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Verfügbar unter/Available at: <https://hdl.handle.net/20.500.11970/105971>

Vorgeschlagene Zitierweise/Suggested citation:

Nasermoaddeli, Mohammad Hassan; Kösters, Frank; Lemmen, Carsten; Wirtz, Kai; Klingbeil, Knut; Hofmeister, Richard; Burchard, Hans (2015): Modelling effects of benthic organisms on sediment Transport and challenges. Poster präsentiert bei: Symposium "Küste 2025".

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Modelling effects of benthic organisms on sediment transport: past, present and future (38)

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In spite of the progresses made over the last decades in the understanding of sediment transport processes the forecasting capabilities of models are limited, due to the complexity of processes, such as biologically-mediated sediment transport.

Benthic organisms may stabilize or destabilize the sediment by altering erodibility, critical bed shear stress, roughness, mud content, sediment aggregation or settling velocity. Near bed flow velocity and thereby bed shear stress can be further affected by the biogenic structures of benthic organisms. Biodeposition and resuspension as well as fecal pellet production affect near bed sediment concentration.

A generic platform has been developed here, allowing the representation of biological effects of an unlimited number of benthic organisms provided that these effects have been parameterized. This model was coupled via the MOSSCO (MOdular System for Shelves and Coasts) framework to study the biological effects of the bivalve *Tellina fabula* and microphytobenthos in the North Sea. First results show the expected biologically-mediated amplification and attenuation of the sediment concentration in the water column.

With current available data, however, it is rather difficult to verify and validate such complex models, because simultaneous measurements of hydrodynamic, morphological and biological parameters are rarely available. Therefore, we recommended to focus future research in this topic on two main aspects: firstly, by gaining knowledge on the effect of biota on the sediment transport at community level by means of laboratory and field measurements and secondly by developing functional trait-based approaches to quantify the corresponding effects on the sediment transport.