Ripples in the Scheldt

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The ecological and morphological qualities of the Scheldt estuary are under close consideration. A key indicator for the ecological quality of tidal flats is the mobility of the sediment, because stable beds provide more suitable habitats for sediment dwellers than flats that are constantly reworked. The aim of the research is to increase our understanding of the dynamics of the sediment bed and relate these dynamics to hydromorphological developments in the Scheldt estuary.

Rijkswaterstaat fabricates geomorphological maps of the inter-tidal and supra-tidal areas, based on (false-colour) aerial photographs. Geomorphic map units consist of mega ripple fields, flats, marsh and pioneer vegetation (not comprehensive). An important subdivision of the maps is in low energetic environments with limited bed mobility and high energetic environments with extensive bed mobility. The surface areas of the map units in the high-energetic environments from the maps of 1996 to 2012 have been determined and trends have been calculated.

The surface area of mega-ripple fields in the inter-tidal realm of the Western Scheldt shows a decrease from 1996 to 2012, with an average of 42 ha/y. Around 1100 ha of mega-ripple fields remain in 2012. Deviations up to 200 ha from the trend are observed. Older geomorphological maps and aerial photographs show even more extensive mega-ripple fields. The decline of the mega-ripple fields appears to be a long-term development in the Western Scheldt.

The decline of the mega-ripple fields occurs concurrently with the reduction of ebb- and flood chutes entering and cross cutting tidal flats. The presence of mega-ripple fields and ebb- and flood chutes coincides and the simultaneous decline may be coupled. Both developments are likely related to structural changes in tidal flow in the estuary and on and over tidal flats. Better grip on the processes that control the formation of ebb- and flood chutes and mega-ripple fields is vital for the management of the estuary.

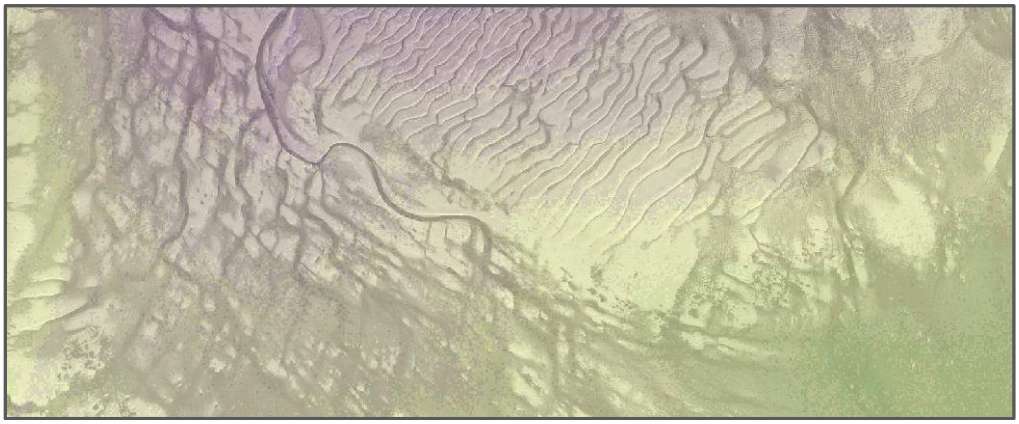

Figure 1. Intricate patterns of ripples and drainage channels on the Hooge platen West (2012 Combined Lidar – Rijkswaterstaat- and aerial photo Provincie Zeeland)