

Msc graduation project

Shallow jet dynamics on a streamwise topography

The Eastern Scheldt storm surge barrier is one of the primary flood-defence structures in the South-Western delta of the Netherlands. Since its construction, large scour holes have formed on both sides of the barrier, downstream of the applied bed protection. The scour holes locally reach depths of 60 meters w.r.t. an undisturbed depth of approximately 25 meters, and the scour is still ongoing. To improve understanding and predictability of this phenomenon a research program was started in 2015.

Characteristic for the flow at the Eastern Scheldt barrier are the large horizontal velocity differences and the local streamwise increase in water depth (at the scour hole). The behaviour of these types of flows over a sloping bathymetry is a relatively new research focus. A number of experiments have been performed in the waterlab, the most recent one being in the shallow water flume of 3 meters wide.



Possible topics for an MSc research project include (but are not limited to):

- Convergence vs divergence of streamlines; preliminary tests in a narrow flume showed two distinct behaviours of the mixing layer, either it contracted (in combination with flow attachment) or a strong divergence was observed.
- Relative influence of friction on the phenomena.
- Three-dimensional bathymetric changes; so far, only a linear slope uniform in lateral direction has been investigated.

We are looking for student(s) with an interest in theoretical fluid mechanics and turbulence. Affinity with Matlab or Python for processing large data-sets will come in handy. As lab-work can be a large part of the research, a hands-on, can-do mentality is strongly appreciated.

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