



Extreme waves at Polar front of North Atlantic from 2000 to 2009

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Surface elevation measurements obtained by a ShipBorne Wave Recorder (SBWR) at Station Mike (66 N, 2 E) in Norwegian Sea are analysed. The data were collected by the Norwegian Meteorological Institute (DNMI) during the period 2000-2009. The analysis is focused on extreme wave records which have an Abnormality Index (AI) higher than 2. We also analyse the frequency of occurrence of waves over 6 m in height which we call giant waves. We found that the annual maximum of the extreme wave fails to reach up the annual maximum of the giant wave in most of years. The largest extreme wave found was 22.0 m and occurred on January 11st 2006 during a period of time when the significant wave height was ~ 10.7 m, while the largest giant height was 25.6 m and occurred on November 11st 2001 when the significant wave height was 15.2 m. We could not detect any trends in the occurrence of extreme waves over the decade in question. However the number of giant waves observed show an increasing tendency with time. The annual mean of the extreme wave height increased from 4.6 m to 6.0 m between 2001 and 2009. During the same period the significant wave height H_s remained the same.

Wind speed records from the same ship correlate well with the maximum wave height but not with the AI which was also found to be independent of seasonality and corresponding wind speed.

The annual mean of the extreme wave height was found to correlate with the winter NAO which also correlates with H_s and H_{max} . But it is ambiguous to say that AI correlates with the seasonal NAO as well.

The suitability of the Rayleigh distribution to describe the probability of giant waves under various AI conditions will also be discussed.