

Abstract Submitted
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Experimental measurement of vorticity flux across the interface of an unsteady breaking wave JESSE L. BELDEN, ALEXANDRA H. TECHET, MIT Department of Mechanical Engineering — The nature of the vorticity and vorticity flux on the air and water side of an unsteady breaking wave is examined using fully time-resolved Particle Image Velocimetry (PIV), with the aim of better understanding the physics of air-sea interaction. Results reveal regions of strong vorticity in the air, in the absence of wind, as well as distinct vortical regions in the water beneath the crest region, which persist through the breaking process; these regions of vorticity are mechanisms for mixing and transport. The near-surface vorticity is correlated with the viscous flux of vorticity at the surface on both sides of the air-water interface to gain further insight into the physical processes during breaking. The method used to calculate vorticity flux follows the methods presented in previous work [1,2]. Using this analysis, the physical flow characteristics associated with the vorticity flux can also be examined. [1] Gharib, M. and A. Weigand, *J. Fluid Mech.* 321:59–86 (1996). [2] Dabiri, D. and M. Gharib, *J. Fluid Mech.* 330:113-139 (1997).

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