Geophysical Research Abstracts,
Vol. 11, EGU2009-154, 2009
EGU General Assembly 2009

Nonlinear Waves, Instabilities and Observational Data

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Evidences tell us freak waves are difficult to deal with from a scientific point of view. Though it is generally accepted that in deep water the mechanism involved in the generation is modulation instability there are some doubts about the way such giant waves can appear on a relatively calm sea. Partly the problem could be, it has been pointed out, that the so called evolution equations, as for instance Schrödinger nonlinear equation (Benjamin-Feir, 1967, Zakharov, 1968) , are valid for little wave steepness, that we know is not the case with freak waves. Further enhancements of this equation(Trulsen and Dysthe, 1996) have enlarged something the scope. On the other hand, statistical description gives us another tool to cop with the problem, not without some shortcomings also.

However, as the matter of fact, freak or extreme waves are present in our seas causing accidents, casualties and damages. For that reason the main aim of this research is to collect data from past records in order to see how near or how far we are of the expected conditions to the formation of freak waves, assuming them to be generated in a nonlinear process on surface waves .The approach is going to be carried out on a specific case where the above conditions presented themselves, using wave records both, previous and simultaneous, to the location from a nearby station(a deployed buoy). For that end, we are going to use some parameters, as wave steepness, shape of the wave, asymmetry ,nonlinearity etc., in an attempt to check the theory with observational data.