Supplementary Figure S1: Sample Mean Excess (SME) for a range of thresholds at the grid point closest to Bergen, Norway in the BCM-HIRHAM5 downscaling. The SME is increasing below approximately 12.8 ms-1 and fluctuating above approximately 14.9 ms-1. Using a visual inspection, the threshold would be set at around 13 ms-1. The threshold used in our approach is the minimum annual maximum, at 13.4 ms-1.

Supplementary Figure S2: Model quality tests for the grid point closest to Bergen, Norway in the BCM-HIRHAM5 downscaling. The empirical data is compared to the fitted CDF (top left); the GPD QQ-plot is shown (bottom left); the fitted PDF is compared to a histogram of the data (bottom right); and the profile likelihood is shown (top right) along with the various confidence interval levels.

Supplementary Figure S3: Likelihood Ratio Tests in the four downscaling. White: Likelihood ratio test passed. Green: Likelihood ratio test failed in reference period. Blue: Likelihood ratio test failed in future period. Red: Likelihood ratio test failed in both periods.