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## Small waves can produce monster waves

**Normal waves can unexpectedly turn into waves the size of a ten-story building. What's more, these monster waves arise many times more rapidly than was previously thought. This has been shown by researchers at Umeå University in Sweden.**

It is generally known among seafarers that in normal waves you can suddenly stand eye to eye with 25- to 30-meter waves, so-called monster waves. Unlike a tsunami, which is formed by powerful earthquakes at the bottom of the sea, monster waves arise out to sea among regular waves caused by winds. These monster waves are believed to have caused many shipwrecks through the years, and it is well known that oil platforms, like those off the Norwegian coast, are occasionally shaken by these waves.

Now, under the direction of Padma Shukla, scientists Bengt Eliasson, Mattias Marklund, and Lennart Stenflo of Umeå University, and Ioannis Kourakis of Ruhr-Universität Bochum, Germany, have shown that normal random small waves, from gusts of wind, for instance, can suddenly give rise to monster waves. If the conditions are right, these monster waves grow by 'borrowing' energy from surrounding waves, a so-called non-linear effect, and these scientists have now managed to use computer simulations and other methods to produce images of how these waves are created. The results achieved by the Umeå researchers also show that such waves grow to enormous proportions many times more quickly than was previously believed.

“The consequences of an encounter with monster waves are catastrophic for those working on ships and oil platforms. These new research findings can enhance our knowledge of how and why monster waves form. Detailed knowledge of this phenomenon will be a cornerstone in finding methods to predict the course of these waves,” says Mattias Marklund, professor of physics at Umeå University.

Since monster waves appear to come out of nowhere and do not have the properties we usually associate with waves, stories of monster waves have previously been viewed as tall tales. In recent years, however, satellites have been used to observe how these waves suddenly appear, only to disappear just as suddenly. The findings from these observations have led to the insight that monster waves occur much more frequently than was ever suspected.

These findings are presented in the scientific journal Physical Review Letters.

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