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Wave Induced Sediment Transport

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ASSERT Award #: N-00014-95-1-0840

LONG-TERM GOALS

The original scope of this ASSERT grant was the same as the mother grant N00014-89-J-3128 under the former title Mechanics of the Seabed. Primary goals were to study (1) the formation of ripples and sandbars under progressive and partially standing surface waves, as these bed features may be of importance to mine burials, and (2) The role of shear in the wave boundary layer for augmenting the effective diffusion of suspended sediments.

OBJECTIVES

To perform experiments for checking as well as guiding the theoretical work on ripples and sandbars by Ph.D. candidate Ms. Jie Yu. Laboratory observations were made in a small wave flume on the evolution of ripples and sandbars under a standing wave above a sand layer.

APPROACH

A small wave flume with glass walls (5 m length, 0.3 m height, 0.3 m width) was constructed with a precision motor. A horizontal layer of fine sand with diameter from 0.1 to 0.2 mm was laid on the flume bed. Visual observations were made on the growth of ripples and sandbars.

RESULTS

Only qualitative results have been obtained so far. Scaling effects are found to be important. While the sand diameters are close to those in nature, the wave amplitudes, water depth, and wavelength are considerably smaller in the laboratory. As a consequence, only very small-scale ripples (5 cm wavelength) are easily reproduced while the sandbars generated are too small to model the sandbars in nature. One important observation is that mature ripples are quite steep as to cause vortices leading to significant suspensions. These qualitative results imply that suspended load is quite important in the total budget of sediment transport.

IMPACT/APPLICATIONS

While more quantitative experiments awaits further experiments, planned for next year, the visual observations has convinced us that except at the initial stage of ripple instability, suspended load is as important as the bed load. We are therefore working on a theory incorporating both.

RELATED PROJECTS

Efforts made in this grant are for supporting (guiding) the theoretical work on sandbars in N00014-89-J-3218.

REFERENCES

Sammarco, Tran and Mei, 1997a: "Subharmonic Resonance of Venice Gates in Waves, Part I. Evolution Equation and Uniform Incident Waves," *J. Fluid Mech*., 295-326.

Sammarco, Tran, Gottlieb and Mei, 1997b: "Subharmonic Resonance of Venice Gates in Waves, Part II, Sinusoidally Modulated Incident Waves," *J. Fluid Mech*., 327-360.

PUBLICATIONS

Mei, C.C., Chien, C. M., and Ye, F., 1998: "Transport and Resuspension of Fine Particles in a Tidal Boundary Layer Near a Small Peninsula," *J. of Physical Oceanography*, Vol. 28, 11, 2313-2330.

Mei, C.C., 1999: "Mild-Slope Approximation for Long Waves Generated by Short Waves," *J Engineering Mathematics*, Feb. 1-15.