

# Tidal plume fronts, internal waves and sediment resuspension in a near field river plume

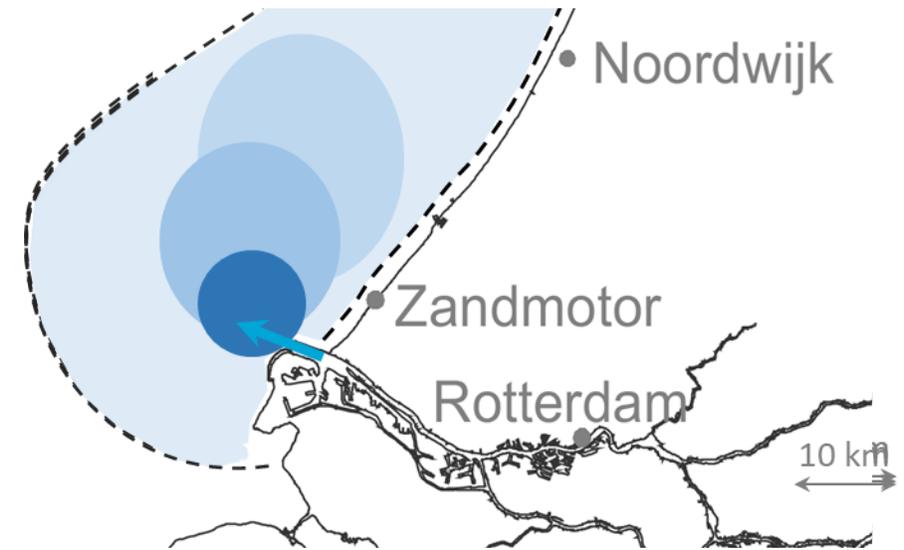
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Claire Chassagne



The near to mid-field plume is dominated by tidal plume fronts released every tidal cycle. (Flores, et al. 2017, Rijnsburger et al. 2018.)

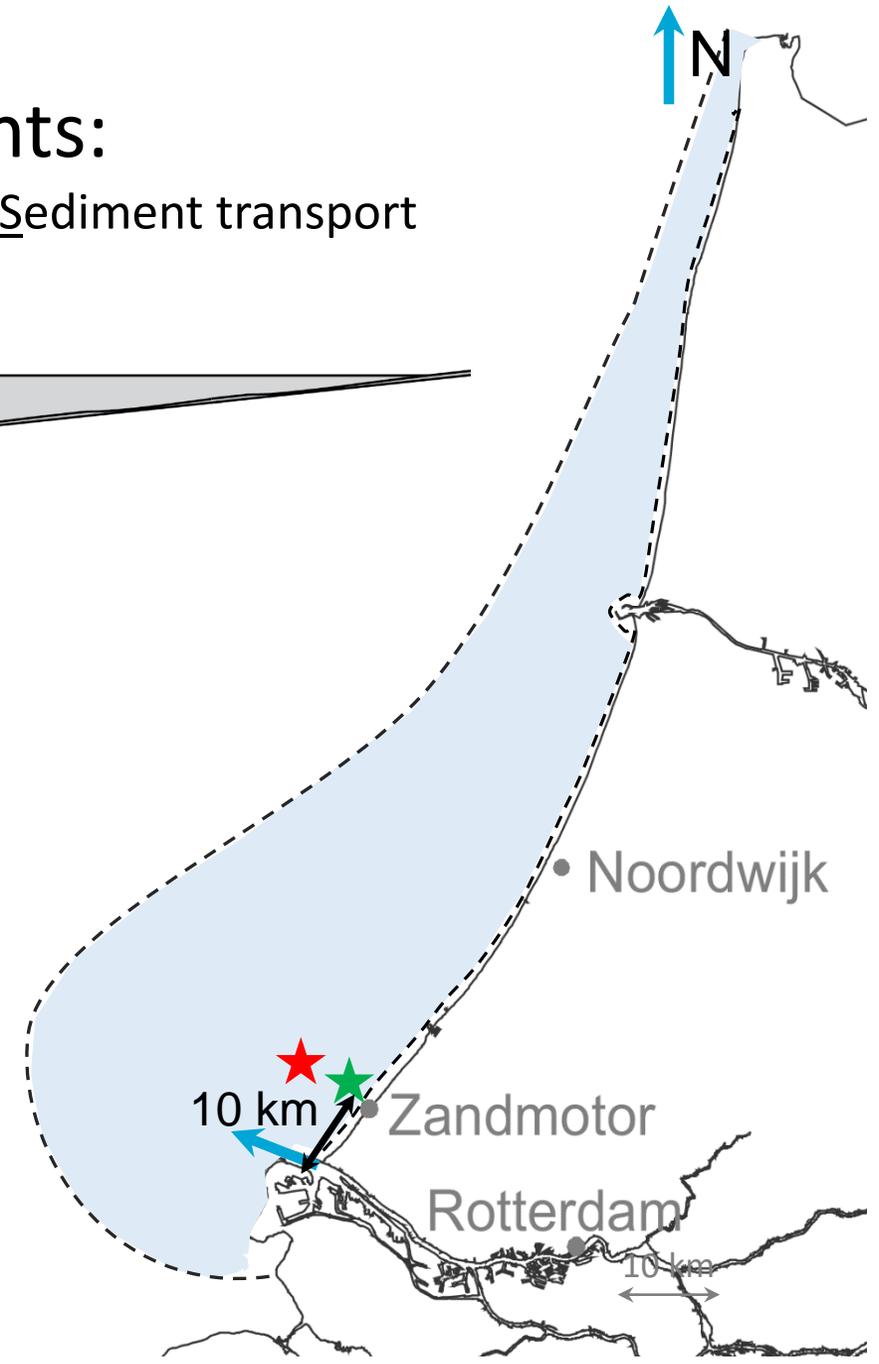
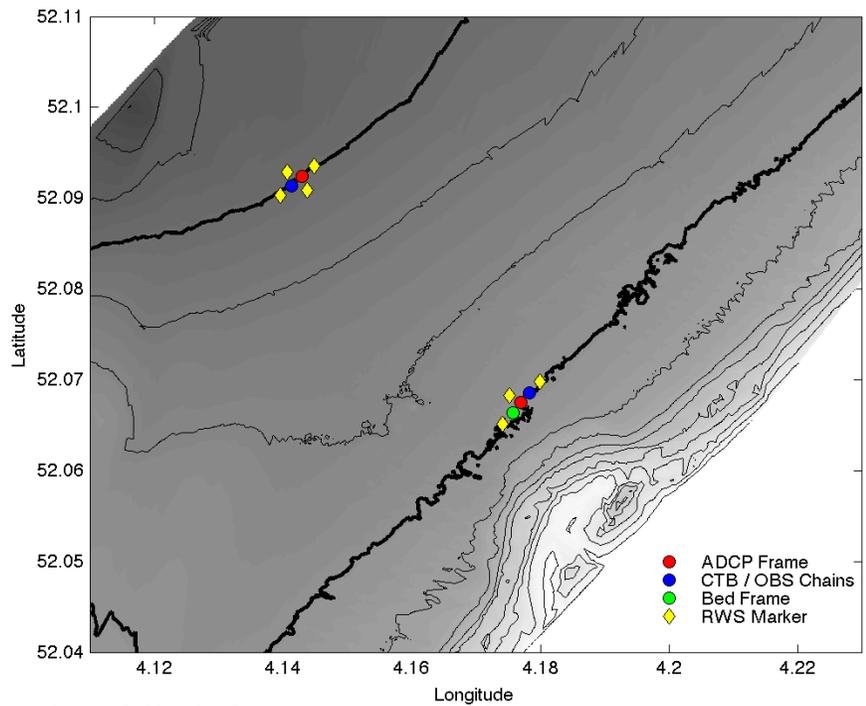
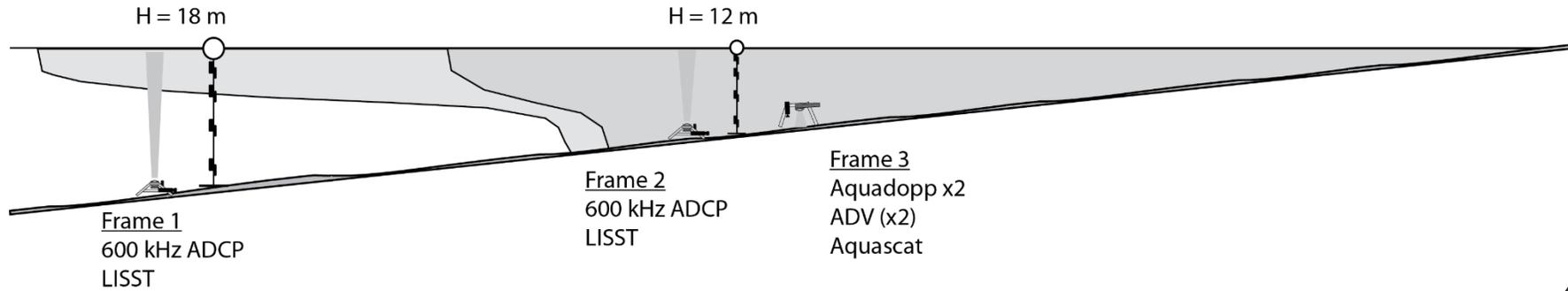
The tidal plume fronts can propagate to the coast.

Here we investigate what happens to sediment resuspension as the tidal plume fronts propagate to shore.

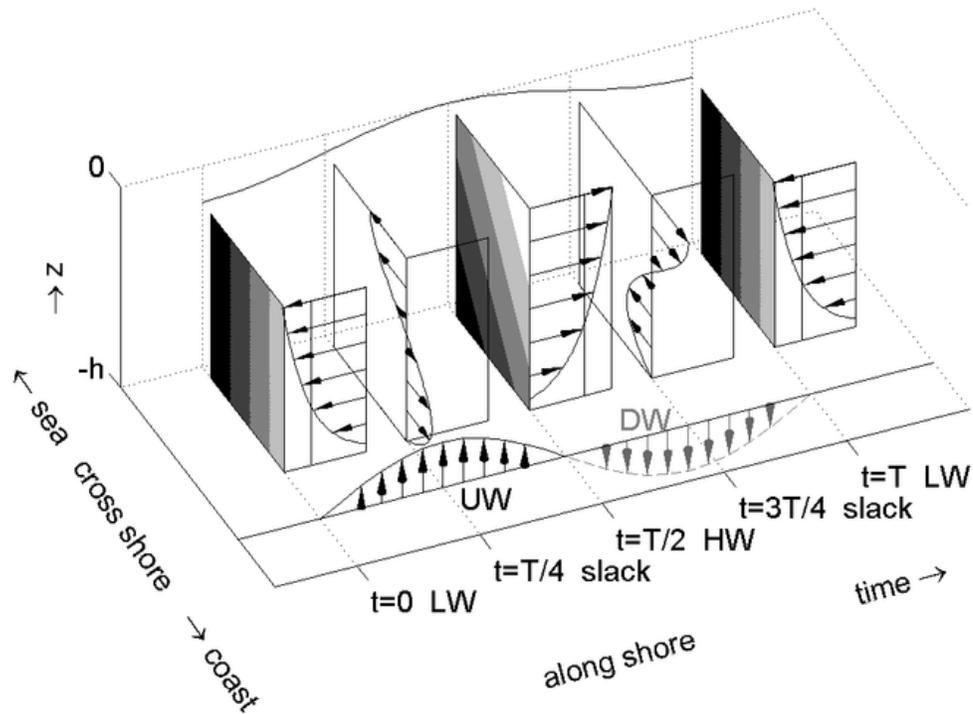


# The STRAINS experiments:

STRatification Impacts on Nearshore Sediment transport  
Feb-March 2013 and Sept-Oct 2014

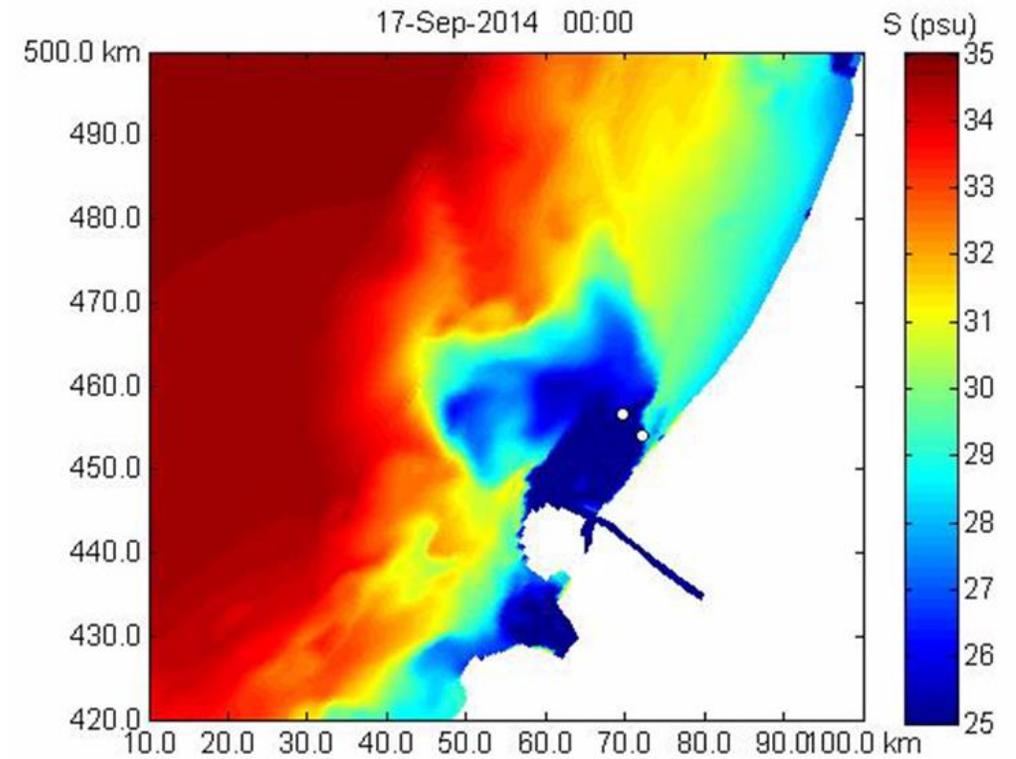


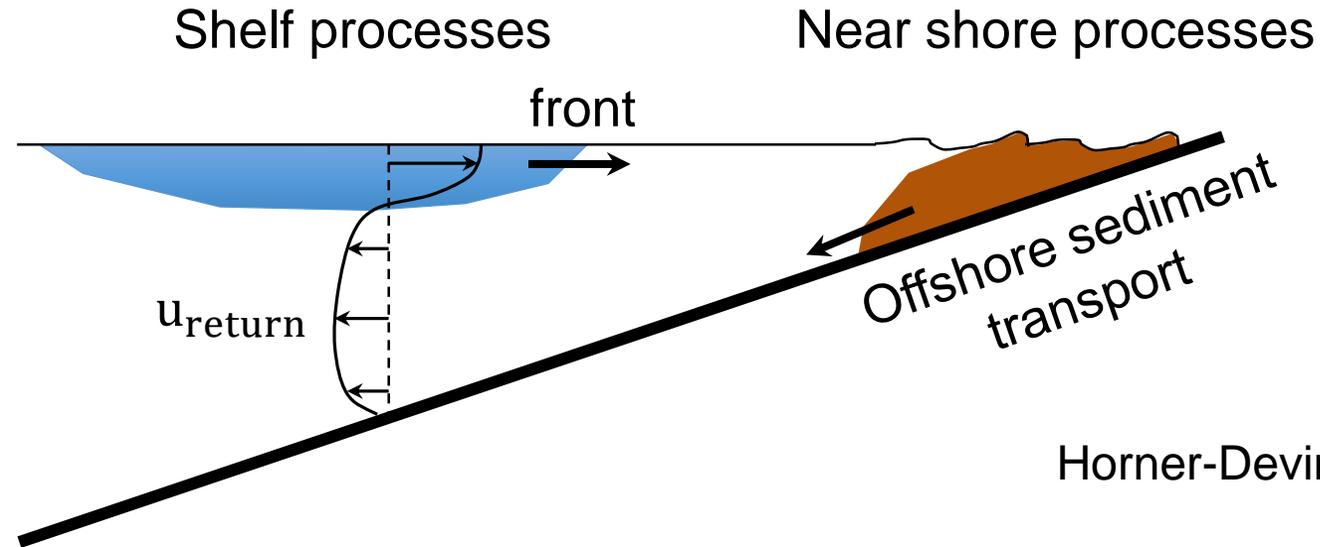
Tidal plume fronts are advected onshore by tidal straining



(De Boer, 2006)

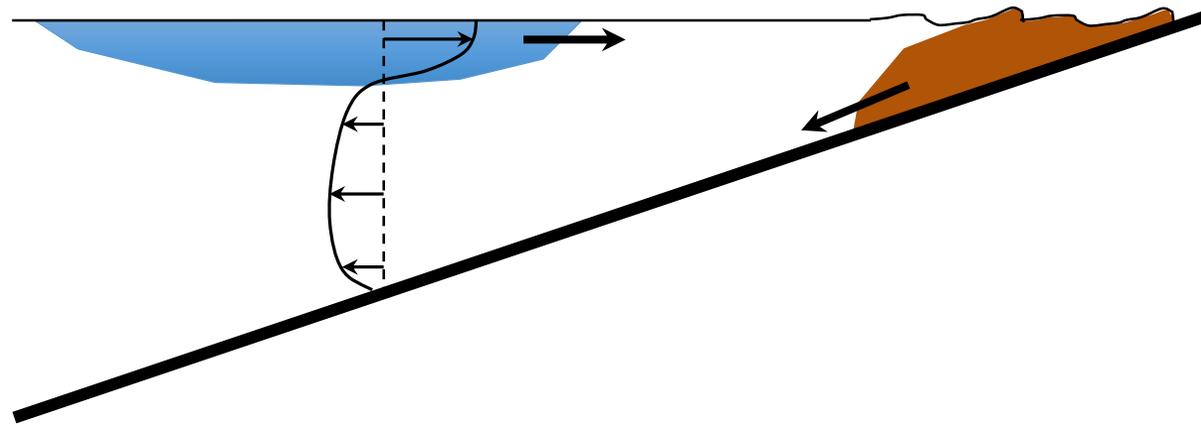
- Simulation of Rhine River Plume.
- White dots are the two field locations.





Horner-Devine et al. (2017)

1. Fronts propagates onshore
2. Sediment is resuspended nearshore by waves
3. Return flow moves suspended sediment offshore



- As the tidal plume fronts propagate to shore, internal waves break and mixing takes place.
- Fronts impact sediment resuspension near the coast.
- Return flow near bed moves sediment offshore.

# References

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- de Boer, G.J., Pietrzak, J.D., & Winterwerp, J.C. 2006. On the vertical structure of the Rhine region of freshwater influence. *Ocean Dynamics*, 56(3- 4), 198–216.
- Flores, R. P, Rijnsburger, S. Horner-Devine, A.R. Souza, A. J. & Pietrzak, J.D. 2007. The impact of storms and stratification on sediment transport in the Rhine region of freshwater influence. *JGR*. 122, 4456–4477
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