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## Morphological development of the Ameland inlet/Boschplaat in the Dutch Wadden Sea

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The eastern tip of the Island Terschelling (Boschplaat) has been eroding significantly over the last decades. The loss of valuable nature (such as Cupido's Polder) has raised the question whether this erosion will continue in the future. Historical data show a cyclic development of the morphology of the Ameland inlet and the adjacent island tips (having a period of 50 to 60 years). As part of this cycle the Boschplaat grows seaward and retreats (Israël, 1998).

In this research we aim to acquire more insight in the morphological state of the Boschplaat. Are we still in the eroding part of the cycle and how long will this last? We aim to answer this question by analysing and interpreting the morphological development of the Ameland inlet. Five different methods to determine changes in the sediment budget of coherent morphological units are developed.

The five methods of sediment budget analysis include the analysis of: aggregated grids, differences in surface determined by height intervals, polygons, the development of morphological units including sediment budgets, allocation and deformation and a combination of the previous methods. The penultimate method uses contour lines to determine (non-arbitrary) the morphological units, which can be followed through time. The last method uses positive and negative sediment budgets to automatically create coherent areas.

Using the new methods, the tidal channels in the inlet have been characterized separately, based on reference contour lines. The channel next to the Boschplaat (the Boschgat) shows a north-westward movement from 1971 to 1989, however it shows a slight south-eastward movement since 1999 (Fig. 1). The volume of this channel fluctuates, and is not showing a decrease. The channel situated in the east (the Borndiep) shows a westward movement in the most recent years and a decrease in volume.

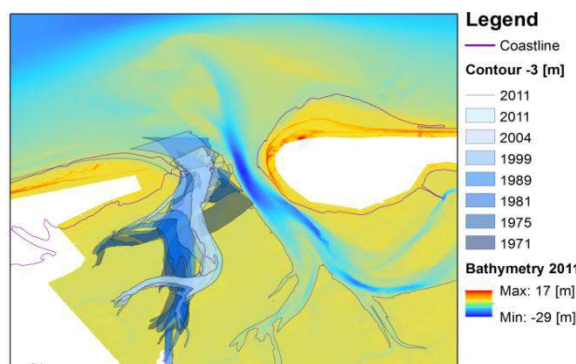


Figure 1. Development of Boschgat, Ameland inlet (development of morphological units)

The decrease in volume of the Borndiep and the relative stable volume of the Boschgat give the indication that the cyclic behaviour as described by Israël (1998) is not yet continuing. However, the direction in which the two channels are migrating might indicate that the system will change into a one-channel inlet. This is an indication of the continuation of the cyclic behaviour, in contradiction to the volume development of the channels.