

Modelling the Western Scheldt navigation channel spring tide eddy at Ossenisse

S.E. Poortman¹, S. Bom², L. de Wit¹ & A.J. Blik¹

¹ Svašek Hydraulics, poortman@svasek.com, wit@svasek.com, bliek@svasek.com

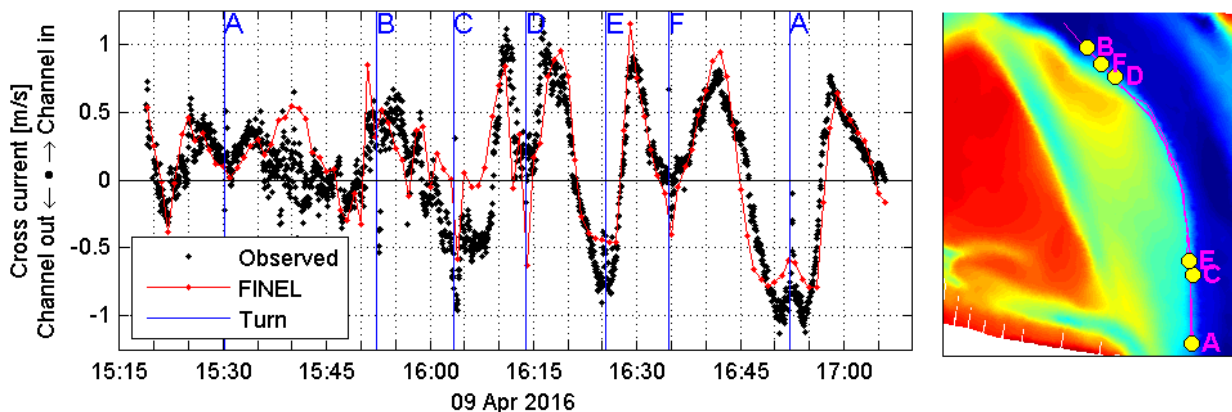
² TU Delft, sambom@live.nl

Abstract

During strong spring tides, east of Ossenisse an eddy is present in the Western Scheldt navigation channel, causing cross currents up to 2.5 m/s in the navigation channel (Royal Netherlands Navy, 2015). The cross current is troublesome for shipping and has in the past even led to ships running aground, for example the Fowairet in 2005. This accident has led to research on the cross current, consisting of several measurement campaigns and modelling efforts. The measurements in the area provided insight in the eddy behaviour and the circumstances in which the eddy arises, and since then warnings are issued when strong cross currents are to be expected.

Modelling the spring tide eddy however proved difficult. Settings of several available numerical flow model schematisations of the Western Scheldt have been adjusted in order to model the spring tide eddy near Ossenisse. Results have improved and a spring tide eddy is produced, but the location of the eddy and the timing of generation still deviate from reality (Deltares, 2013; LTV, 2013).

Recently, it is investigated whether it is possible to reproduce the Ossenisse spring tide eddy with the FINEL model package. By locally refining the triangular mesh and reducing the Nikuradse bed roughness, modelling the Ossenisse spring tide eddy with FINEL has succeeded. The model results are compared to several current measurements performed by Rijkswaterstaat, see an example on April 9th, 2016 below. The location of the eddy and the cross current are modelled well, although some deviations in the peak velocities are still visible. With FINEL now predictions of the Ossenisse eddy can be provided as well as better understanding of the driving mechanisms. It can also be used to develop local measures which reduce the hindering influence of the eddy on navigation.



Observed and modelled cross current in the navigation channel near Ossenisse. Note that the observations are sailed current measurement, and the location of the vessel varies in time. The moments the vessel turns around and the vessel track are indicated as well.

References

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