

Abstract

Babanin and Haus (J Phys Oceanogr 39:2675–2679, 2009) recently presented evidence of near-surface turbulence generated below steep non-breaking deep-water waves. They proposed a threshold wave parameter $a^2\omega/\nu = 3,000$ for the spontaneous occurrence of turbulence beneath surface waves. This is in contrast to conventional understanding that irrotational wave theories provide a good approximation of non-wind-forced wave behaviour as validated by classical experiments. Many laboratory wave experiments were carried out in the early 1960s (e.g. Wiegelt 1964). In those experiments, no evidence of turbulence was reported, and steep waves behaved as predicted by the high-order irrotational wave theories within the accuracy of the theories and experimental techniques at the time. This contribution describes flow visualisation experiments for steep non-breaking waves using conventional dye techniques in the wave boundary layer extending above the wave trough level. The measurements showed no evidence of turbulent mixing up to a value of $a^2\omega/\nu = 7,000$ at which breaking commenced in these experiments. These present findings are in accord with the conventional understandings of wave behaviour.

"Artículo publicado en Journal of Experiments in Fluids, ISSN: 0723-4864 (Print) 1432-1114 (Online), en mayo del 2012, para descargas seguir el [vinculo](#) "