Geomorphological Mapping of Intertidal Areas with Object Based Image Analysis

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Key words: Coastal Zone Management; Geoinformation/GI; Remote sensing; Geomorphology, OBIA

SUMMARY

Rijkswaterstaat is manager of all the main watersystems in the Netherlands. For the management of the intertidal areas in these watersystems we produce geomorphological maps. These maps are produced on a regular basis only for the Western Scheldt and the Eastern Scheldt. The method used to produce these maps is based on manual mapping from false color aerial photographs. This method is labor intensive and therefore expensive, which is the reason why they were never made for the much larger systems as the Waddensea and the Eems-Dollard.

Utrecht University developed an automated method which uses Object Based Image Analysis. The advantage of using objects instead of pixels is that beside the spectral properties you can use form, texture and context for the classification (1). The classification is done in eCognition, using a ruleset where objects are stepwise assigned to classes. In total eight classes describing the geomorphology are recognized. The method is applicable on multiple water systems and on photographs of multiple years. As the method is sensitive to difference in quality and lightening conditions of the photographs, calibration on the main thresholds performed which are internally coupled with the rest of the ruleset (1).

The results are very good. The method is first developed on the Western Scheldt where the automated method agreed with the manual method for 73%. After some improvements it was tested on the Eastern Scheldt and the Waddensea. For the Eastern Scheldt the agreement with the manual method was 90% (1). For the Waddensea it was not possible to do a comparison with the manual method because the geomorphological maps where never made for these water systems. Here the results where validated by an expert of Rijkswaterstaat. This validation showed that 85% till 95% of the classification was correct (1). The production time for a watersystem as the Western Scheldt is for the manual method roughly 400 hours and for the automated method 80 hours. This reduces the

costs of geomorphological maps which makes it possible for Rijkswaterstaat to produce these maps also for large watersystems. Thanks to this new method we can produce geomorphological maps of the Waddensea and the Eems-Dollard.

1) Douma, H., E.A. Addink & M.G. Kleinhans (2019). Nadere uitwerking productie Geomorfologische Kaart met behulp van Object-Based Image Analysis voor de Waddenzee. Universiteit Utrecht, Departement Fysische Geografie, rapport i.o. Rijkswaterstaat CIV.

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