

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Turbulent dynamics over evolving three-dimensional sandy rippled beds ALLISON PENKO, JOSEPH CALANTONI, Naval Research Laboratory — Ripples on the seafloor affect the development of the wave bottom boundary layer impacting wave energy dissipation and sediment transport. Using a three-dimensional numerical model, SedMix3D, we simulate the complex turbulent flow of a fluid-sediment mixture over a rippled bed and the subsequent three-dimensional bed evolution. In general, results from SedMix3D are in excellent agreement with laboratory observations of time-dependent vorticity and swirling strength fields, ripple geometry characteristics, and statistically averaged flow quantities. We present simulations of evolving rippled beds of varying initial topographies with domains covering areas of the seafloor up to 12 cm x 24 cm with a vertical extent up to 24 cm. A significant difference between the spatial distribution of turbulence over three-dimensional ripple structures and two-dimensional parallel ripples is observed in the simulations. We also examine the effect of the turbulence on the maintaining and evolution of the two- and three-dimensional ripple structures.

Allison Penko
Naval Research Laboratory

Date submitted: 02 Aug 2011

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