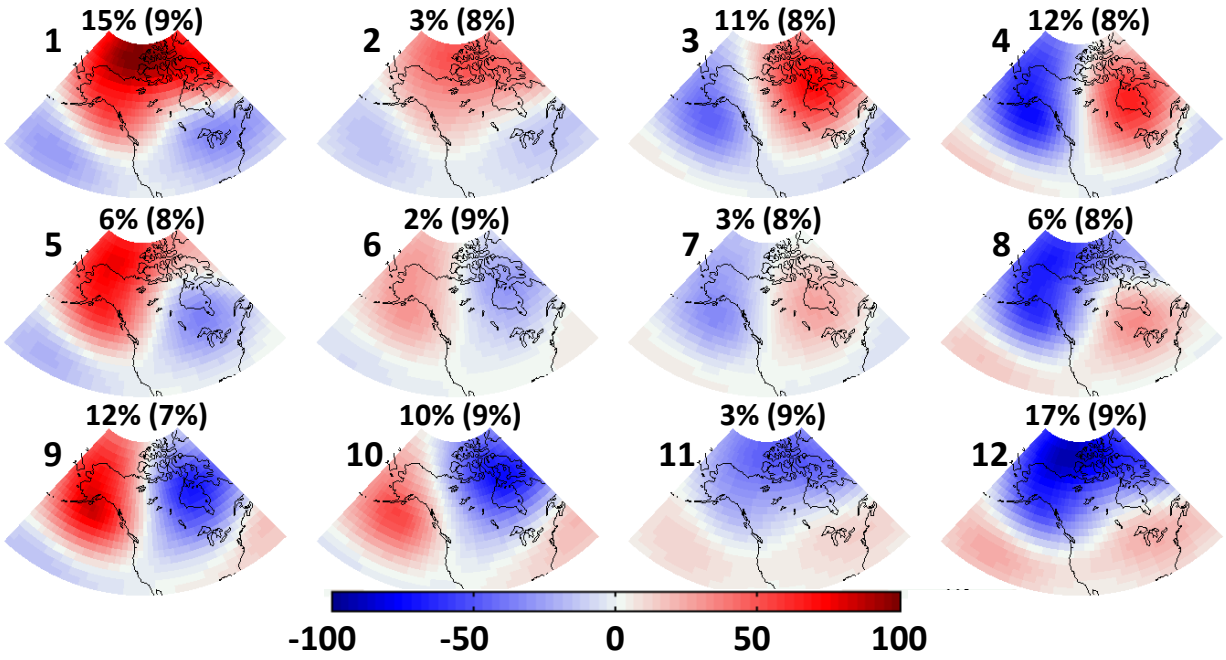

Figure 1: Representative patterns in daily 500-hPa geopotential height anomalies [m, shaded] for all months from 1948-2019 calculated using Self-Organizing Maps. The domain covers 30°N-80°N and 180-60°W (midlatitude North America/NE Pacific). Percentages indicate the frequency of occurrence of each node during winter (JFM) and summer (JAS; in parentheses). Numbers to left of each node are for reference purposes. Data to generate the SOM were obtained from the NCEP/NCAR Reanalysis (Kalnay et al. 1996).

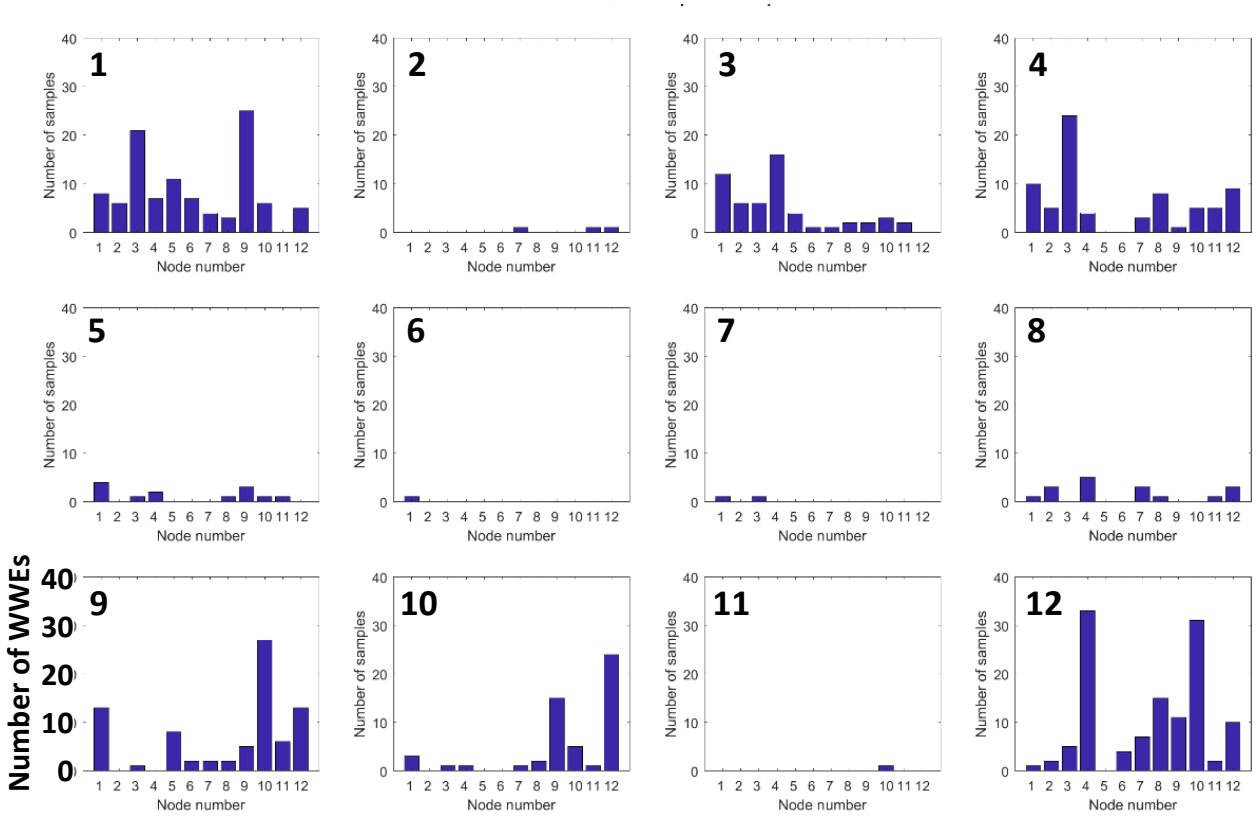

Figure 2: Distributions of days (y-axis) of node number (1-12, x-axis) corresponding to two days following a long-duration event (LDE) in a particular node during winter. The matrix corresponds to node placement in the master SOM shown in Fig. 1, indicated with bold numbers in upper left corners.

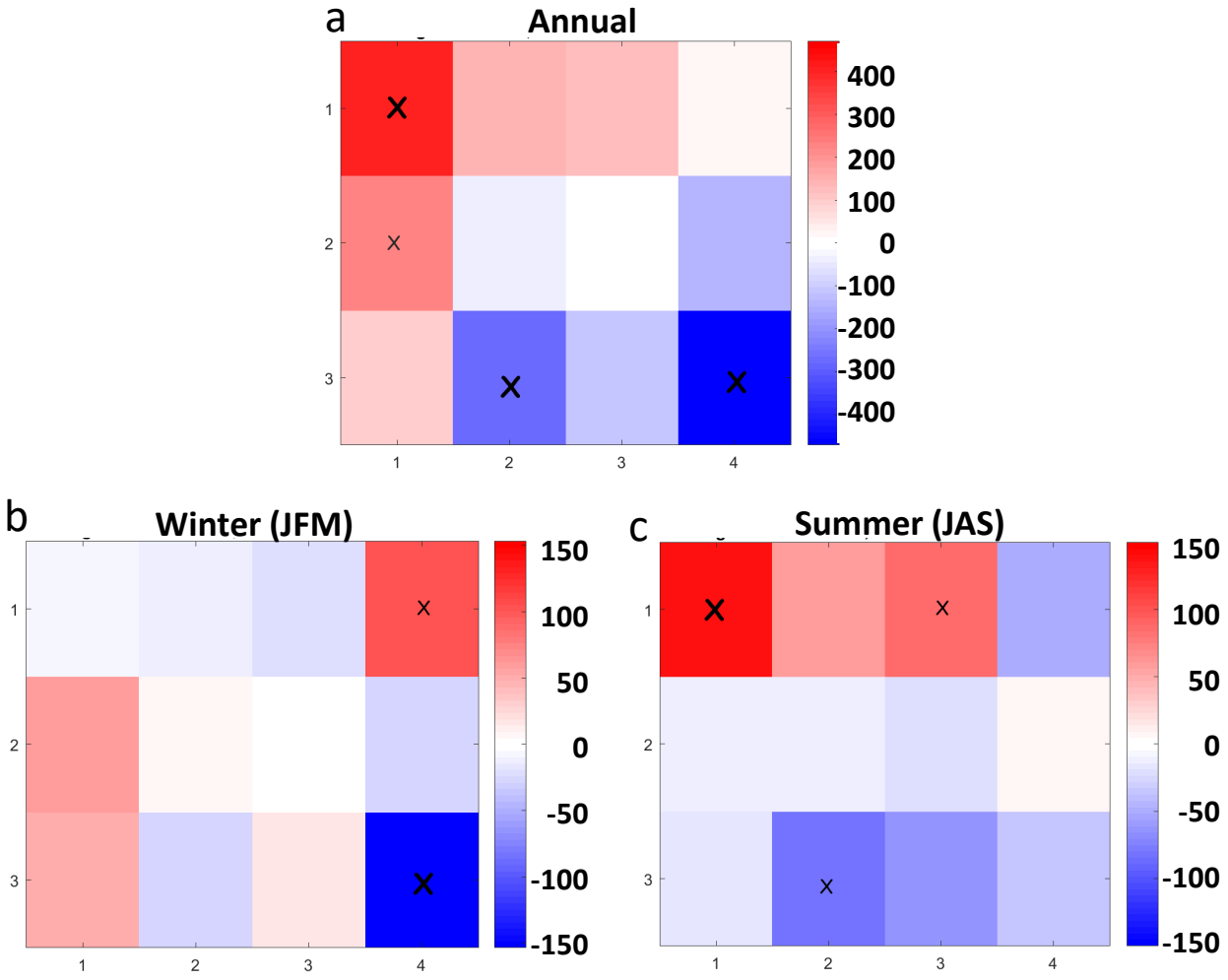

Figure 3: Change in the frequency of occurrence (days) of each node from 1961-1989 to 1991-2019 during (a) all months, (b) winter (JFM), and summer (JAS) based on NCEP reanalysis data. The small (large) Xs indicate changes that are statistically significant with 90% (95%) confidence using a students-t test.

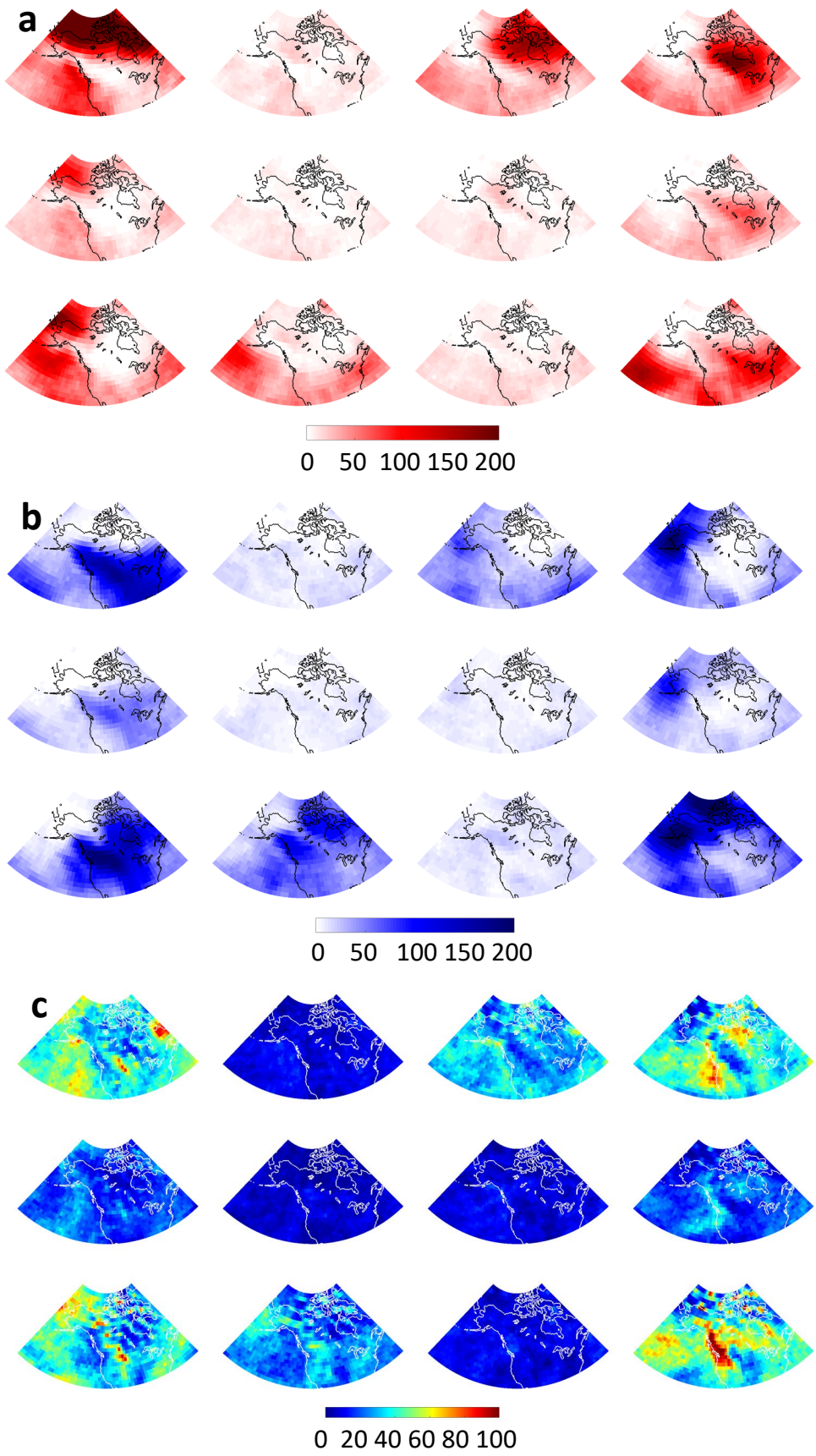

Figure 4: Winter (JFM) temperature and precipitation extremes associated with each node of the master SOM. (a) Number of days (shading) that air temperature anomalies at 925 hPa exceed 1.5 σ. (b) Same as (a) but for anomalies below -1.5 σ. (c) Same as (a) but for daily precipitation anomalies exceeding 1.5 σ. Data are from the NCEP/NCAR reanalysis.

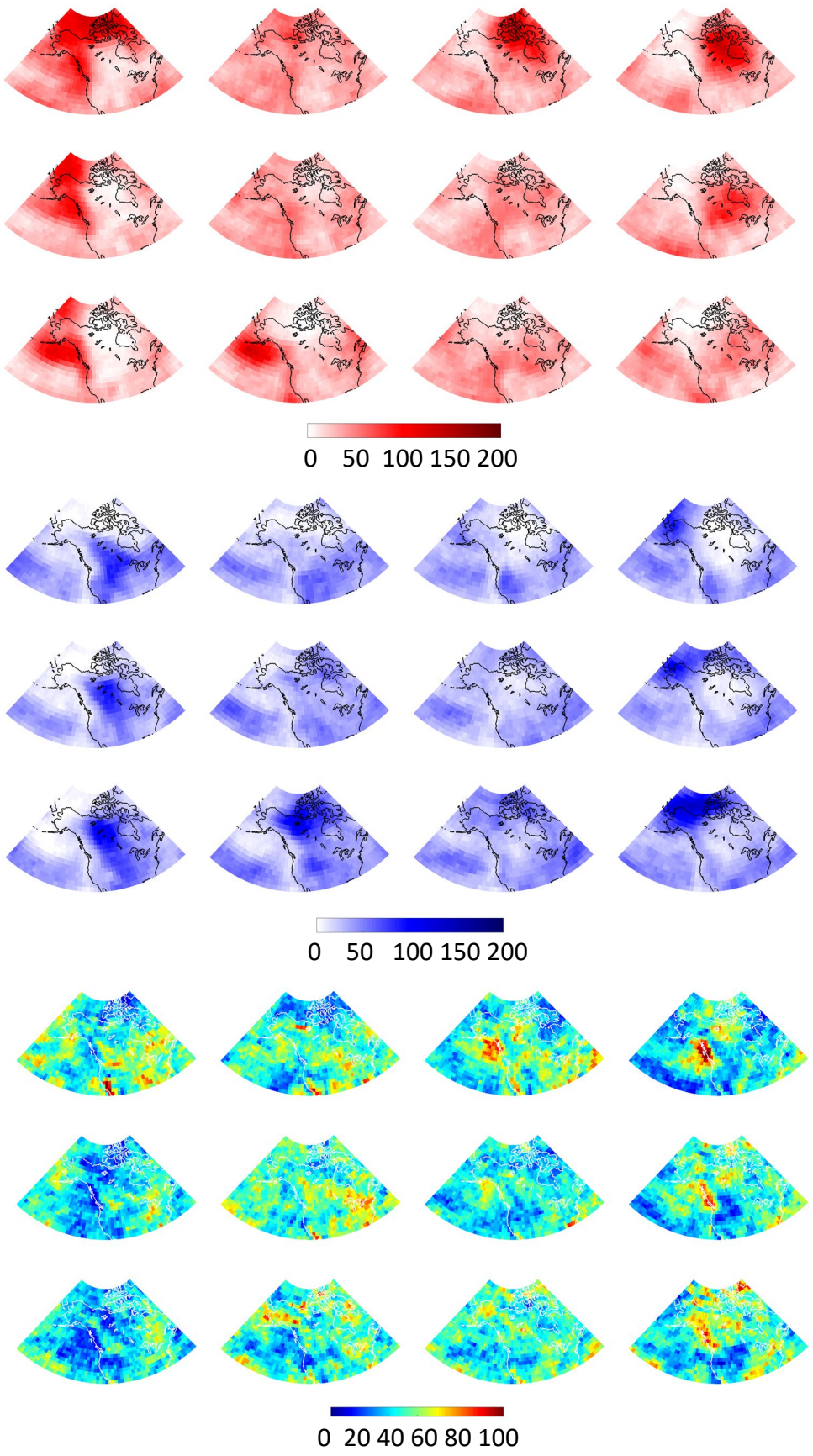

Figure 5: Same as Figure 4, but for summer (JAS).

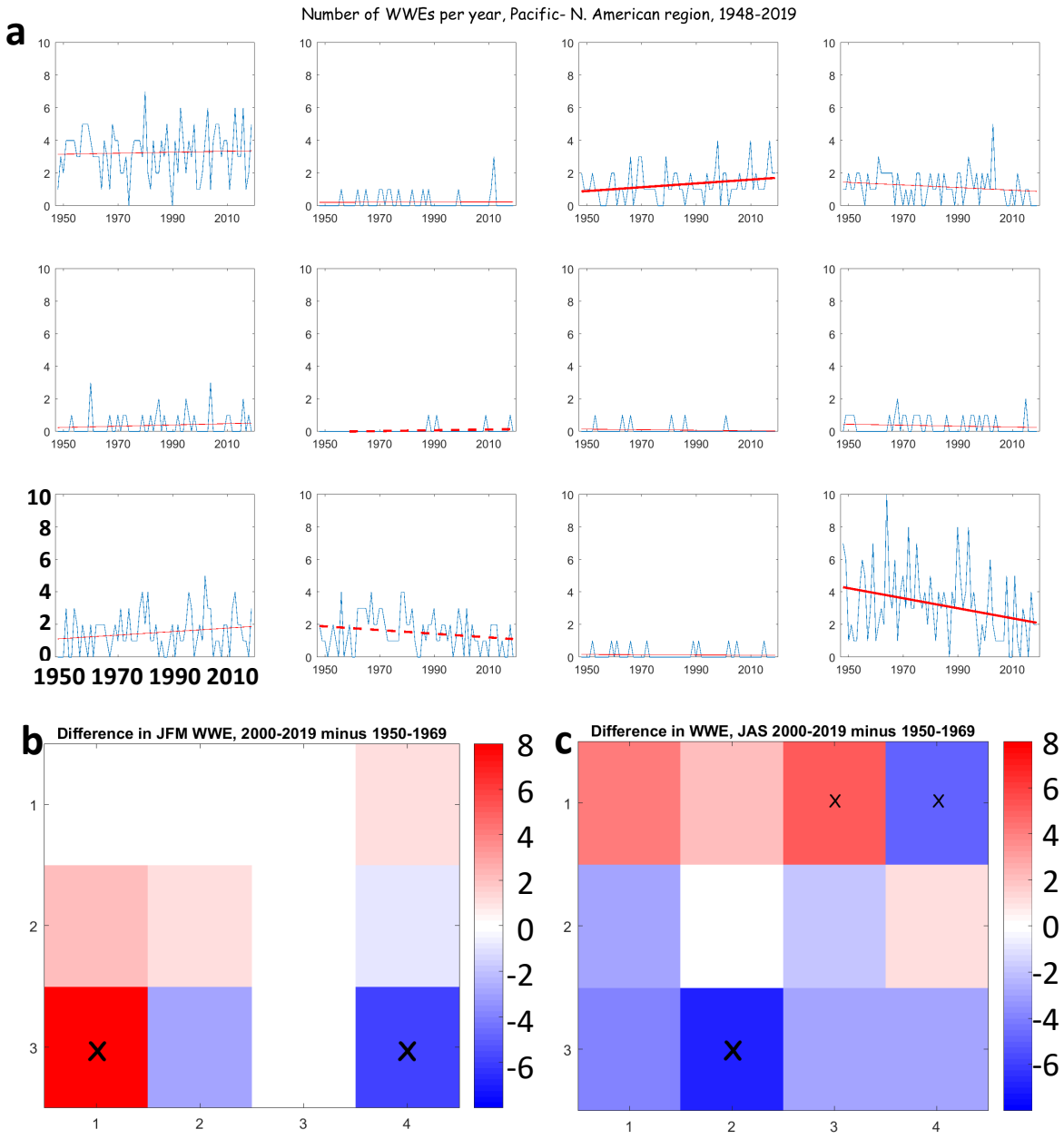

Figure 6: (a) Time series of WWEs per year for all months during 1948-2019. Solid (dashed) red lines indicate significant trends at the 95% (90%) confidence level based on an f-test. (b,c) Differences in the total number of WWEs in each node between two 20-year intervals: 1950-1969 to 2000-2019 during winter (JFM, b) and summer (JAS, c), derived using data from the NCEP reanalysis. Small (large) Xs indicate statistical significance > 90% (> 95%) based on student's t-test.

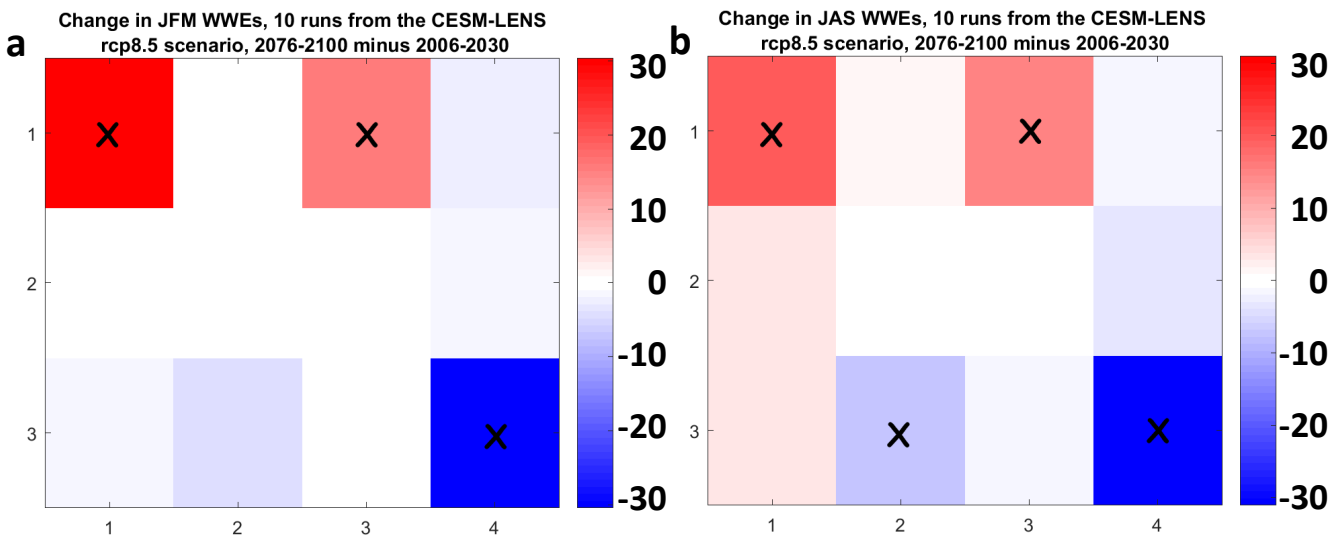

Figure 7: Projected changes in the total number of WWEs from 2006-2030 to 2076-2100 in (a) winter and (b) summer based on ten simulations by CESM assuming RCP 8.5 forcing. The Xs indicate statistical significance > 95% based on a student's t-test. Note difference in scales between annual and seasonal counts.