Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Wave Driven Fluid-Sediment Interactions over Rippled Beds[1] DIANE FOSTER[2], University of New Hampshire, CLAIRE NICHOLS, Ohio State University — Empirical investigations relating vortex shedding over rippled beds to oscillatory flows date back to Darwin in 1883. Observations of the shedding induced by oscillating forcing over fixed beds have shown vortical structures to reach maximum strength at 90 degrees when the horizontal velocity is largest. The objective of this effort is to examine the vortex generation and ejection over movable rippled beds in a full-scale, free surface wave environment. Observations of the two-dimensional time-varying velocity field over a movable sediment bed were obtained with a submersible Particle Image Velocimetry (PIV) system in two wave flumes. One wave flume was full scale and had a natural sand bed and the other flume had an artificial sediment bed with a specific gravity of 1.6. Full scale observations over an irregularly rippled bed show that the vortices generated during offshore directed flow over the steeper bed form slope were regularly ejected into the water column and were consistent with conceptual models of the oscillatory flow over a backward facing step. The results also show that vortices remain coherent during ejection when the background flow stalls (i.e. both the velocity and acceleration temporarily approach zero). These results offer new insight into fluid sediment interaction over rippled beds.

[1]We would like to acknowledge support fromthe Nationa Science Foundation.
[2]My affiliation has changed from Ohio State to UNH.

Diane Foster
University of New Hampshire

Date submitted: 06 Aug 2008 Electronic form version 1.4