

EGU21-14606

<https://doi.org/10.5194/egusphere-egu21-14606>

EGU General Assembly 2021

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On the space-time maximum oceanic waves and related sea-state parameters during the tropical storm Kong-rey (2018)

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The characteristics of the space-time extreme value statistics of maximum oceanic waves under the tropical storm Kong-rey (2018) is investigated in the Northwestern Pacific Ocean (Yellow Sea and East China Sea). We base our composite analysis upon space-time 3D measurements of the sea surface elevation field and wave model frequency/direction spectra. We focus on the highest individual waves that may develop at short-term/range under the cyclonic winds and we consider the spatial distribution around the storm centre of two main variables of interest, namely the maximum sea surface elevation (crest height) and the maximum wave height. Their expectations are linked to characteristic parameters of the sea state, such as the significant wave height, the mean steepness, the directional spreading, the bandwidth, of which we extend the meaning in the temporal domain in order to include the 3D geometry of the wave field. Our results evidence the sea regions where the highest individual waves may be expected and highlights, via scale analysis, the main mechanisms responsible for the generation of space-time extreme conditions.