Appendix B6
Watershed-based Climate and Hydrologic Process Changes

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The results of the watershed-based statistical analysis of the Variable Infiltration Capacity model output (climatological and hydrologic parameters) are presented for a subset of the Colorado River Basin (Basin) watersheds. The selected watersheds span the geographic range of the Basin. One group of watersheds was selected from the Upper Basin, and each of these watersheds contains the headwaters of a significant river. A second group of watersheds was selected from the Lower Basin, and each contains a streamflow station of significance. The selected watersheds are as follows:

Upper Basin

- 01 – Colorado River at Glenwood Springs, Colorado
- 04 – Gunnison River at Blue Mesa Reservoir, Colorado
- 09 – Green River below Fontenelle Reservoir, Wyoming
- 12 – Yampa River near Maybell, Colorado
- 13 – Little Snake River near Lily, Colorado
- 18 – San Juan River near Archuletta, New Mexico
- 20 – Colorado River at Lees Ferry, Arizona

Lower Basin

- 25 – Colorado River below Hoover Dam, Arizona-Nevada
- 29 – Colorado River Above Imperial Dam, Arizona

Figures B6-1 through B6-9 depict the relative changes in monthly precipitation, temperature, evapotranspiration, runoff, snow water equivalent, and soil moisture for these selected watersheds. Separate lines depict the changes for the periods 2011 to 2040 (2025), 2041 to 2070 (2055), and 2066 to 2094 (2080) as compared to the base period 1971 to 2000 (1985). Hydrologic variables were produced using Variable Infiltration Capacity as driven by downscaled climate model forcings. The selection of time periods is explained in appendix B5.

Figures B6-10 through B6-21 are spatial plots of the changes in these parameters for four seasons. The seasons are defined as: Fall (October, November, and December [OND]); Winter (January, February, and March [JFM]); Spring (April, May, and June [AMJ]); and Summer (July, August, and September [JAS]). Separate figures have been provided for the three future periods.

FIGURE B6-1
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
01 – Colorado River at Glenwood Springs, Colorado

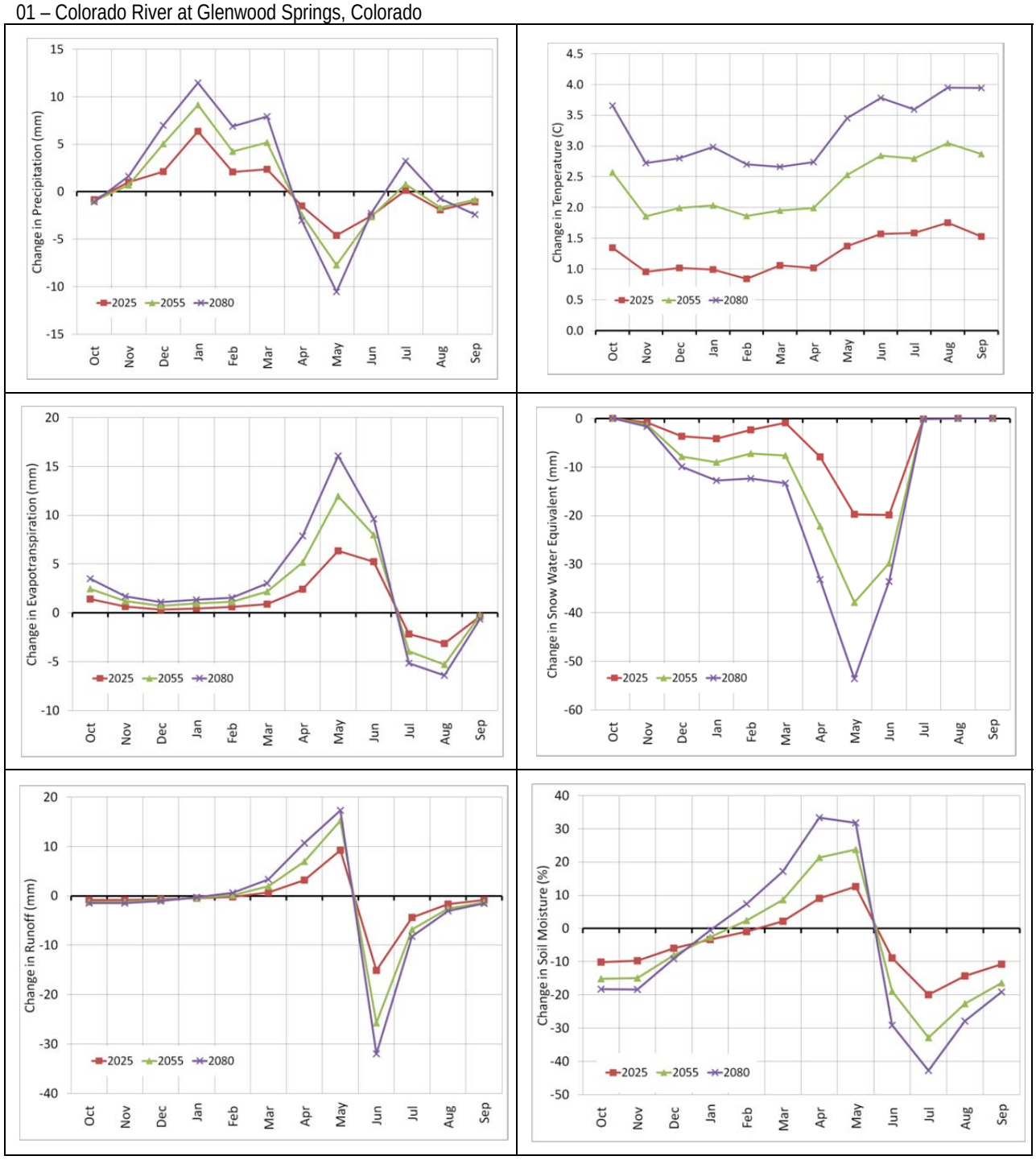

FIGURE B6-2
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
04 – Gunnison River at Blue Mesa Reservoir, Colorado

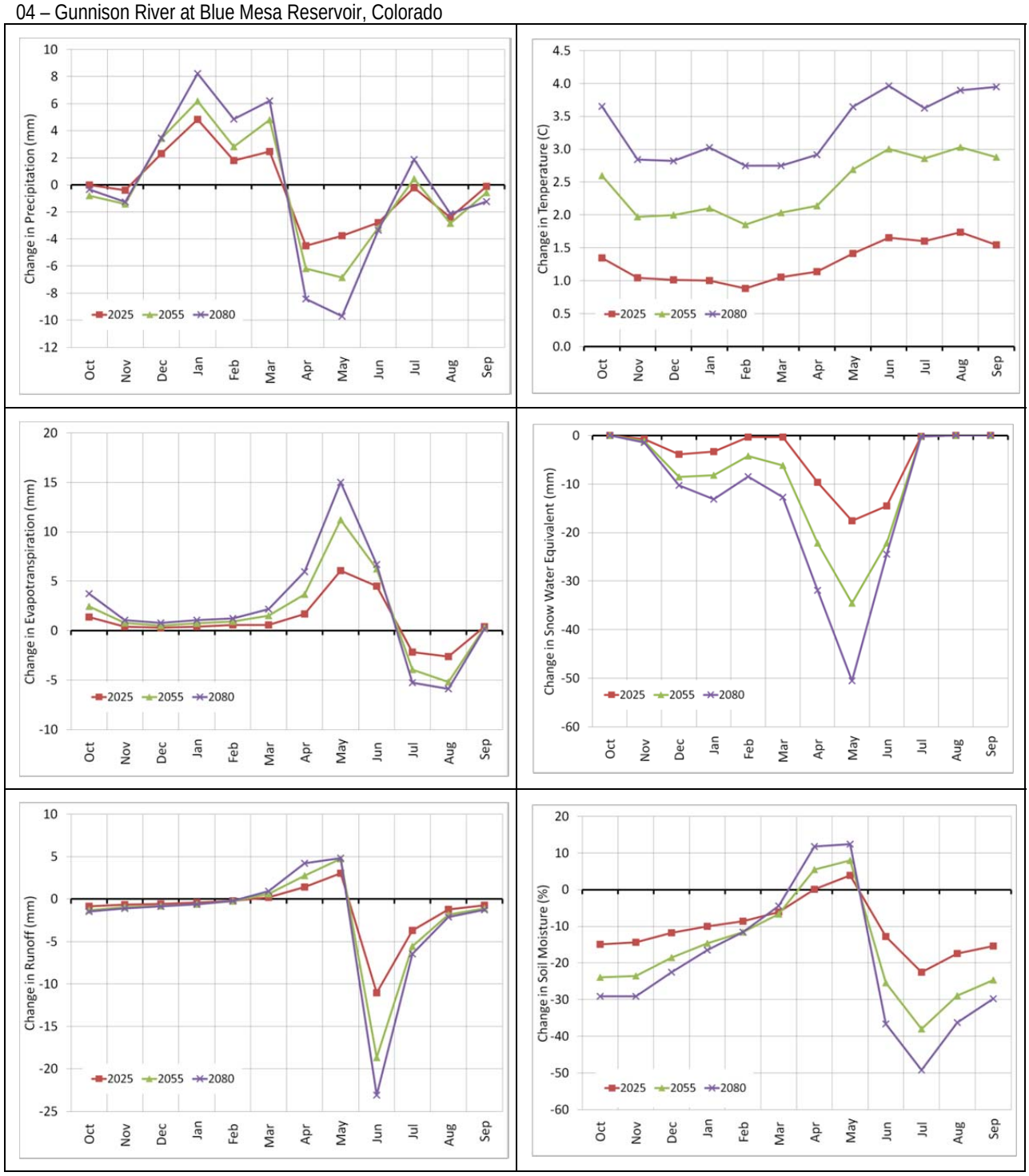

FIGURE B6-3
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
09 – Green River below Fontenelle Reservoir, Wyoming

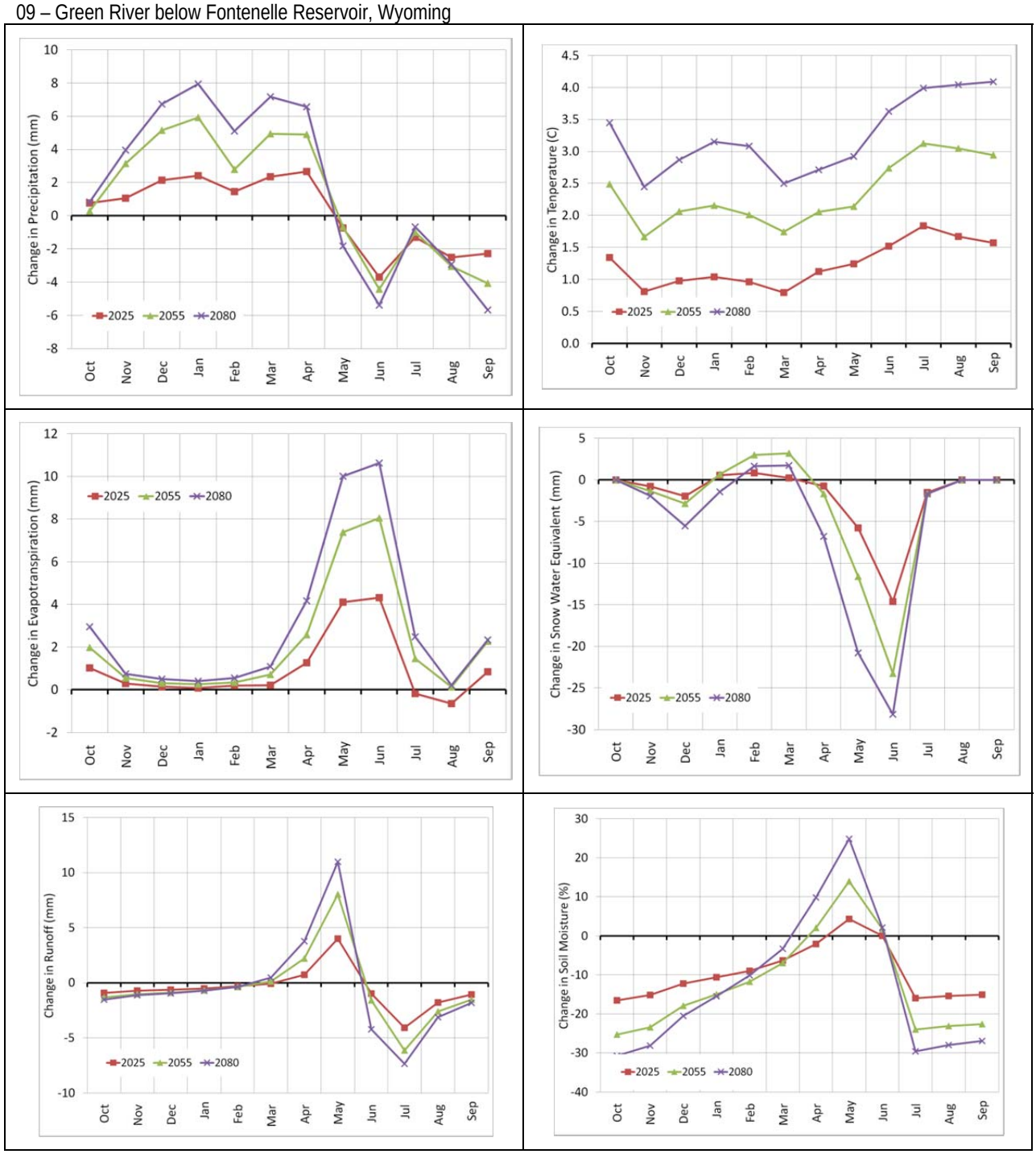

FIGURE B6-4
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
12 – Yampa River near Maybell, Colorado

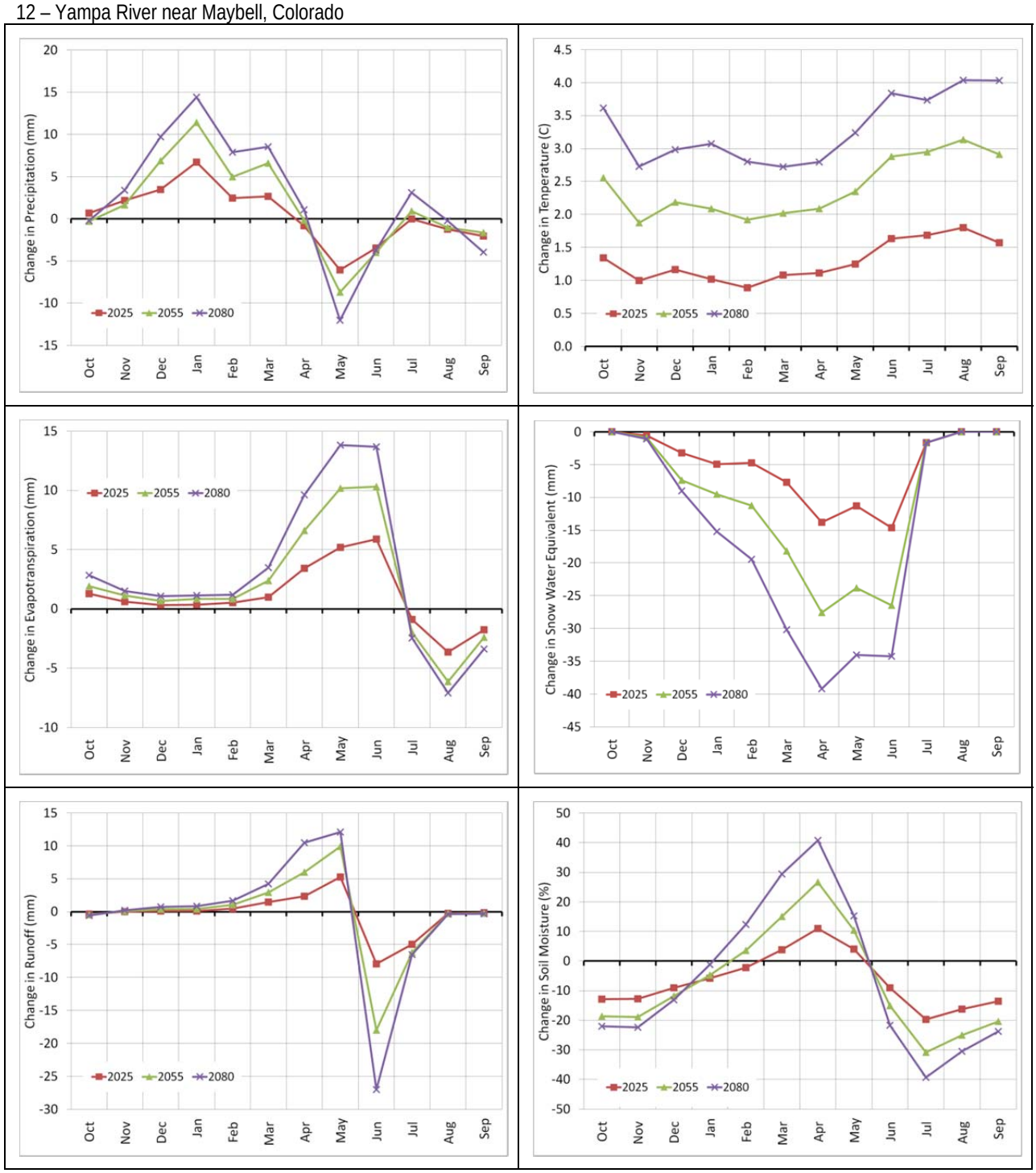

FIGURE B6-5
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
13 – Little Snake River near Lily, Colorado

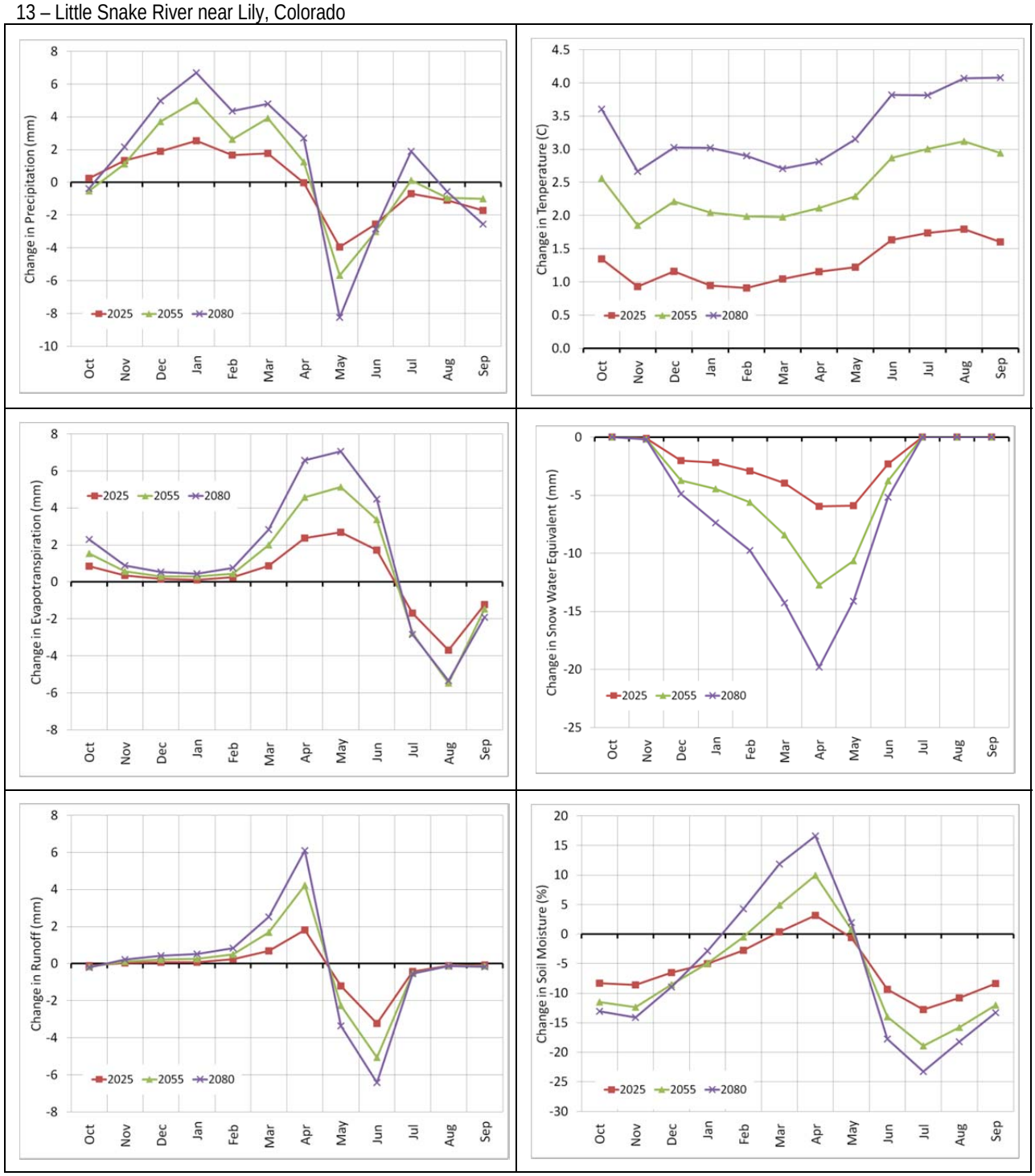

FIGURE B6-6
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
18 – San Juan River near Archuletta, New Mexico

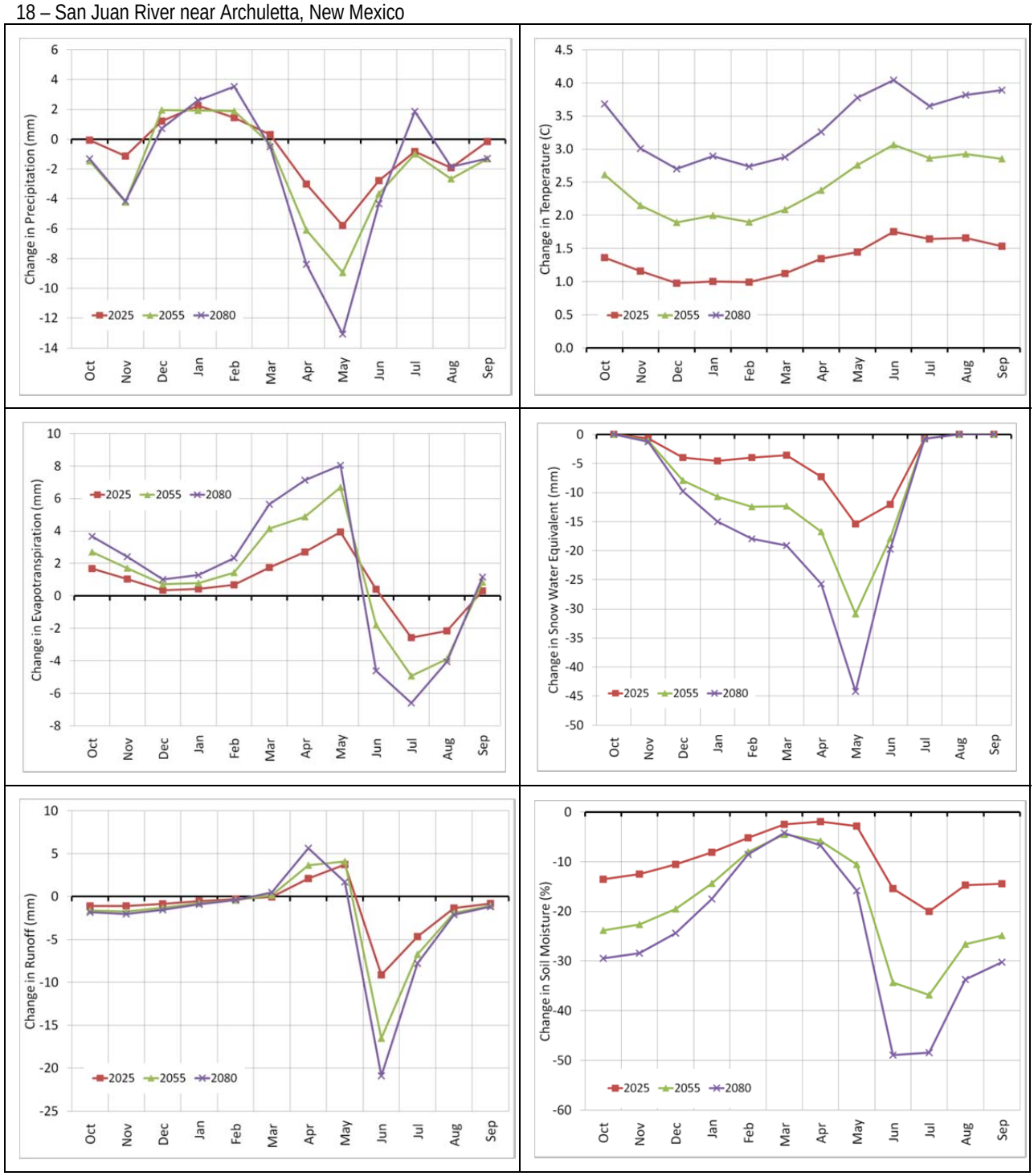

FIGURE B6-7
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
20 – Colorado River at Lees Ferry, Arizona

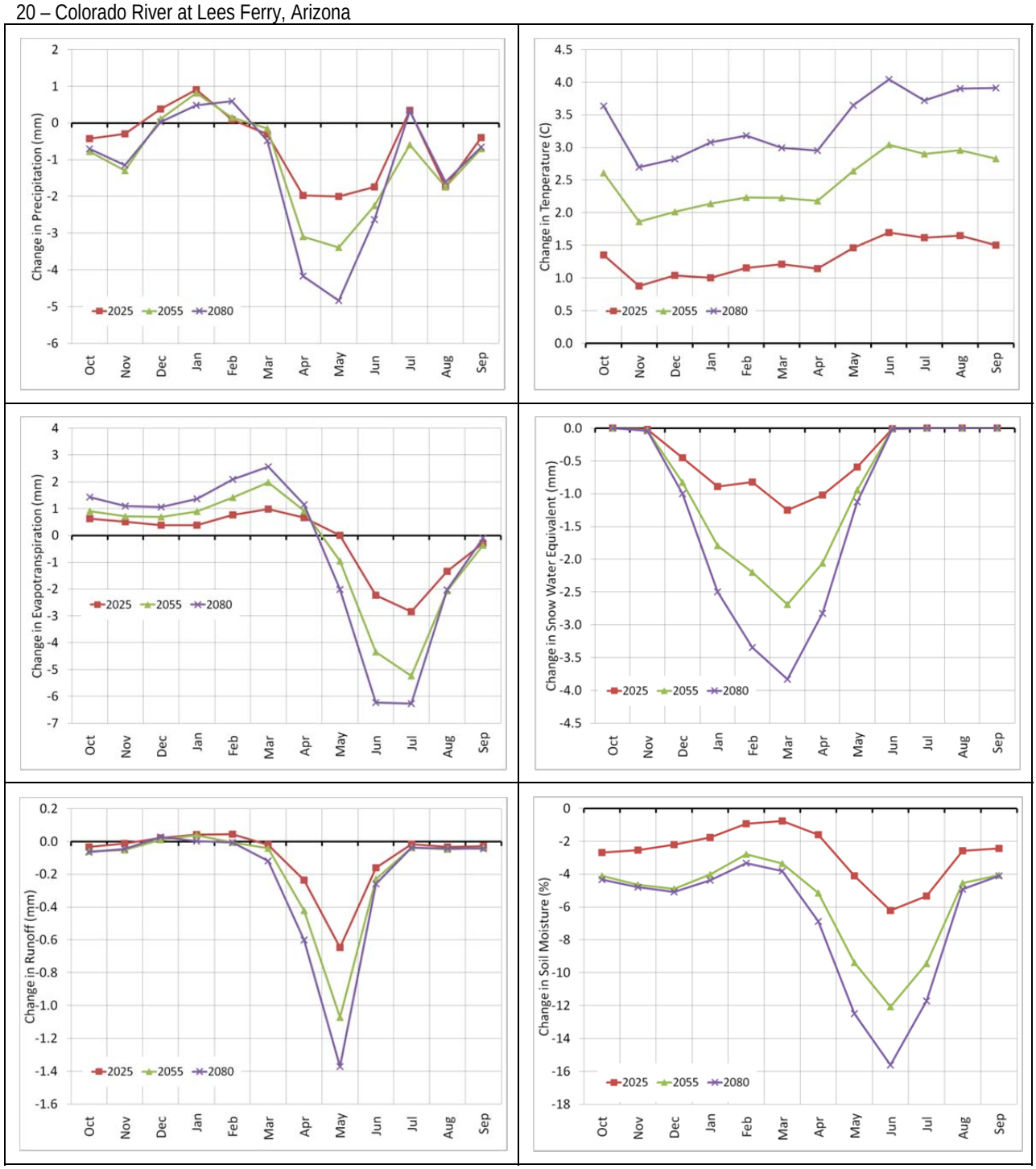

FIGURE B6-8
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
25 – Colorado River below Hoover Dam, Arizona-Nevada

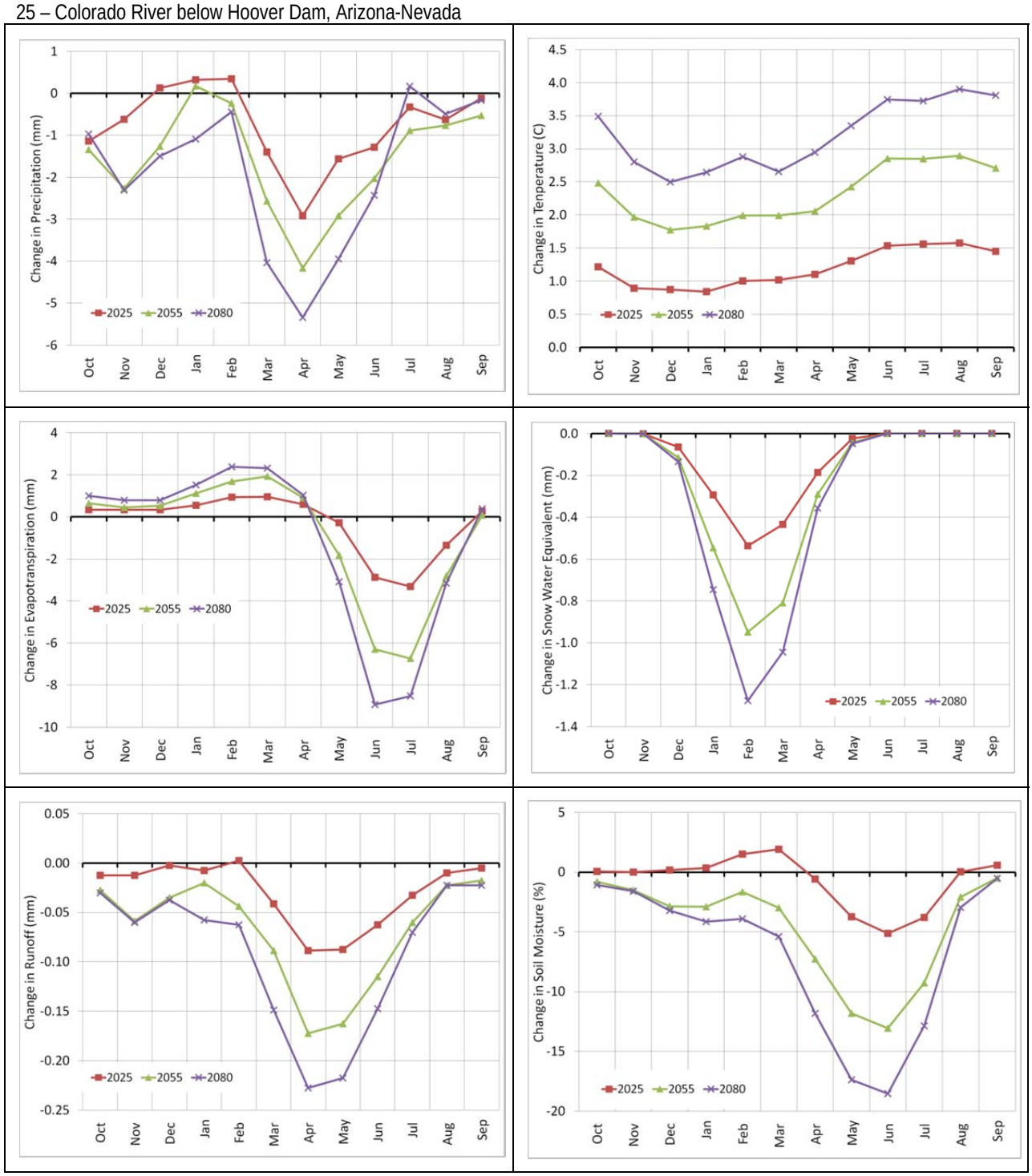

FIGURE B6-9
Projected Change in Mean Monthly Climatological and Hydrologic Parameters
29 – Colorado River Above Imperial Dam, Arizona

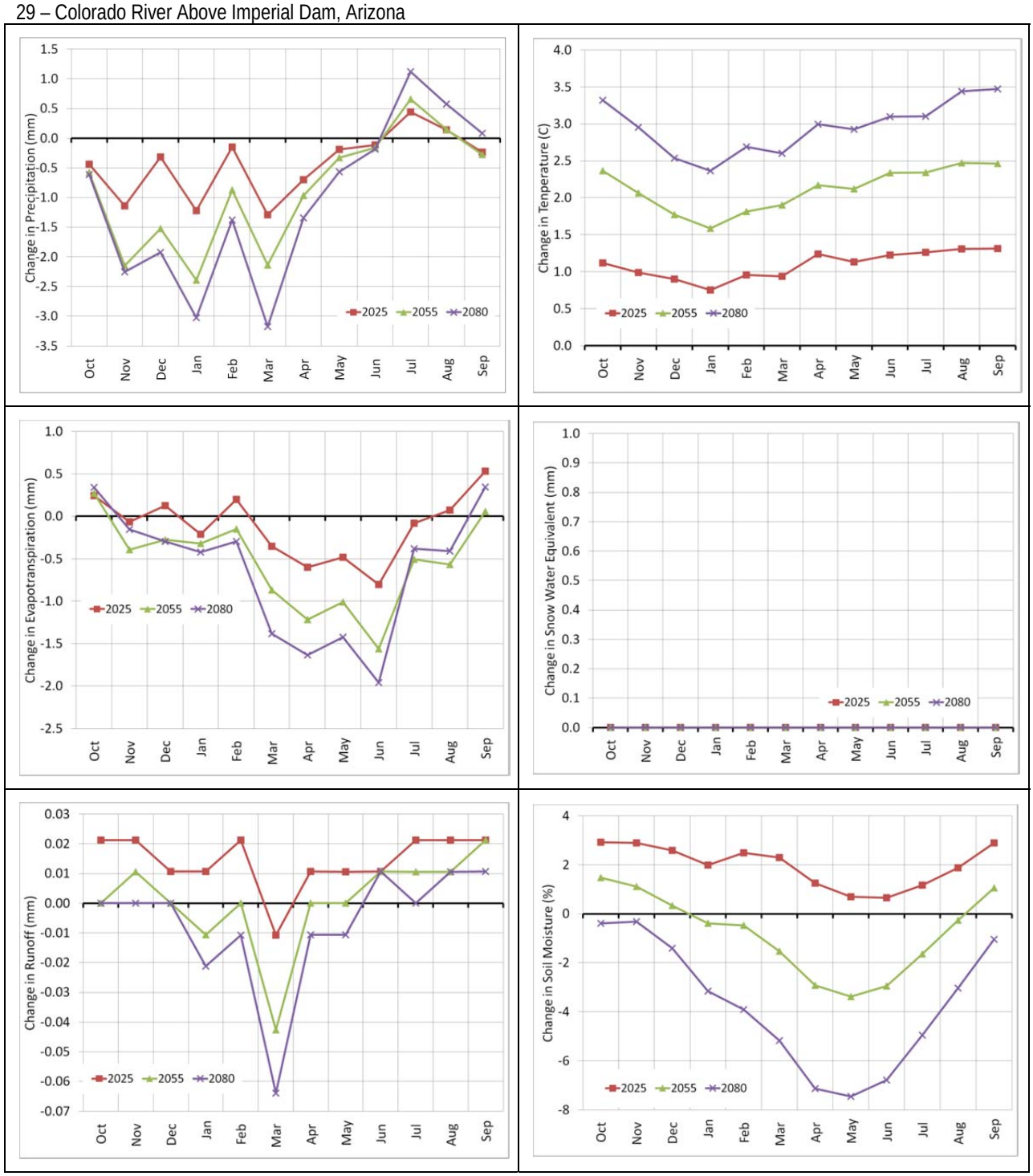

FIGURE B6-10
Projected Percent Change in Mean Seasonal Precipitation
2025 (2011–2040) versus 1985 (1971–2000).

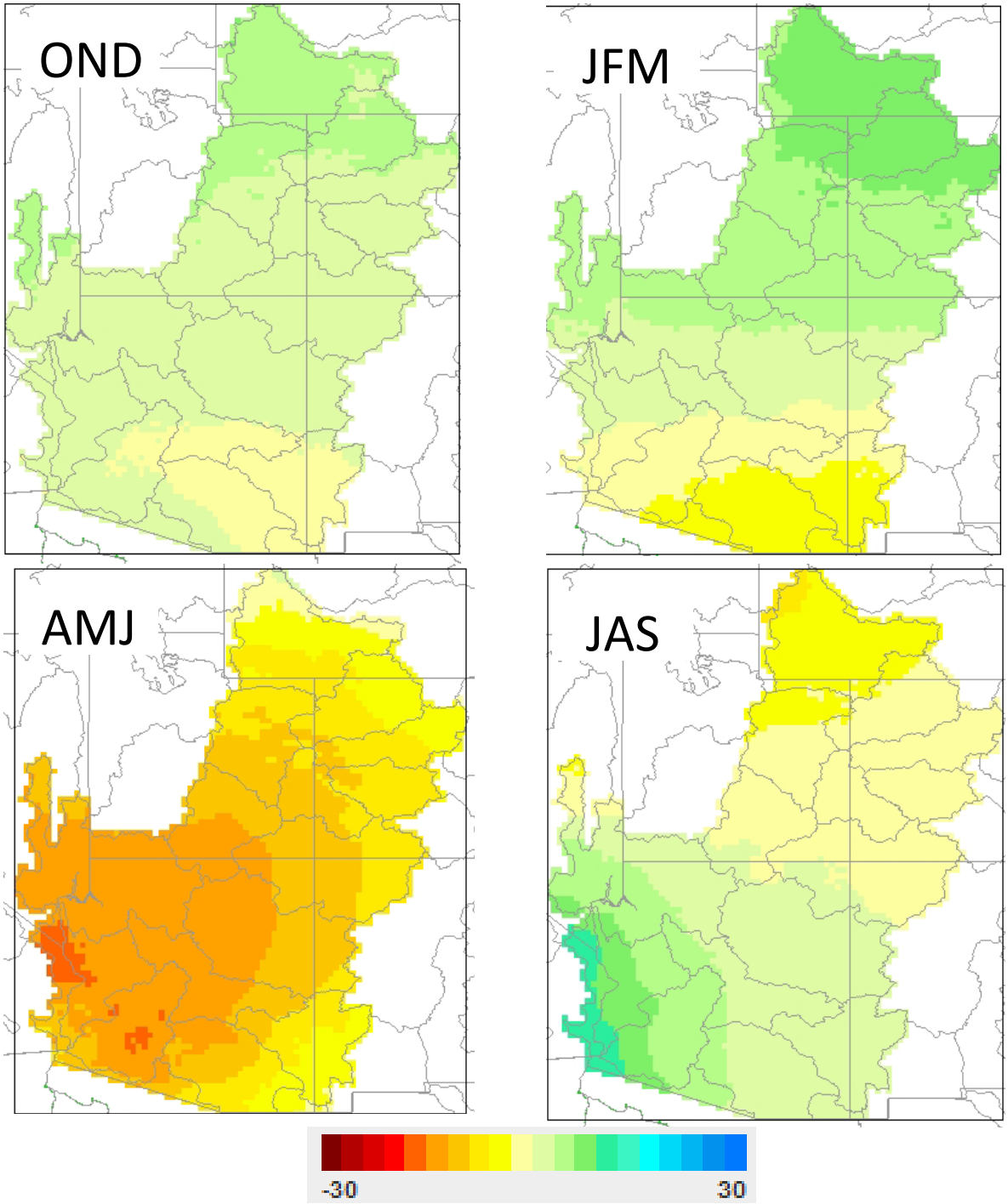

FIGURE B6-11
Projected Change in Mean Seasonal Air Temperature
2025 (2011–2040) versus 1985 (1971–2000). Change shown in degrees Celsius (°C).

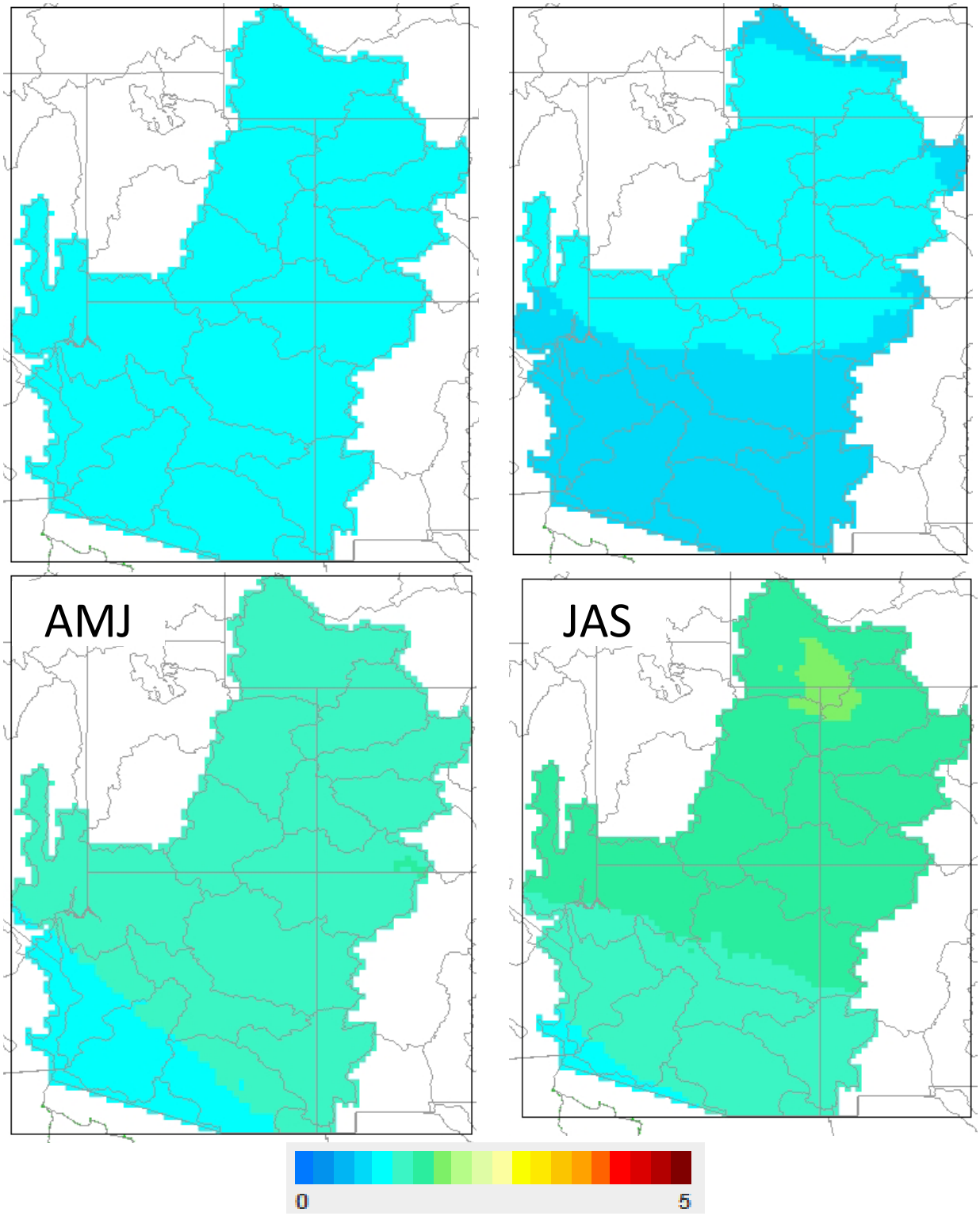

FIGURE B6-12
Projected Percent Change in Mean Seasonal Evapotranspiration
2025 (2011–2040) versus 1985 (1971–2000).

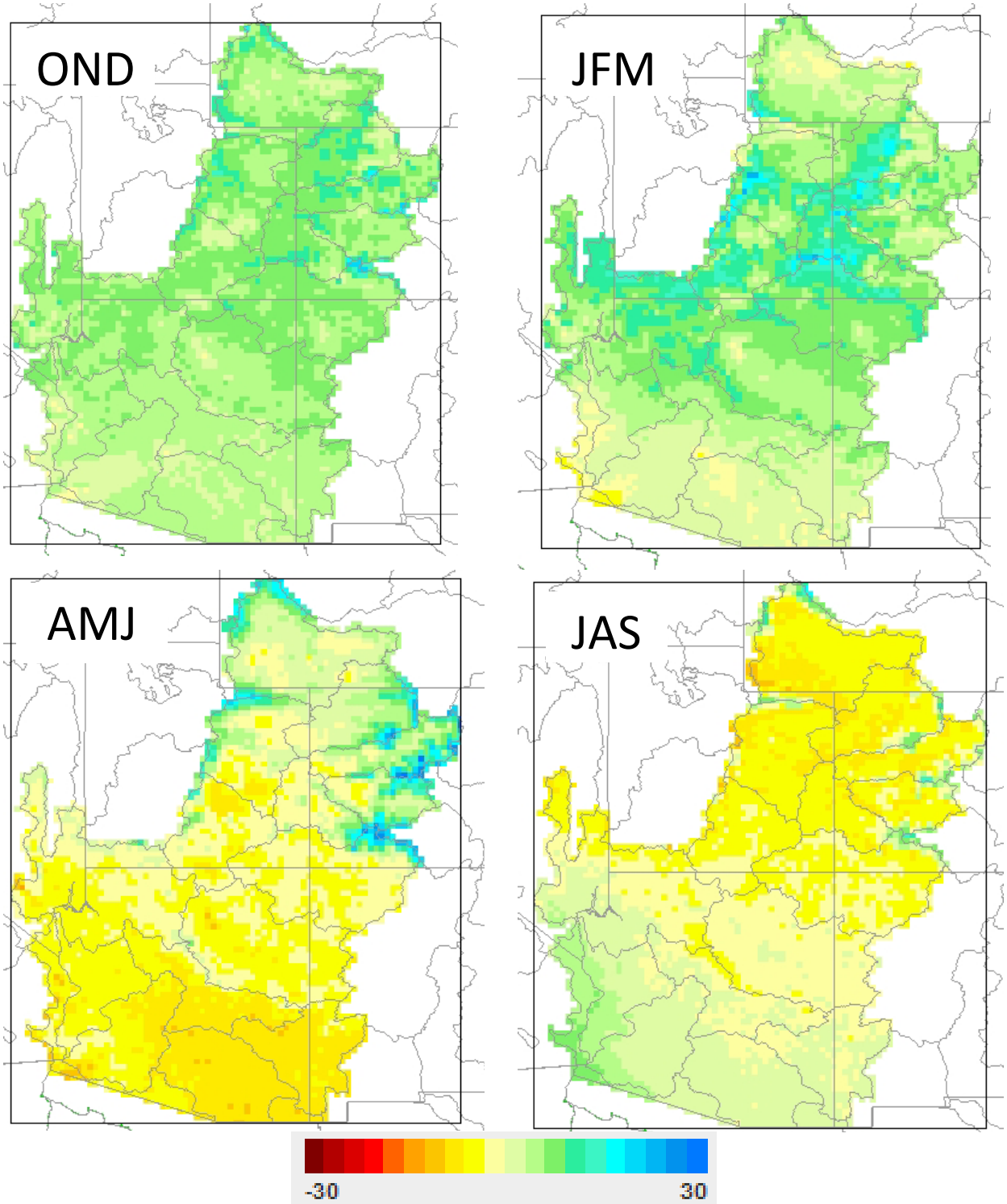

FIGURE B6-13
Projected Percent Change in Mean Seasonal Runoff
2025 (2011–2040) versus 1985 (1971–2000).

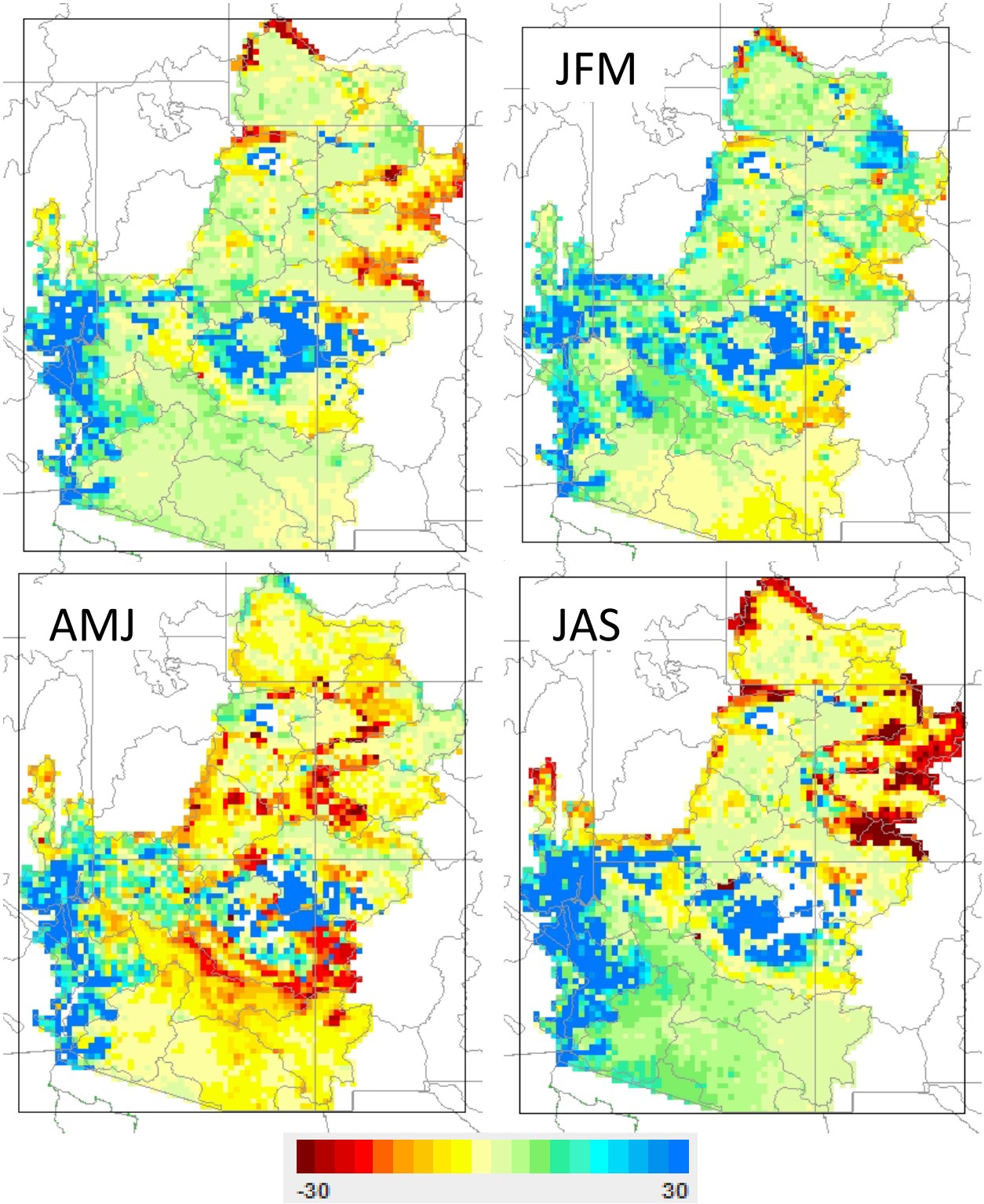

FIGURE B6-14
Projected Percent Change in Mean Seasonal Precipitation
2055 (2041–2070) versus 1985 (1971–2000).

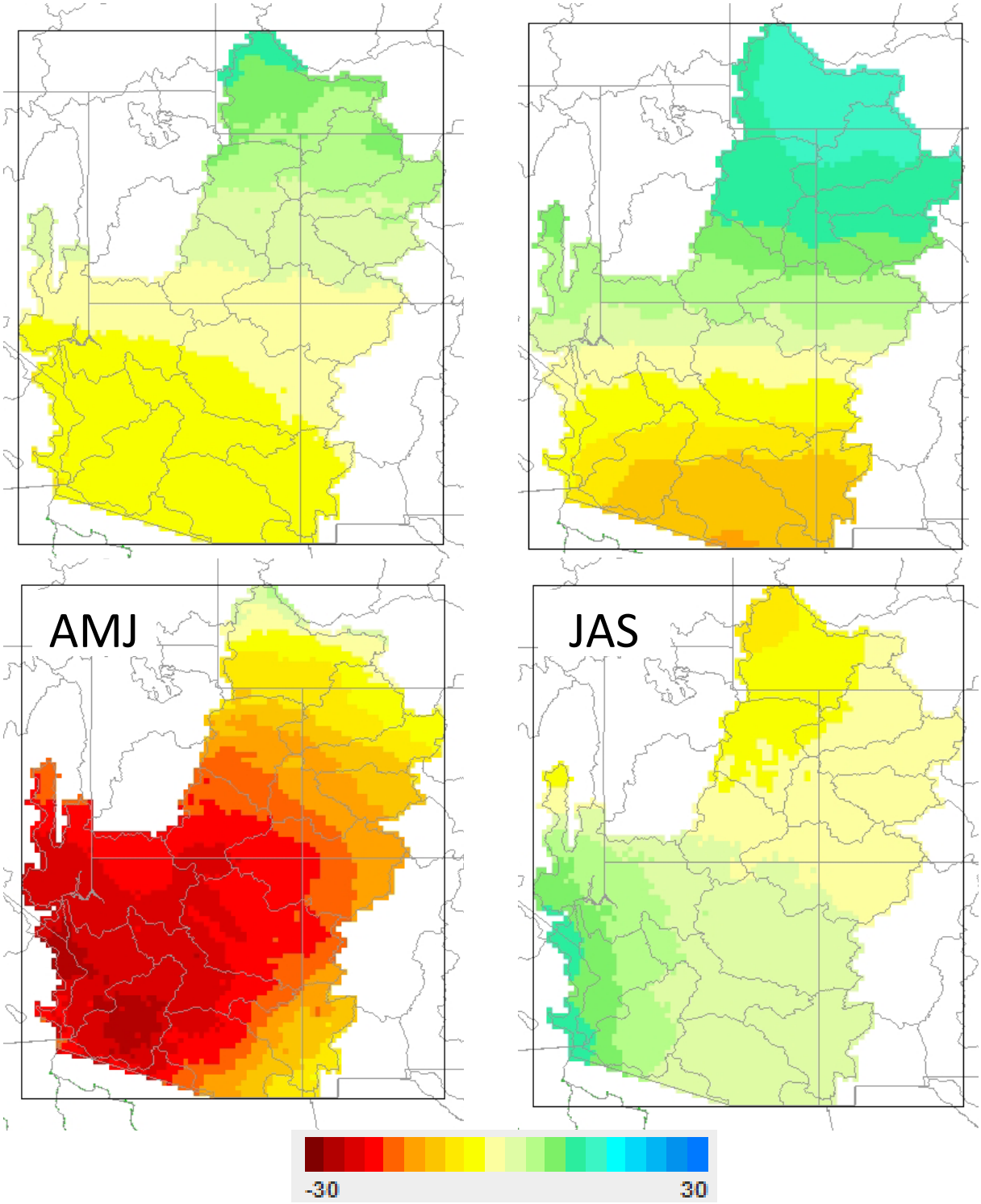

FIGURE B6-15
Projected Change in Mean Seasonal Air Temperature
2055 (2041–2070) versus 1985 (1971–2000). Change shown in degrees Celsius (°C).

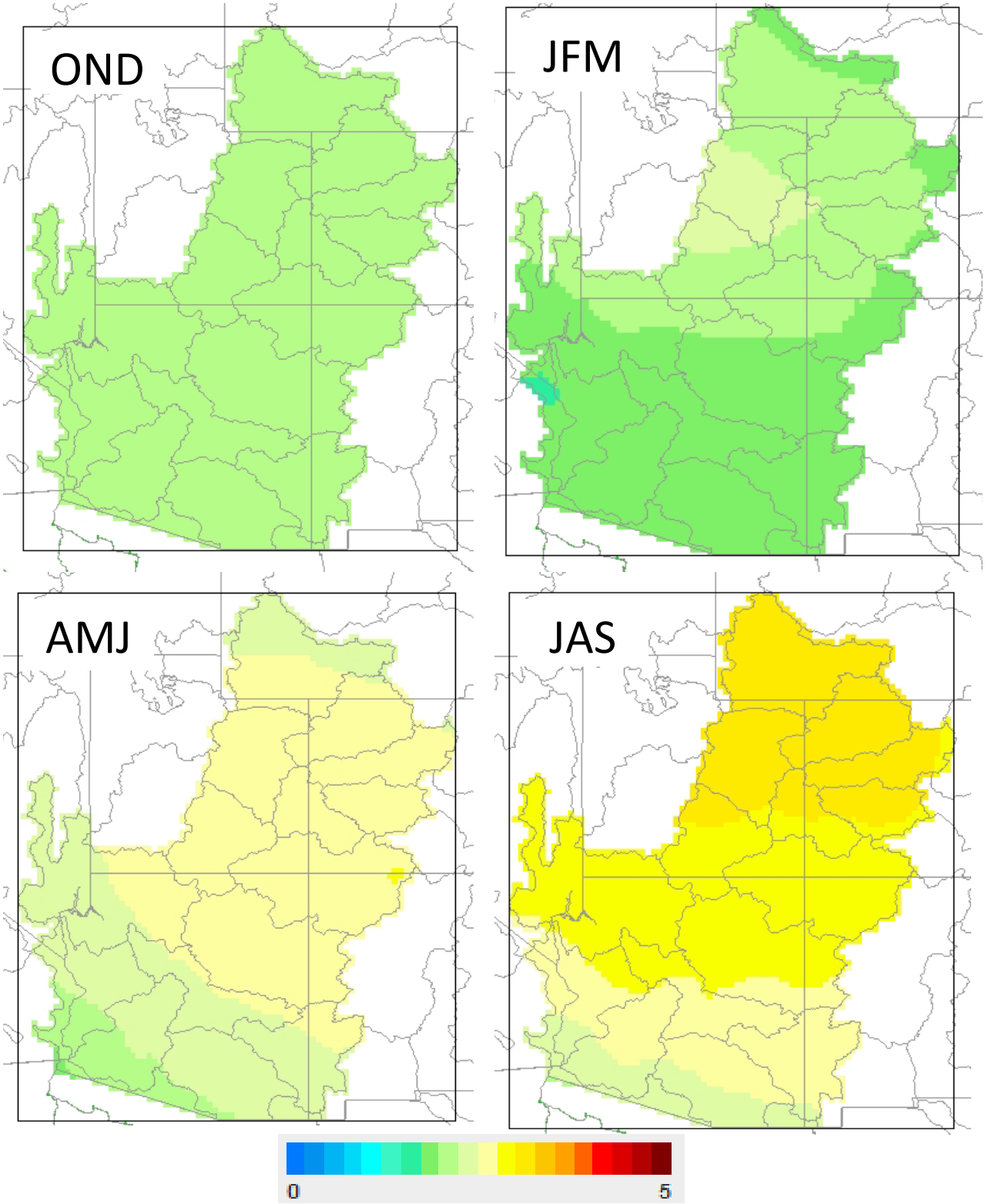

FIGURE B6-16
Projected Percent Change in Mean Seasonal Evapotranspiration
2055 (2041–2070) versus 1985 (1971–2000).

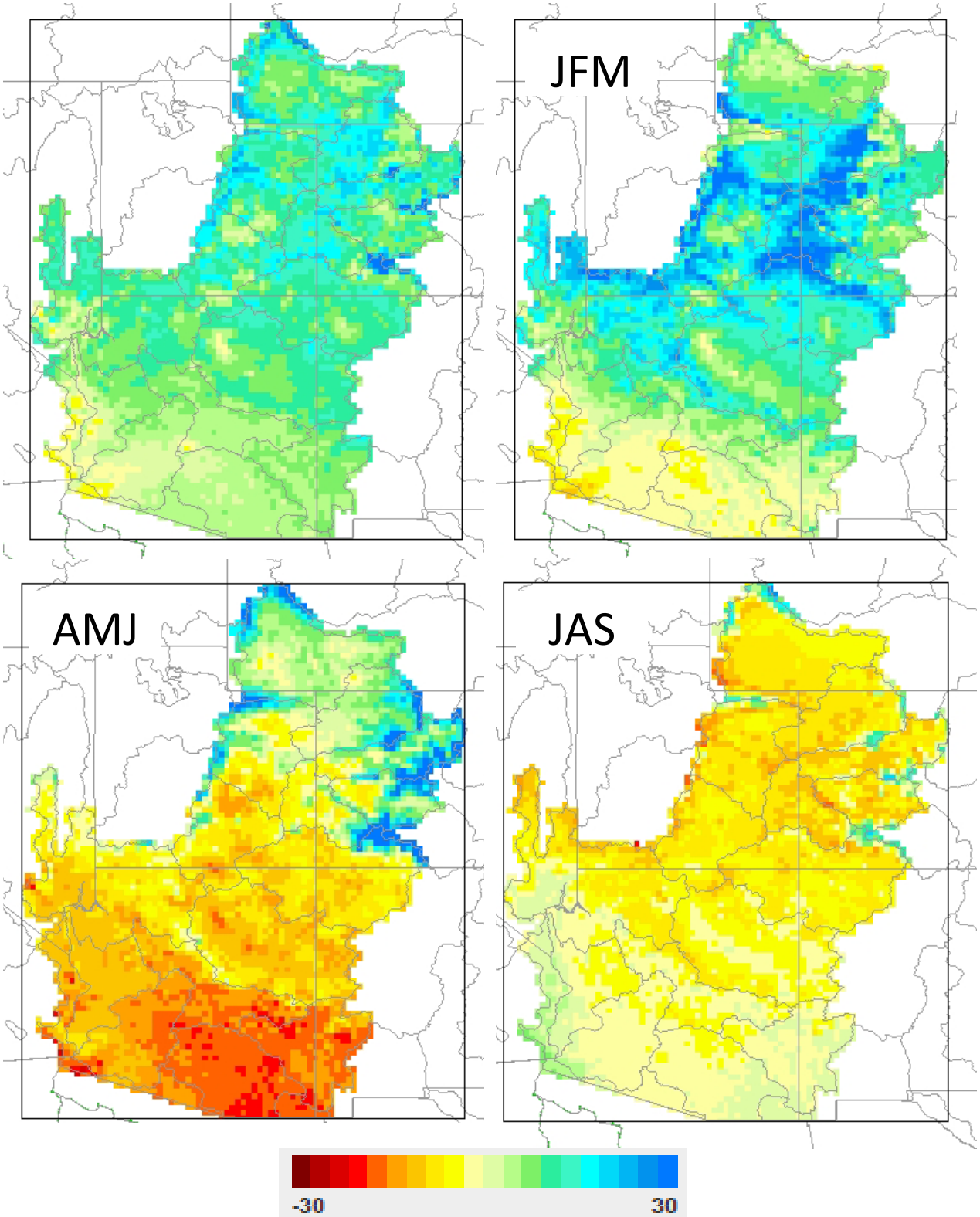

FIGURE B6-17
Projected Percent Change in Mean Seasonal Runoff
2055 (2041–2070) versus 1985 (1971–2000).

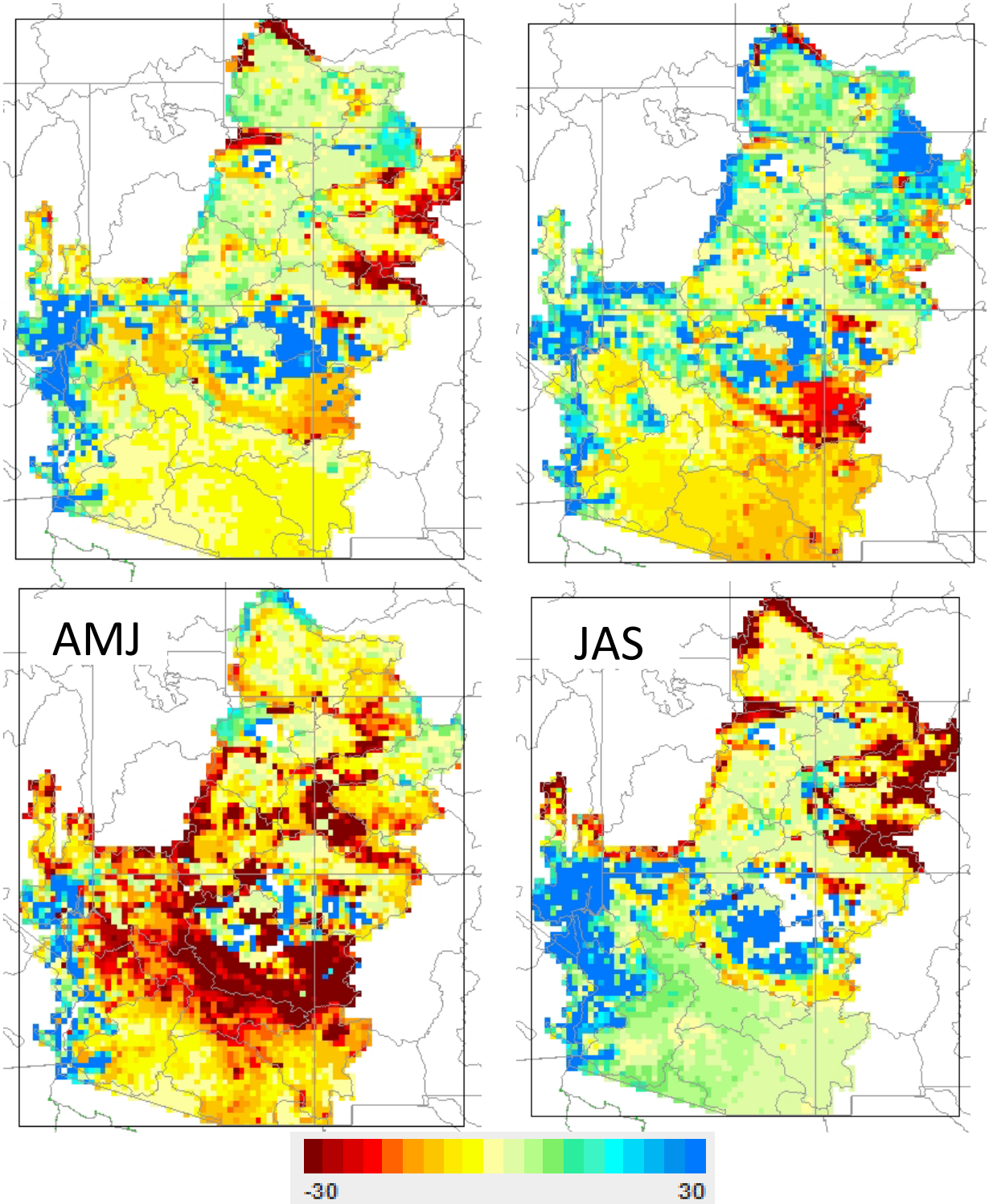

FIGURE B6-18
Projected Percent Change in Mean Seasonal Precipitation
2080 (2066–2095) versus 1985 (1971–2000).

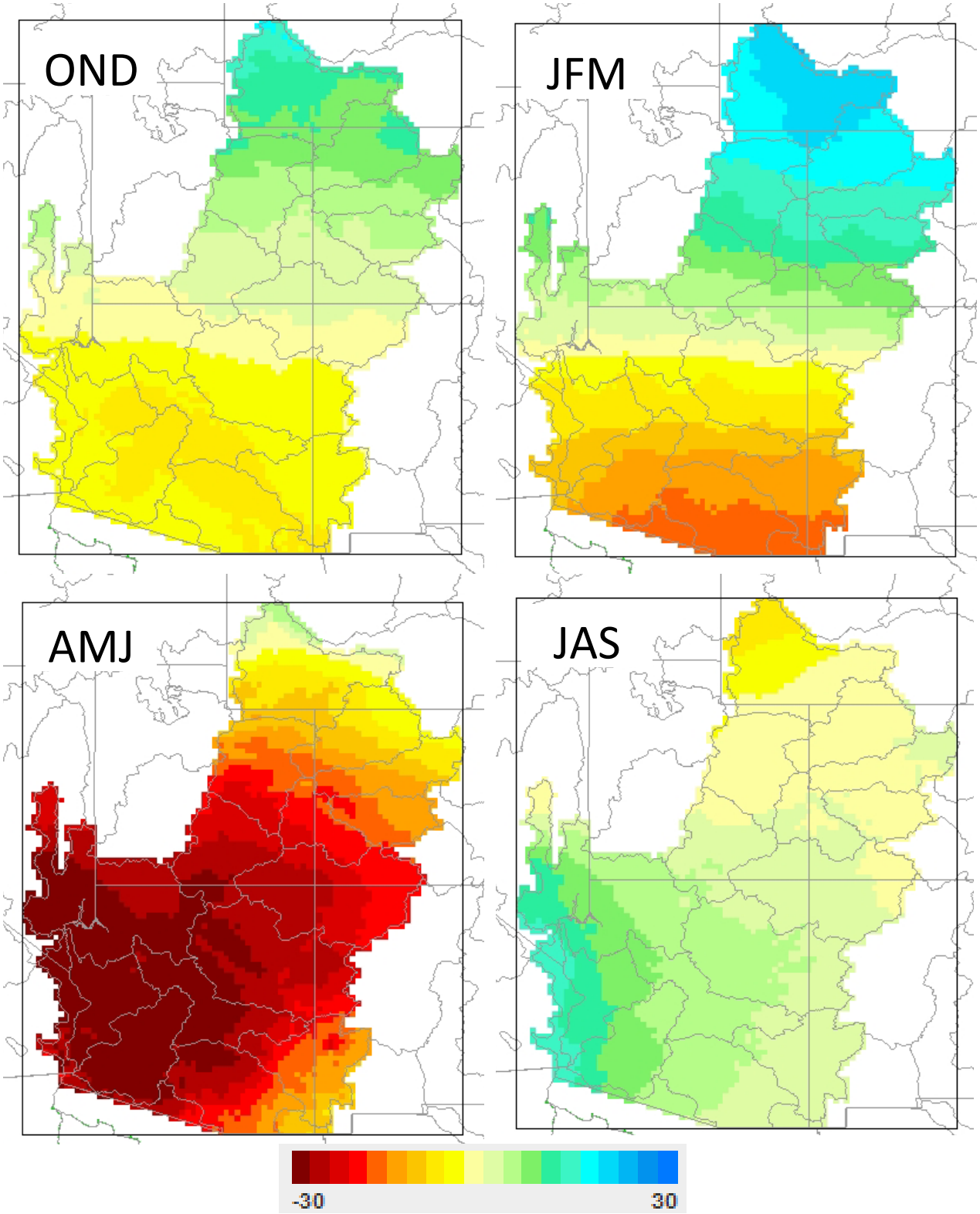

FIGURE B6-19
Projected Change in Mean Seasonal Air Temperature
2080 (2066–2095) versus 1985 (1971–2000). Change shown in degrees Celsius (°C).

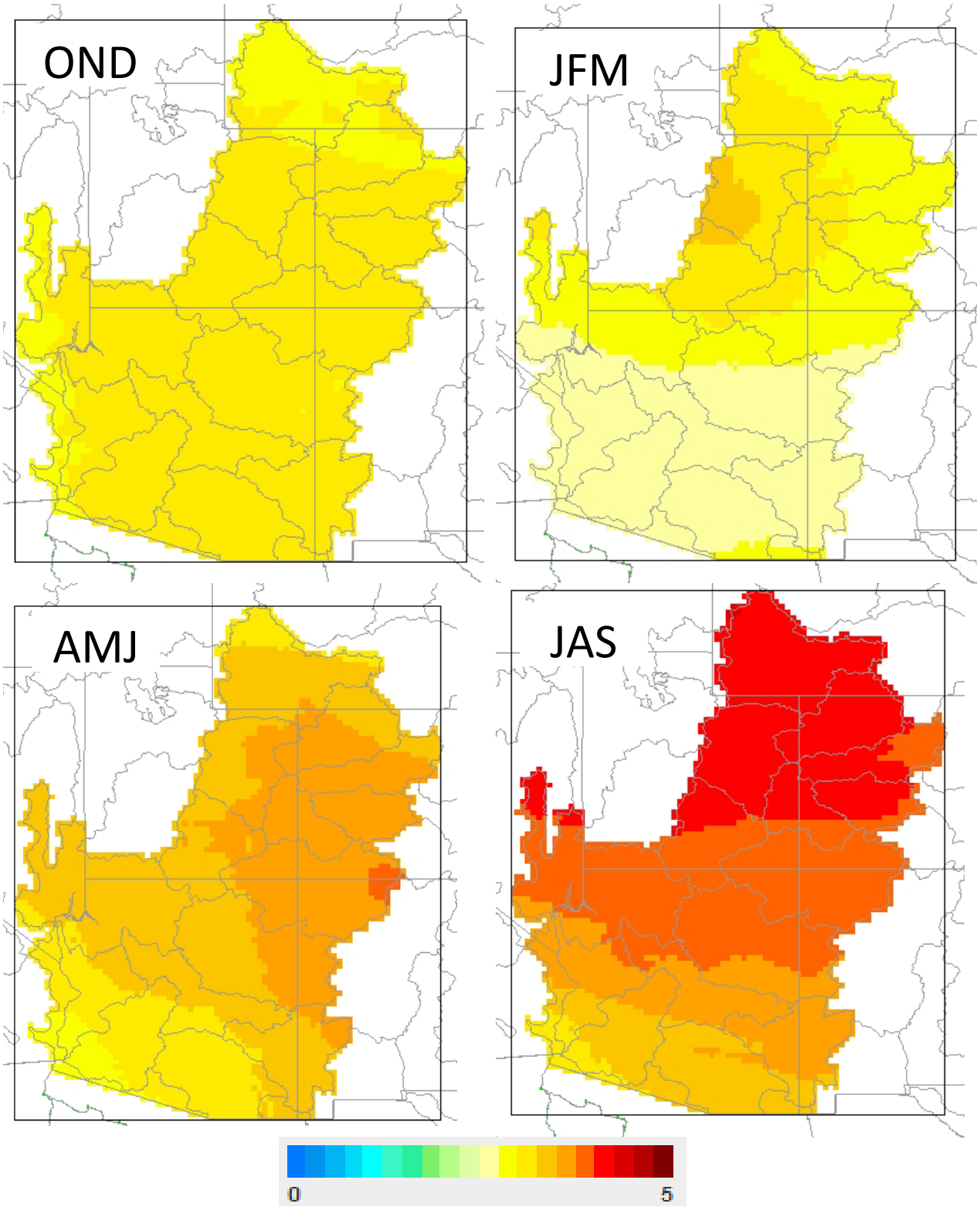

FIGURE B6-20
Projected Percent Change in Mean Seasonal Evapotranspiration
2080 (2066–2095) versus 1985 (1971–2000).

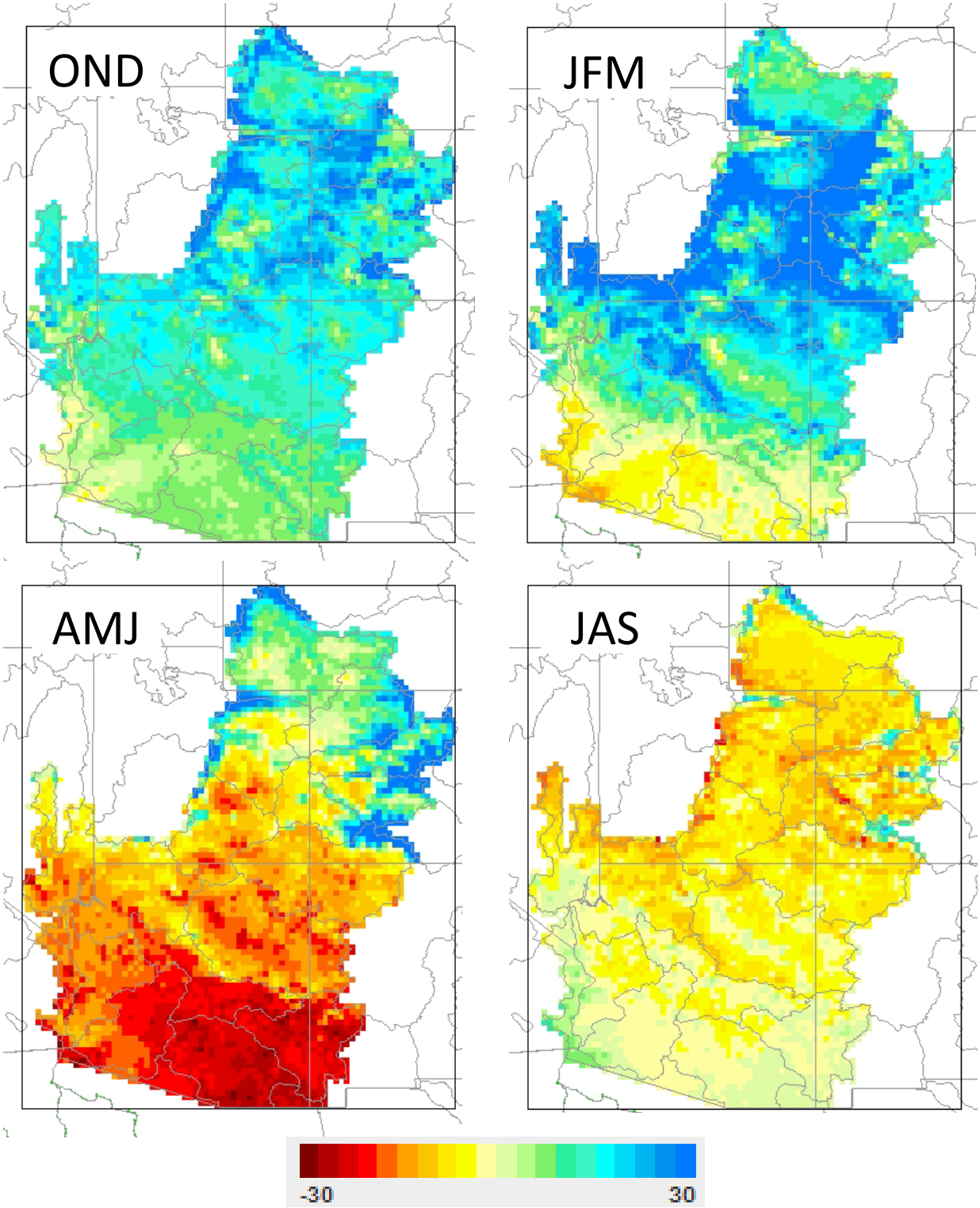
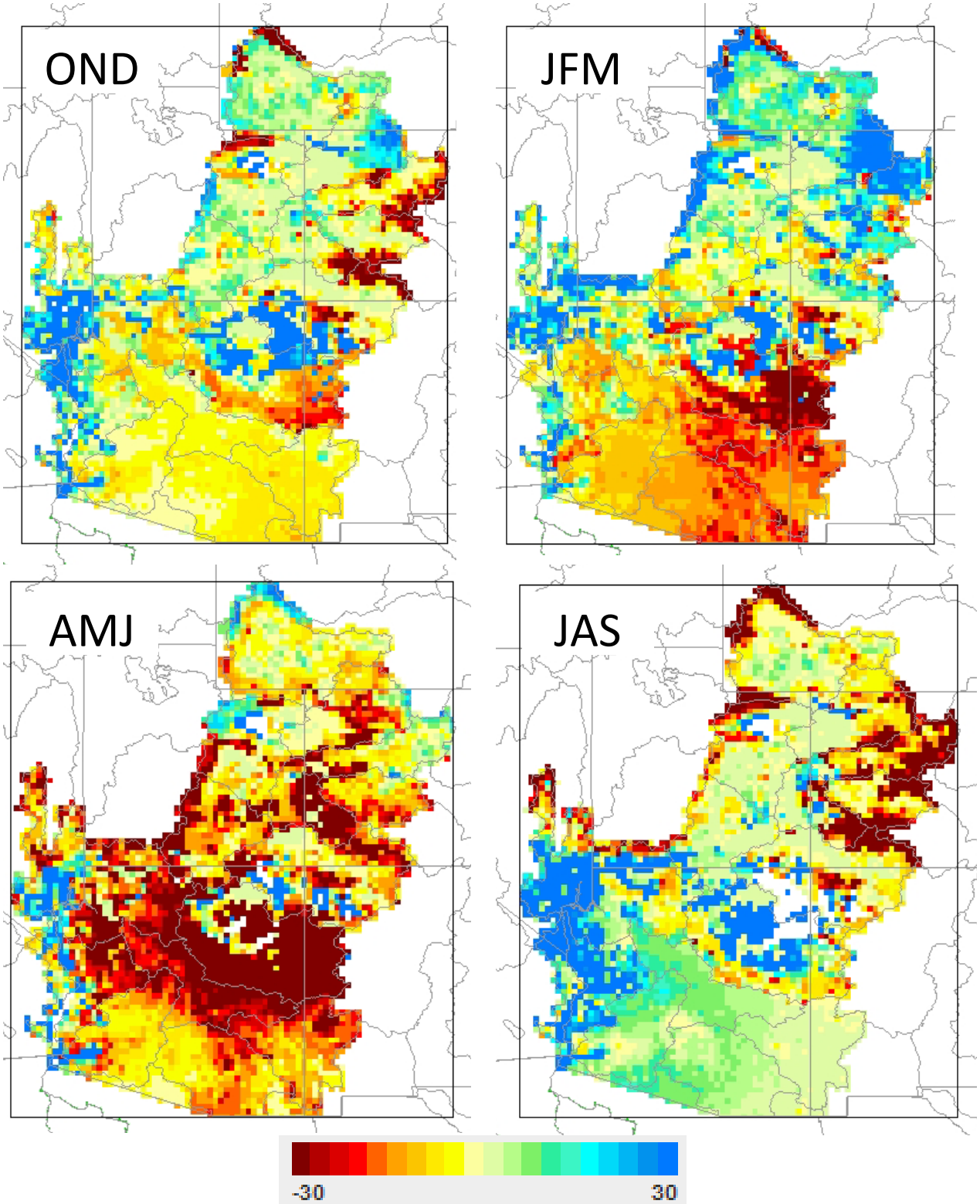
FIGURE B6-21
Projected Percent Change in Mean Seasonal Runoff
2080 (2066–2095) versus 1985 (1971–2000).