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Statistical properties of extreme wave groups based on field data

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An extreme wave always evolves from a wave group in random wave trains. Therefore, better insights into extreme wave groups are crucial for the safety design of marine structures. In the present work, the marginal and bivariate distributions of extreme wave group energy and duration are investigated based on the field datasets from Norway's North Sea. The most probable extreme wave group energy and duration can be obtained based on the distributions, then evolutions of wave shapes of extreme wave groups are investigated and compared with the present extreme wave group theories. It is found that the wave shapes are asymmetry with time-spatial evolution.