

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Hydrodynamic instability and rip current generation¹ JIE YU, ALI MARJANI, North Carolina State University — Rip currents are jet-like offshore flows which are part of the horizontal cell circulations originating inside the surf zone. It is generally acknowledged that alongshore variations in the wave field are essential to rip current generation, however, such a variability can arise from a variety of processes. We present here a linear instability analysis and show that the coupling of waves and evolving currents can lead to a positive feedback, generating rip currents in a system initially alongshore uniform. Preliminary results based on a simplified beach profile show that circulations with alongshore spacing of a few hundreds meters can be initiated by the instability on beaches of typical water depth. Qualitative agreements with observations of natural rip currents are obtained. Extension to complex beach bathymetry is made, and some results are discussed.

¹This work is supported by National Science Foundation (Grant CBET 0756271).

Jie Yu
North Carolina State University

Date submitted: 07 Aug 2009

Electronic form version 1.4