EMS Annual Meeting Abstracts
Vol. 13, EMS2016-29, 2016
16th EMS / 11th ECAC

The Draupner wave: a fresh look and the emerging view [U+10FC00]

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Using the new high-resolution fully coupled ocean-wave-atmosphere ECMWF operational model, we revisit the storm during which the Draupner freak wave of January 1, 1995 was recorded. The model gives a realistic evolution of the storm highlighting the crucial role played by the southward propagating polar low in creating the extreme wave conditions present at the time the freak wave was recorded. Starting from a higher resolution ERA-interim reanalysis, 25 instead of the standard 80 km, the predictability horizon of the Draupner freak wave event with the new high resolution ECMWF model is still only one day, since analyses of the previous days, including the previous December 31, do not result in the development of the polar low. A detailed analysis of the probability of occurrence of these supposedly freak wave events is given. Granted the presence of these large waves in the ocean, it is argued that these events are not physically exceptional. For a given average sea state, as characterized by the significant wave height, they are part of the expected reality of the ocean, the key point being the probability of encountering them. In this respect the often considered record at a specific location can be misleading because the probability of detecting a freak wave must be considered in space and time. A full four-dimensional record (three in space + time) of the sea surface, as nowadays it is possible, clarifies well this point.