



Supplement of

The relationships between extreme winter North Atlantic extratropical cyclone hazards and modes of seasonal climate variability

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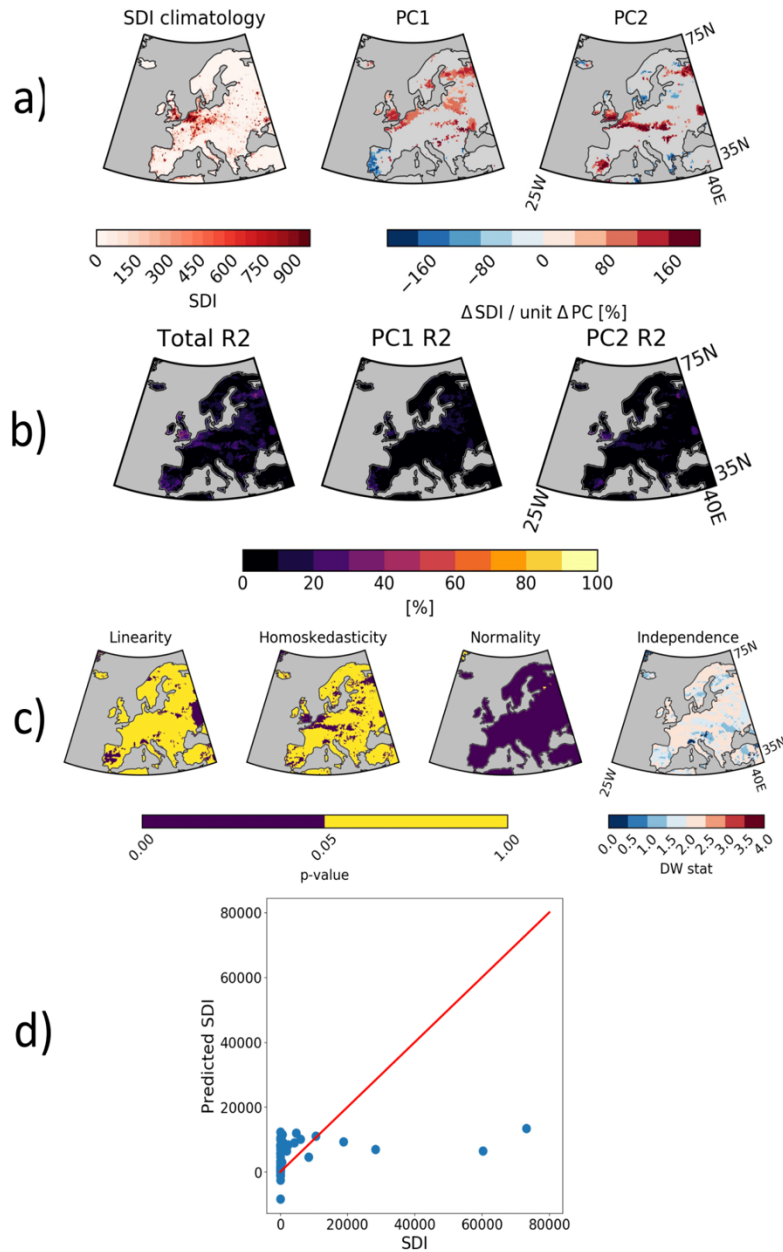


Figure S1: Performance of the linear regression model for the winter Storm Damage Index (SDI). (a) Climatology and regression coefficients onto PC1/PC2. (b) Total R² and PC1/PC2 R². (c) Linearity, homoskedasticity, normality and Independence measures for goodness of fit. Yellow is non-significant p-value at the 95% level, indicating the residuals satisfy the assumptions of the regression model. Purple means significant deviations in the residuals from the underlying assumption of the regression model, indicating a poorer fit. DW = 2 means zero autocorrelation in the residuals, DW < 2 means positive autocorrelation and DW > 2 means negative autocorrelation. (d) Example regression performance at a typical gridbox (1.875°E, 52.125°N).

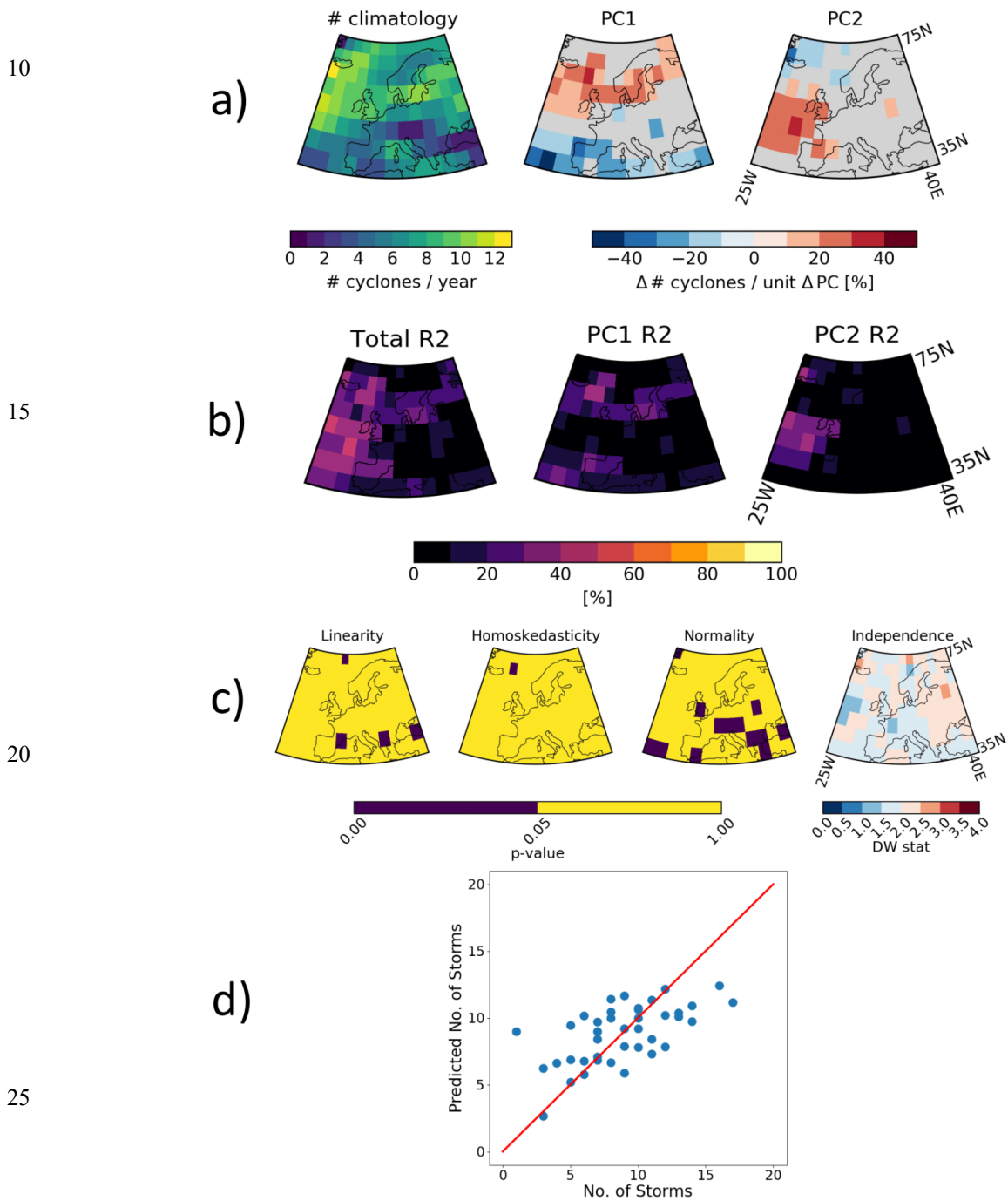
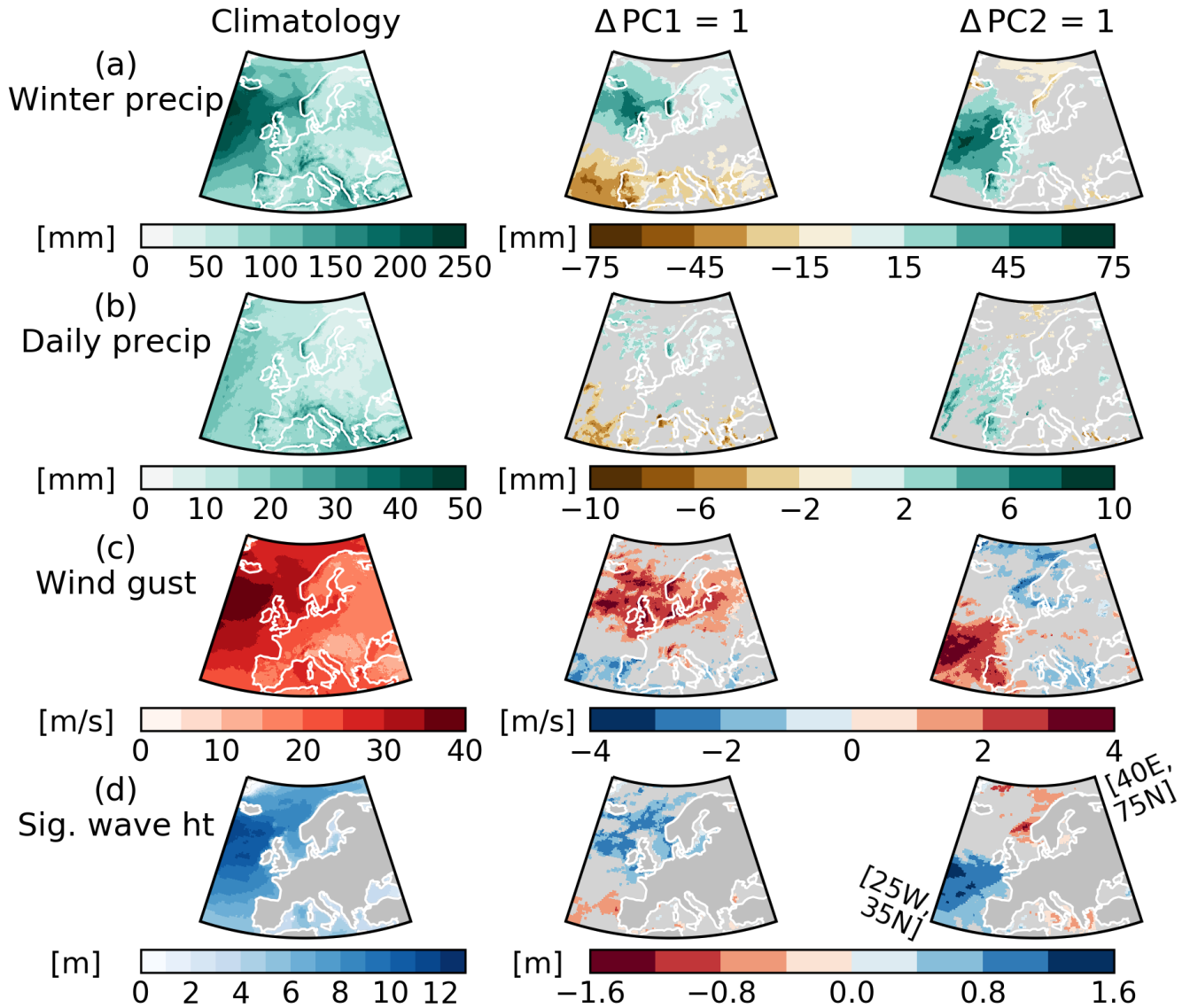


Figure S2: As in Figure S1, but for the winter storm count. (d) shows gridbox (5°E, 55°N).

Maximum for all cyclones in a winter, ERA5 1981-2020



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Figure S3: Maximum winter ETC hazards for (a) winter total precipitation from ETCs [mm], (b) maximum daily precipitation [mm], (c) 10m wind gust [m/s] and (d) maximum significant wave height [m] for (left column) climatology, (middle column) regression onto PC1 and (right column) regression onto PC2. Note significant wave height is only defined over ocean points. Grey areas in middle and right columns denote regions where the regression slope is not significantly different from zero at the 95% confidence level.

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Validity of PC12 for all cyclones, ERA5 DJF 1981-2020

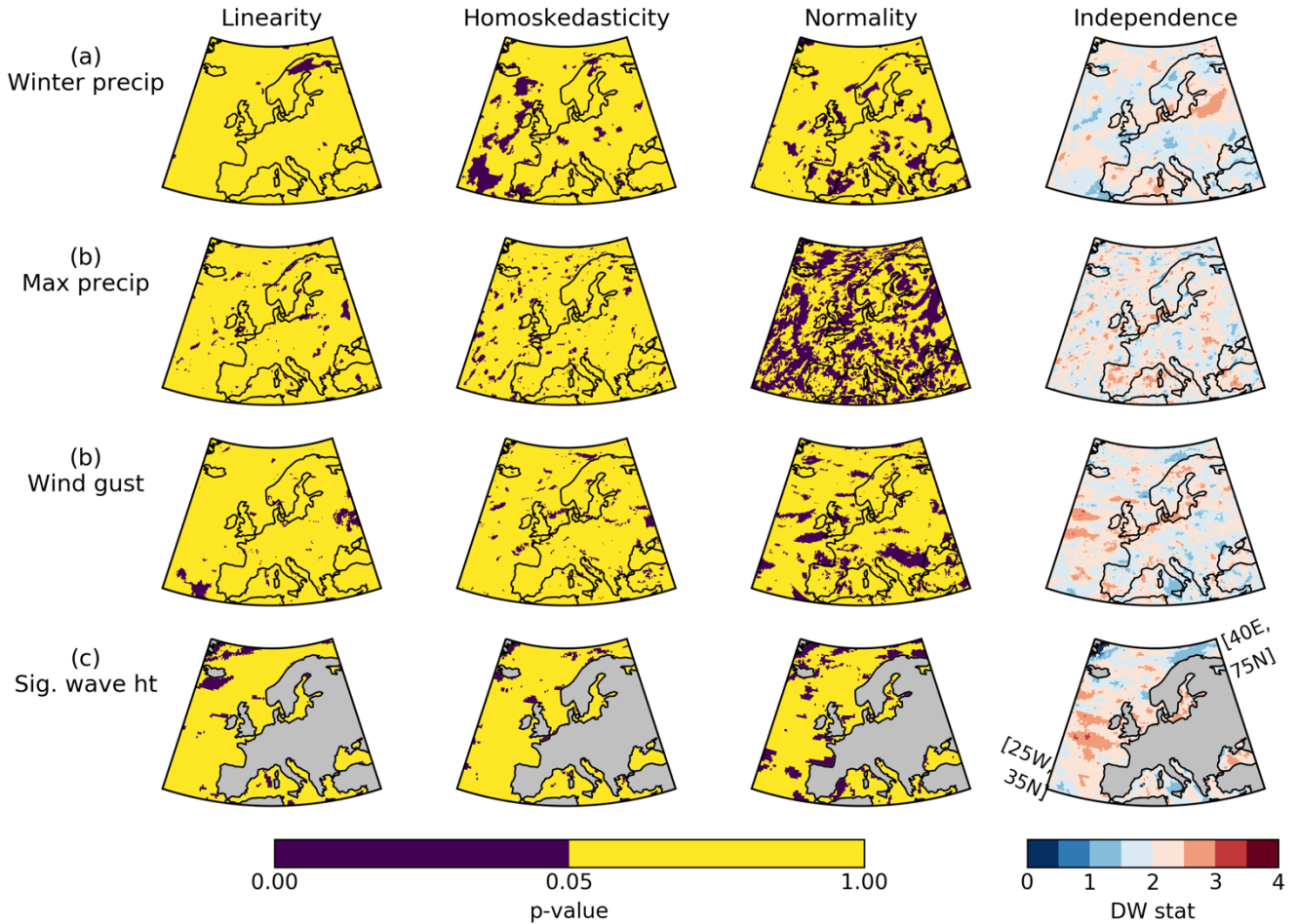


Figure S4: Measures of performance of the linear regression model for ETC hazards regressed onto PC1+PC2 for (a) winter total precipitation from ETCs, (b) maximum daily precipitation, (c) maximum 10m wind gust and (d) maximum significant wave height. Measures are (left) linearity, (second left) homoskedasticity, (second right) normality and (right) Durban Watson independence statistic. Yellow means a non-significant p-value at the 95% confidence level, indicating the residuals satisfy the underlying assumptions of the regression model. Purple means there are significant deviations in the residuals from the underlying assumption of the regression model, indicating a poorer fit. For the DW statistic a value of 2 means zero autocorrelation in the residuals, $DW < 2$ means positive autocorrelation and $DW > 2$ means negative autocorrelation.