Impact of groyne fields on the littoral drift: A hybrid morphological modelling study - DTU Orbit (09/11/2017)

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This paper concerns numerical modelling of the impact on the littoral drift and the shoreline from groynes forming a field of equidistant and identical groynes. The most important effect of a groyne on the shoreline morphology is that the littoral drift is blocked completely or partially. A local reduction in the littoral drift around the groyne introduces alongshore gradients in the alongshore sediment transport and sedimentation and erosion around the groyne which will cause re-orientation of the bed contours towards the prevailing wave direction until an equilibrium is reached. A discussion of this mechanism is presented including effects of scales, e.g. the effect of the relative length of the groynes (compared to the width of the surf zone).The model results indicate a strong dependency of the reduction in littoral drift on the initial geometric bypass ratio (Q_{geo}*), which is defined from the groyne length and the littoral transport on the undisturbed coastline Q_{geo}* is the transport occurring outside the tip of the groynes divided by the total transport. It is found that the sensitivity of the littoral drift to variations in groyne spacing and the angle, of the approaching waves, is inversely proportional to Q_{geo}*.

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