Ecosphere

Appendix S1: Supplementary figures for "Grappling with uncertainty in ecological projections:

a case study using the migratory monarch butterfly"

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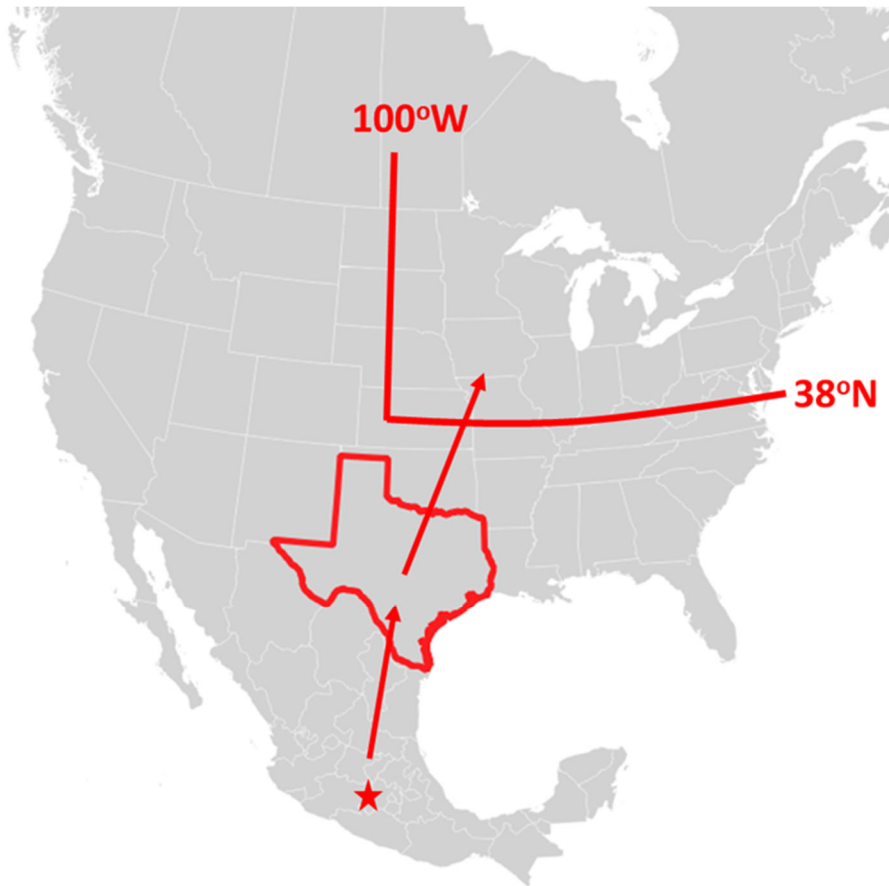leslie.ries@georgetown.edu (corresponding author)

Figure S1. Map of critical regions on the migratory pathway. Monarchs depart from winter grounds in Mexico (red star) each February and arrive in their spring breeding grounds (centered in Texas, red outline) usually in mid-March. The spring generation is produced between approximately 22 March and 2 May. After adults emerge from the spring generation, they fly north and settle into their summer breeding grounds which are east of the 100th meridian and mostly north of 38N (red lines).
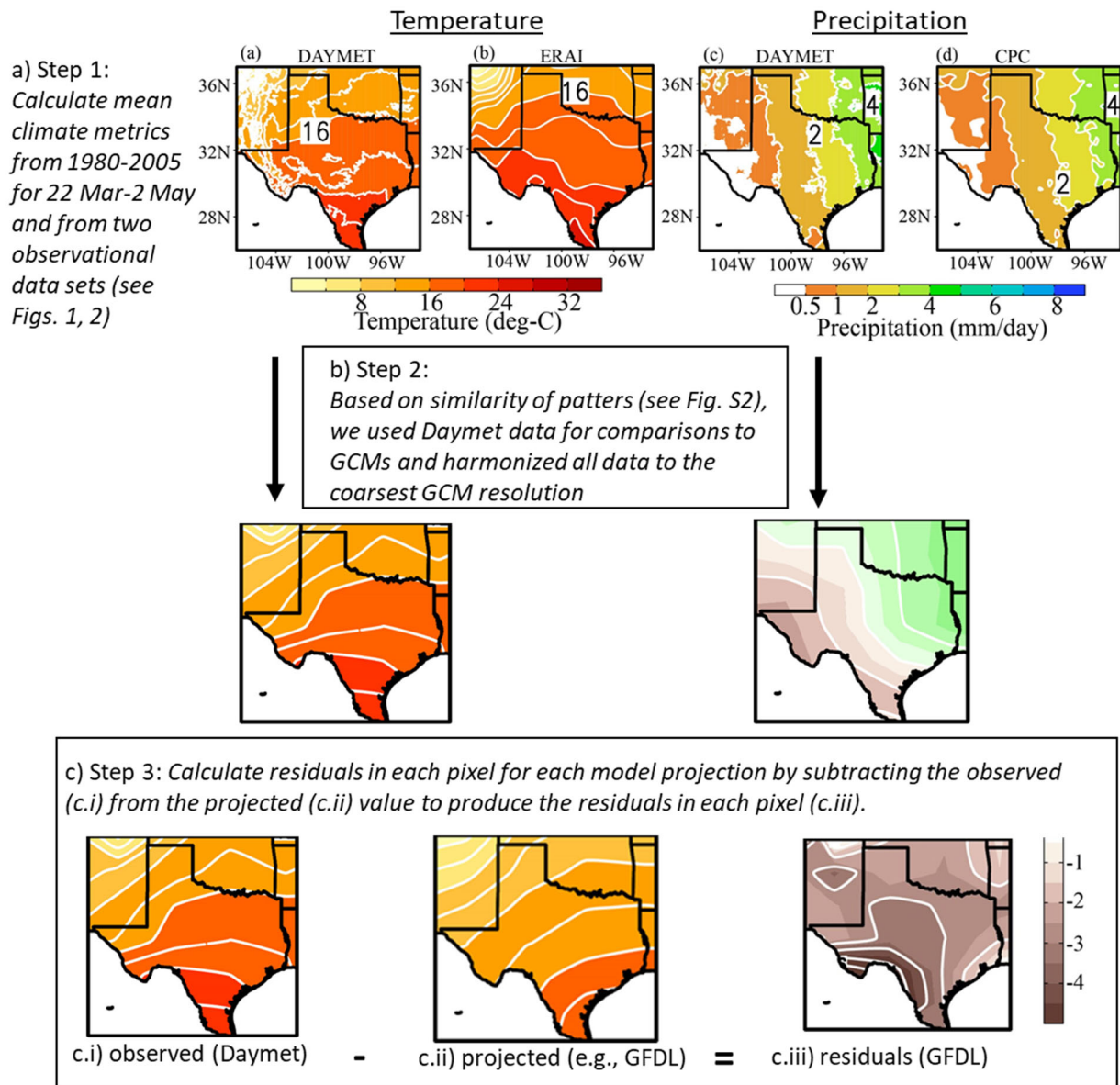
Figure S2. GCM validation process. Step 1 (a): Observed climate patterns from 1980-2005 were averaged across years from two data sets for both temperature (Daymet and ERAI, see text) and precipitation (Daymet and CPC, see text). Step 2 (b): Since both data sets showed similar patterns, we used only Daymet. Step 3 (c): We implemented hindcasts from 16 GCMs and compared them to Daymet observations. Step 4 (d): Across all residual pixels (c.iii), we calculated the average and standard deviation to determine if the model met inclusion criteria (Table 1).
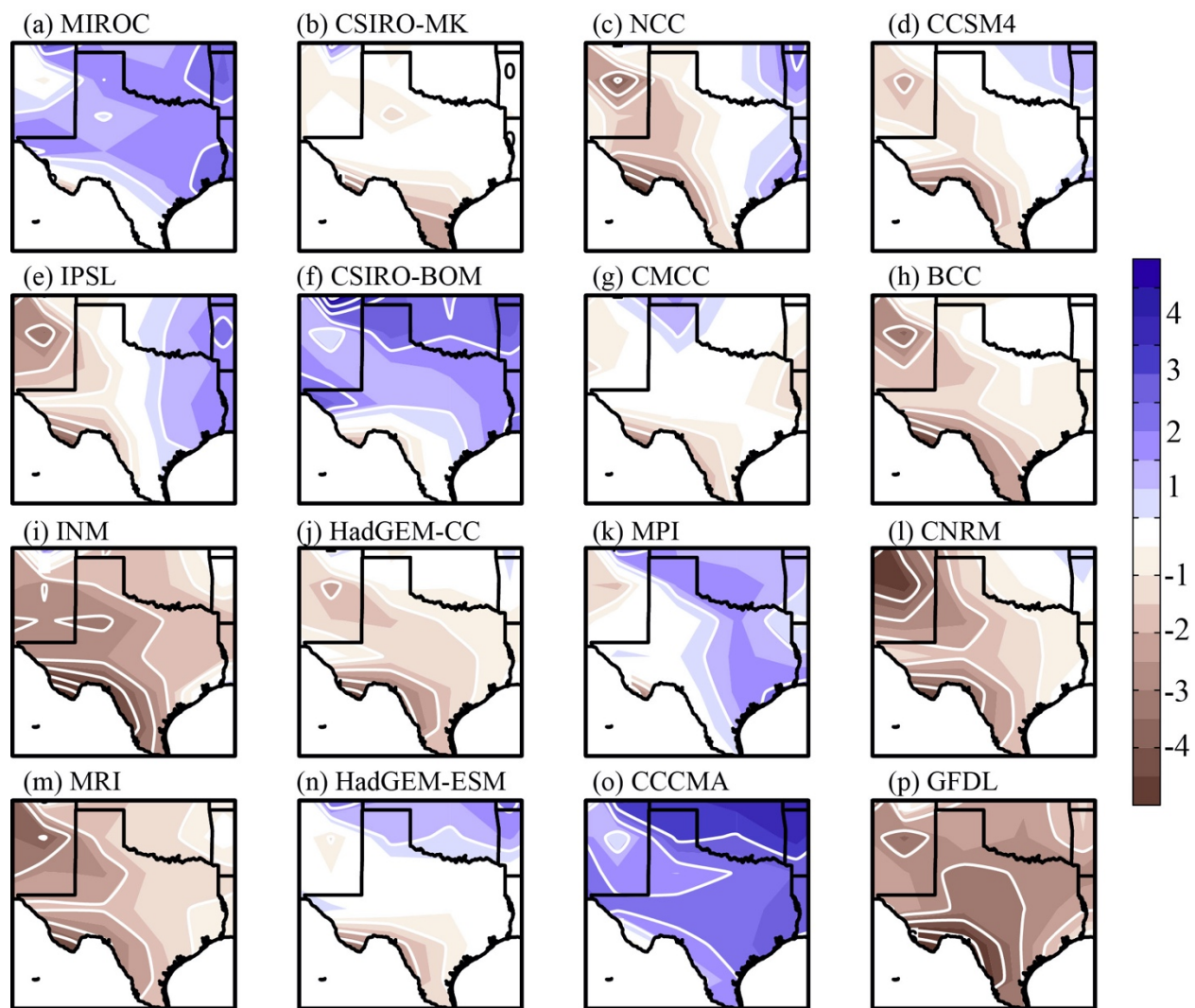
Figure S3. Residual values from step 3 (Figure S2c.iii) for temperature comparisons for years 1980-2005, March 22- May 2. Values for mean and standard deviations calculated across all pixels for each model are shown in Table 1.
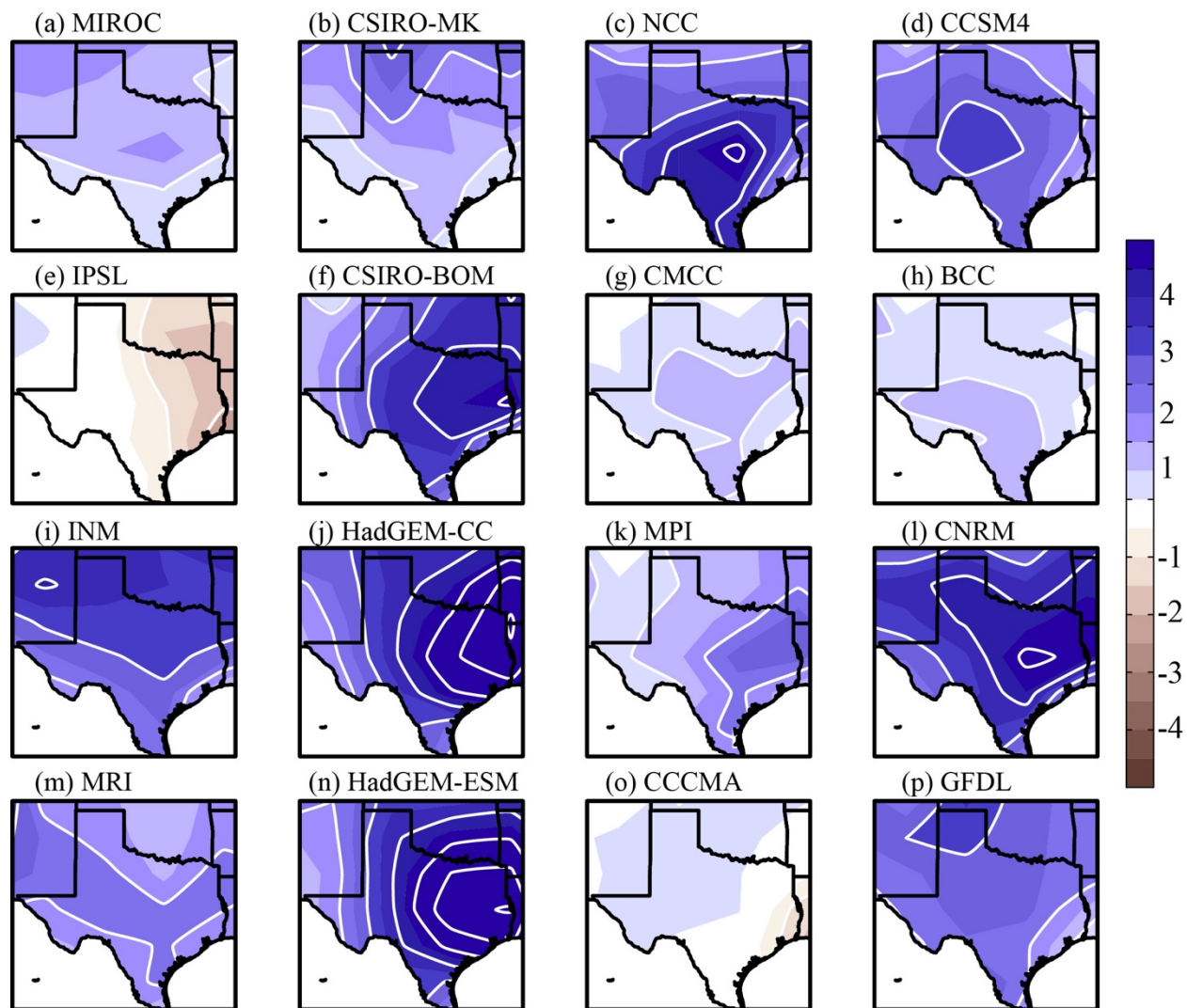
Figure S4. Residual values from step 3 (Figure S2c.iii) for precipitation comparisons for years 1980-2005, March 22- May 2. Values for mean and standard deviations calculated across all pixels for each model are shown in Table 1.