of tides on the division of water and sediment at river junctions?
- How does changed morphology affect water levels and flood risks?

### 1 - First paper: Review of morphological development in the Rotterdam Rijnmond channel network

Since the closure of the Haringvliet in 1970, large morphology changes have occurred. Which changes were expected? Which changes did occur? Previous research will be reviewed and goals for additional research defined.



### 4 - Comparison Rotterdam-Rijnmond area and Pearl River Delta

Their size differs greatly, but both systems show a network of bifurcations and confluences, have undergone large morphological change and are under great human influence. By comparing the two, general statements about morphology and flood risks can be made.



#### References

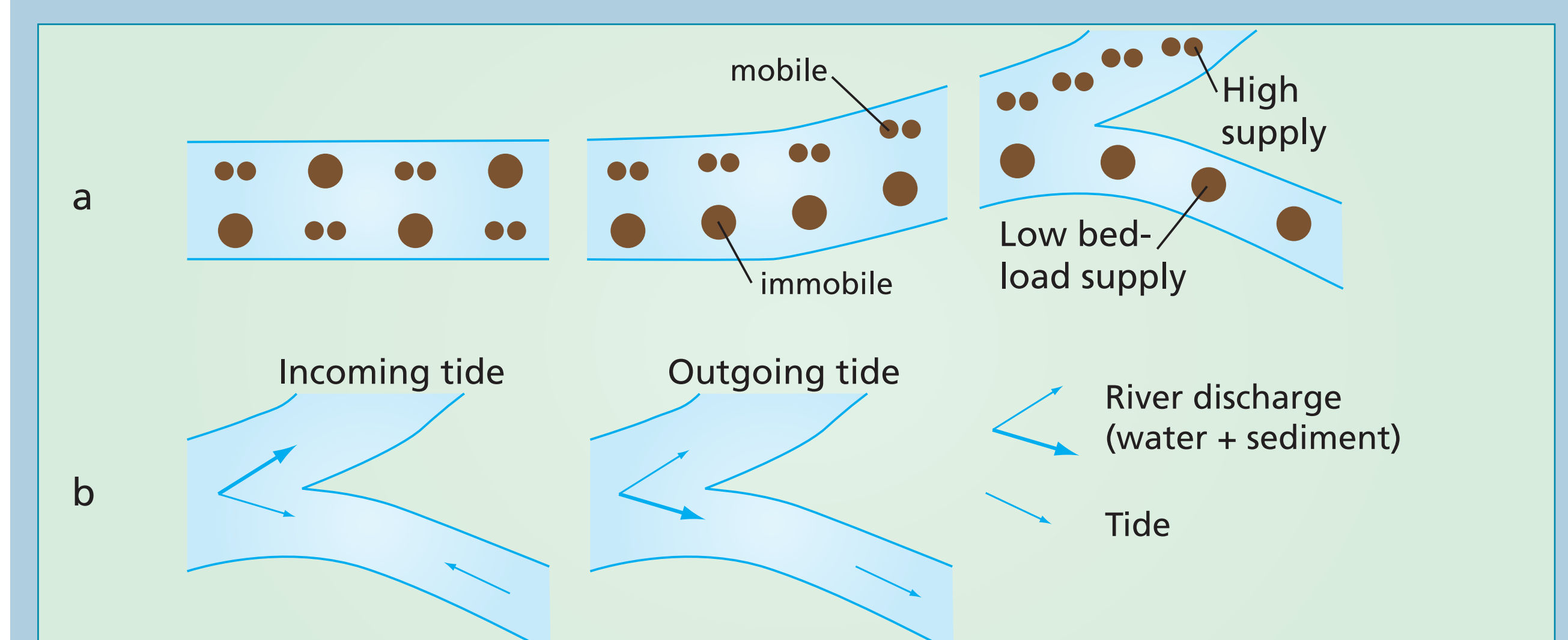
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- R. Frings, R. and Kleinhans, M., 2008. Complex variations in sediment transport at three large river bifurcations during discharge waves in the river Rhine. Sedimentology 55(5), pp 1145-1171.

### 2 - Division of water and sediment at tidal junctions

How do tides influence the division of water and sediment at river junctions? What does this mean for the water level and sediment budget?



Magnitude and direction of yearly average flow ( $m^3/s$ ) for a  $2200 m^3/s$  discharge at Lobith. Source: Snippen et al., 2005.



a) Bend sorting upstream of a bifurcation causes supply-limited transport conditions in one of the downstream branches. b) Tidal water level fluctuations cause cyclical variations in sediment distribution at river bifurcations. Figure from Frings and Kleinhans 2008.

### 3 - Fieldwork

13-hour measurements with LISST, ADCP and ABS at several tidal junctions. Multifrequency ADCP and ABS measurements will be applied for sediment size and transport.



LISST. Photo by Chris Roosendaal



ADCP. Photo by Chris Roosendaal

ABS. Photo by Marjolijn Witteveen