A three dimensional numerical simulation of current induced sediment processes - A comparison to experimental work MARKUS BURKOW, Institute for Numerical Simulation, University of Bonn — Current driven sediment transport causes the evolution of bedforms like dunes, ripples or scour marks. These bedforms are formed by the interaction of entrainment and deposition of sediment particles. In this study we use a numerical simulation of the three dimensional fluid flow and the simultaneous transport processes to reproduce these processes. To solve the incompressible two-phase Navier-Stokes equations we use NaSt3D as fluid solver for incompressible flow problems in three dimensions. High order schemes are applied for spatial as well as for temporal discretization. Bed load transport as the main agent responsible for building up bed forms is modelled by the Exner equation. The rearrangement of sediment leads to a new sediment surface height which results in new bedforms. To test our model we compare our results to flume experiments concerning scour erosion at obstacles carried out at Department of Geography, University of Bonn. And as a two-phase example experimental results concerning splash-erosion are compared to our simulations. In both examples simulation and experiment are in good agreement.

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