

Comparison Between Predicted And Observed Large-scale Sea Bed Features

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This paper describes whether a specific bed pattern prediction model is able to make correct predictions in the Southern North Sea. These predictions are compared to the observational knowledge on large-scale patterns in the North Sea bed.

On the most aggregated level the morphodynamic model [Hulscher, 1996] predicts only absence or presence of sea bed patterns: tidal sand banks, sand waves and parallel ridges. This prediction is based on two physical parameters: the Stokes number E_v and the resistance parameter S . A simple sub-model has been constructed in order to produce local estimates for E_v and S . This sub-model relates for E_v , S to the roughness height z_0 and ϵ , a parameter describing the viscosity profile.

The order of magnitude of the predictions is correct, which means that for realistic values of the input parameters all types of observed patterns are indeed predicted in the North Sea. Even North Sea uniform input for z_0 and ϵ yields predictions showing patchy behaviour of the patterns, like observed. If the spatial variations of z_0 and ϵ , will be included in a certain way, this will lead to an even stronger patchy character of the North Sea bed pattern distribution. For the major part of the observed patterns it has explicitly been shown that there are input parameters which predict the pattern as locally observed; of course, this is only true from an aggregated point of view. The present study shows that the presence of large-scale sea bed patterns can be, in a global way, predicted by the model. Due to the assumptions underlying this model it implies that the bed patterns in the Southern North Sea can be explained as the result of long-term bed-tide interactions.

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References

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