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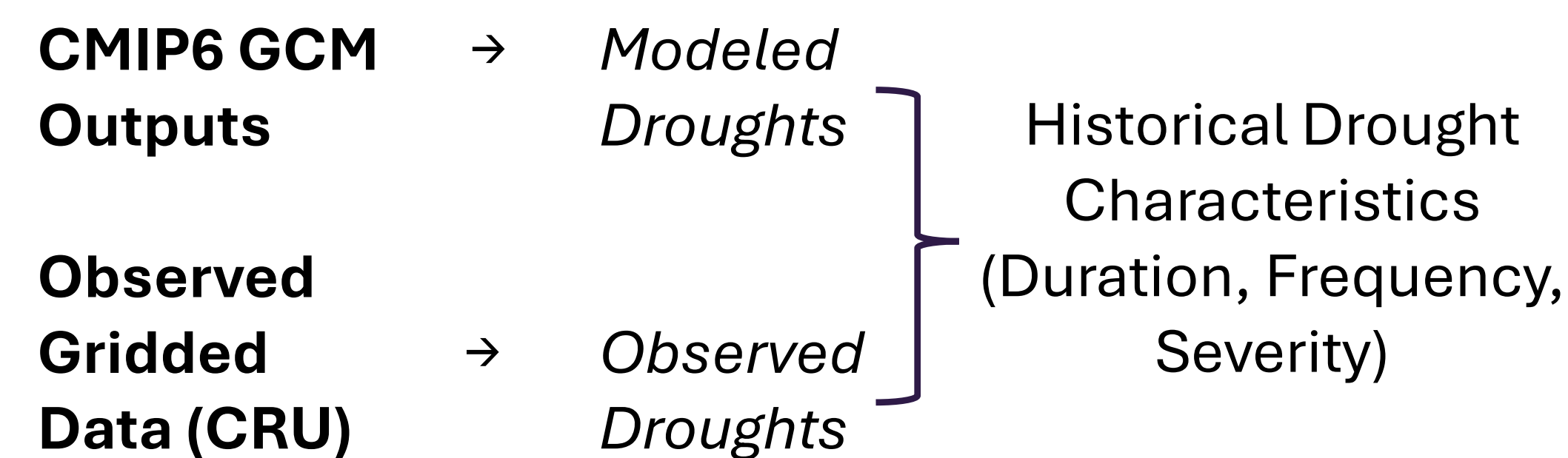
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Background

- Changes in **precipitation** and **temperature** patterns have led to an **increased frequency** of extreme weather events, including **longer and more severe droughts** with warmer global climate.
- While climate model outputs reliably simulate observed climate globally, **biases** in simulations of variables such as **precipitation, temperature,** or derived quantities such as **evapotranspiration** may be **high** in many regions.
- We investigate the **historic model performance** and the **meteorological drought projections** from **CMIP6 GCMs** in warmer global climate.

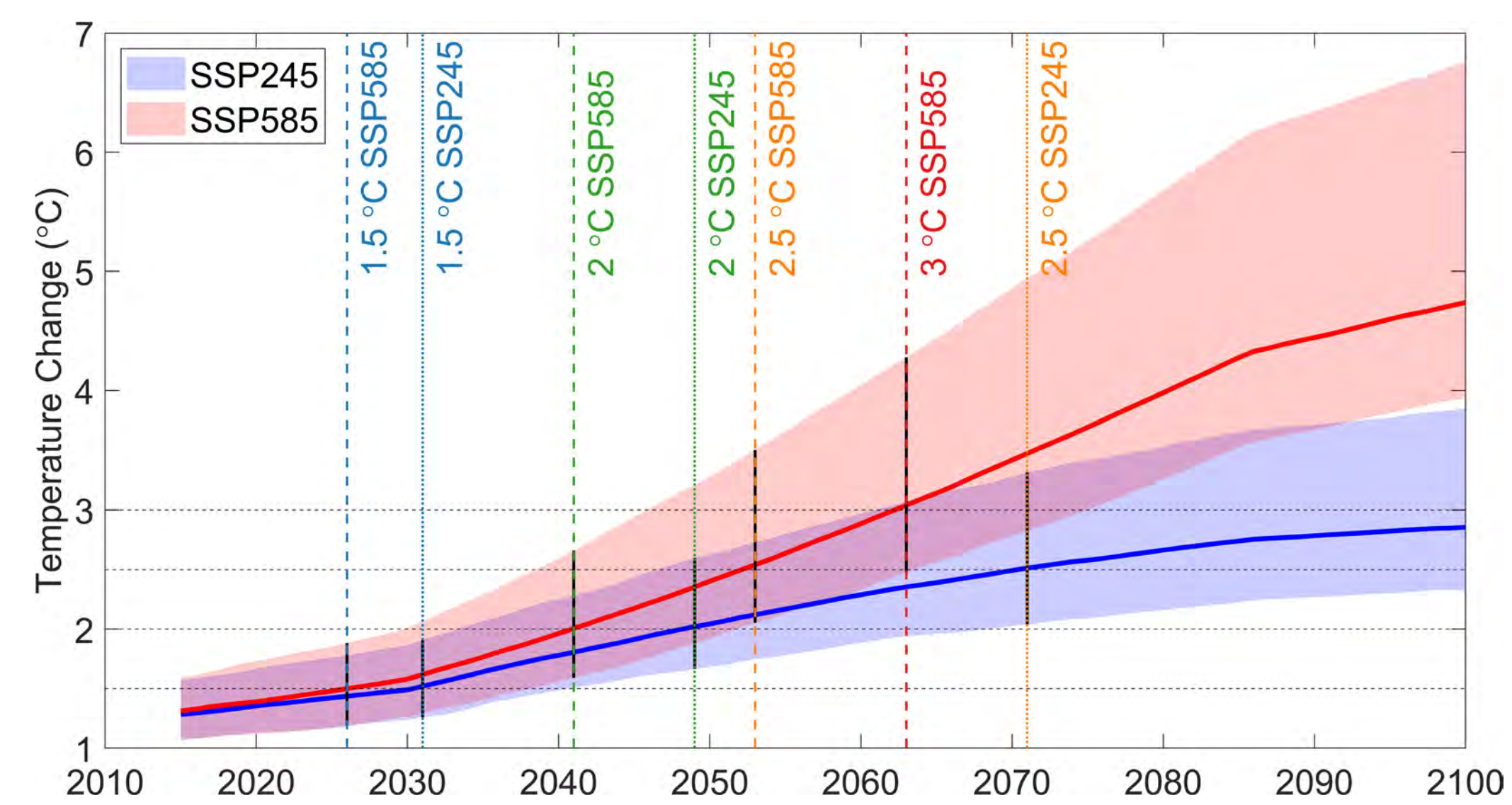
Questions

- CMIP6 models' performance against observations of meteorological droughts in the historical period (1950-2014)

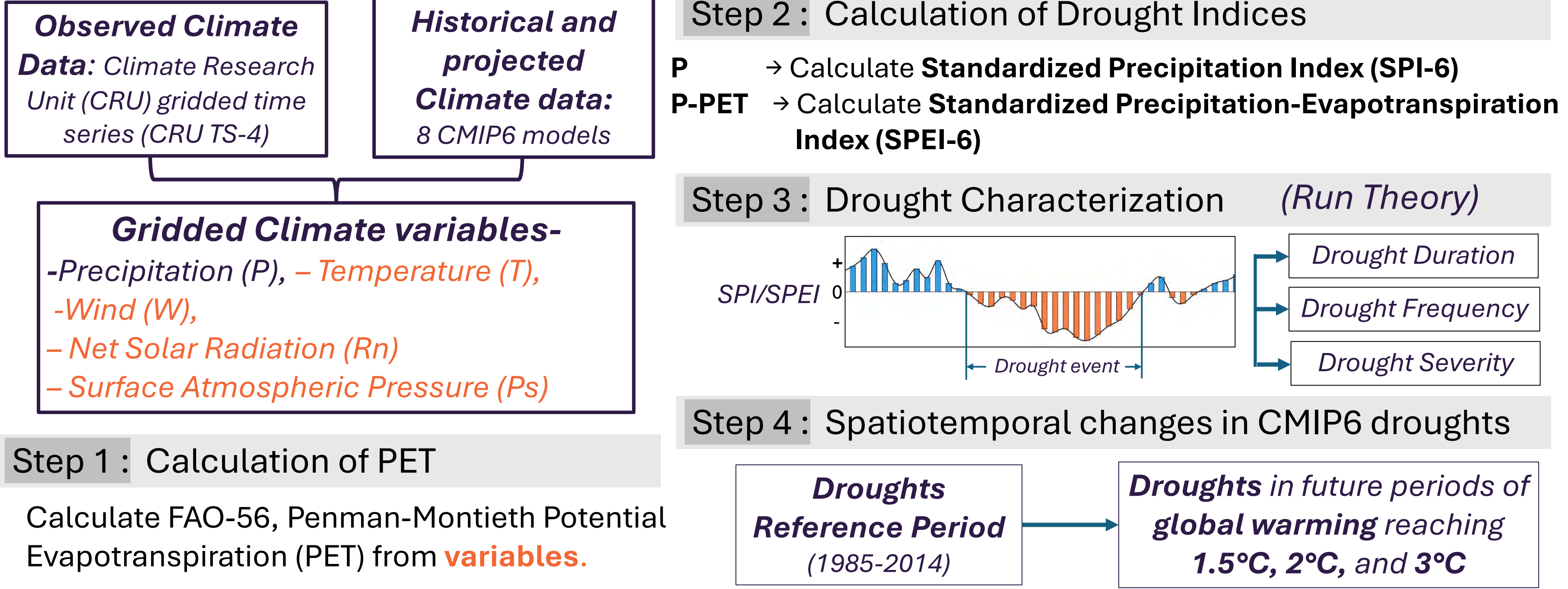


$$\text{Bias} = \frac{\text{CMIP6 drought} - \text{Observed drought}}{\text{Observed drought}}$$

- The **projected changes in meteorological drought characteristics** at different levels of **global warming** (1.5°, 2°, and 3°C) from CMIP6 models.

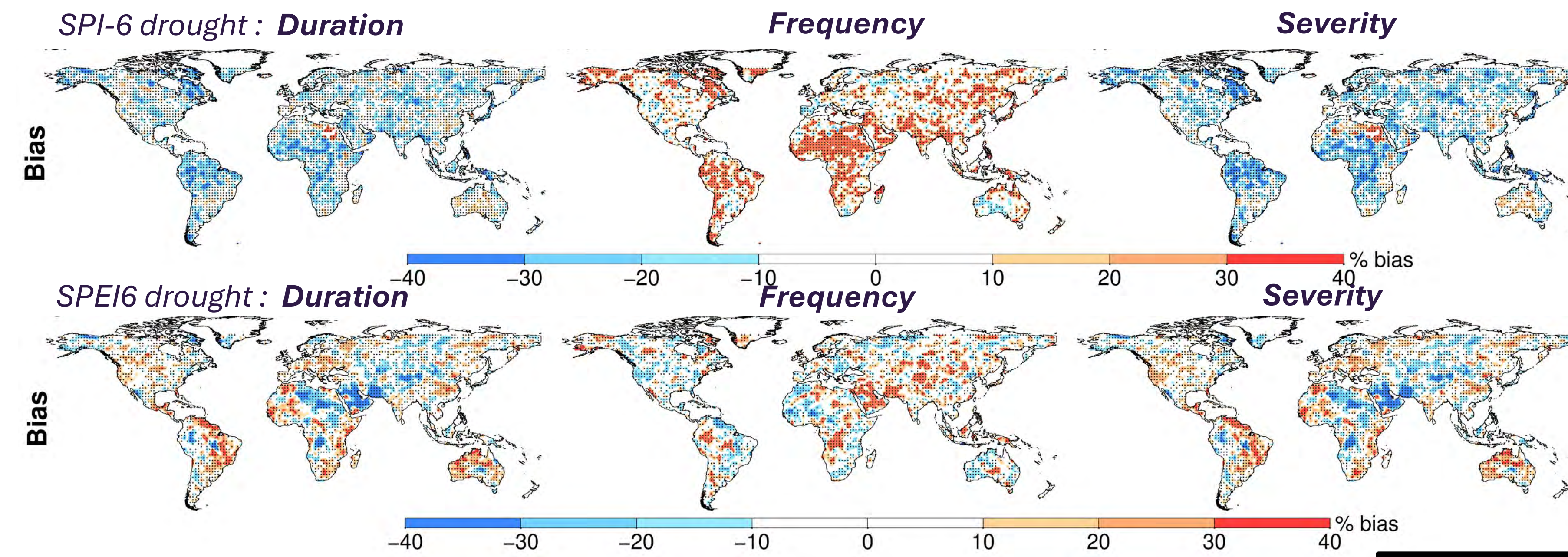


Data and Methods

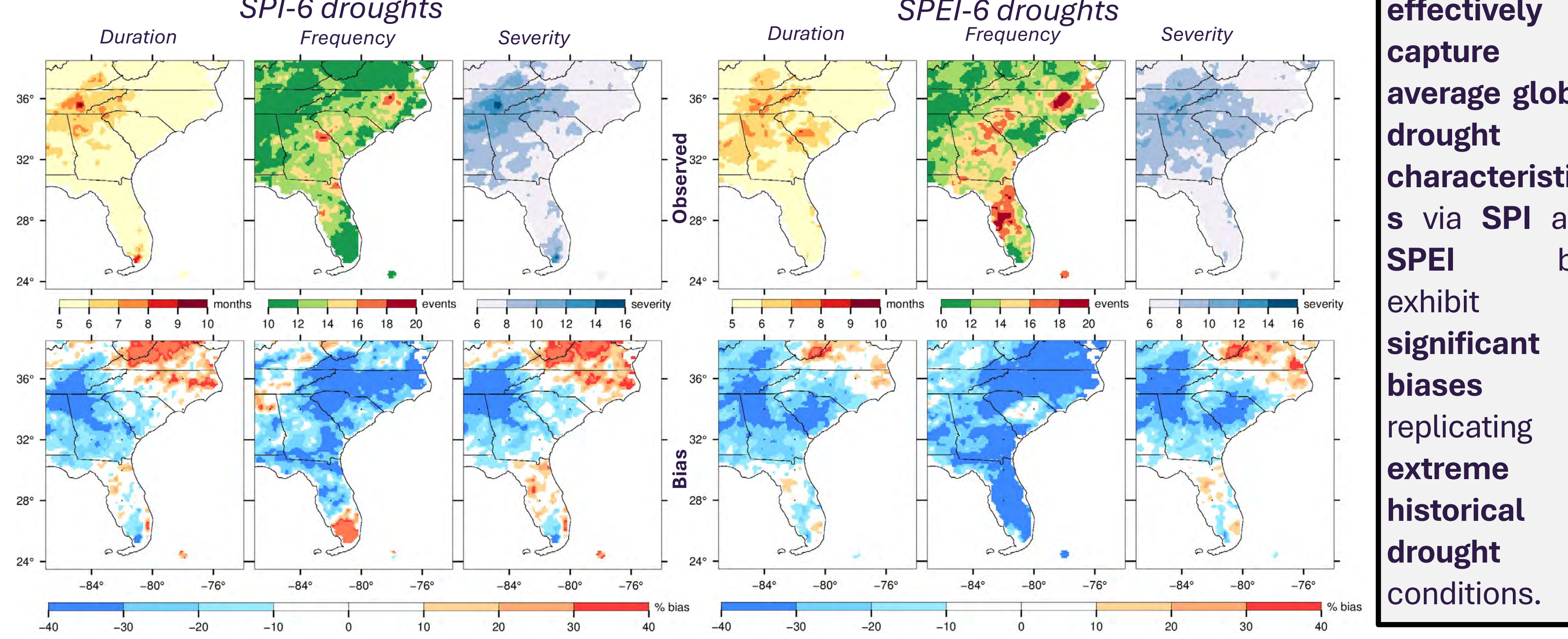


Results

Global historical bias in CMIP6 meteorological droughts

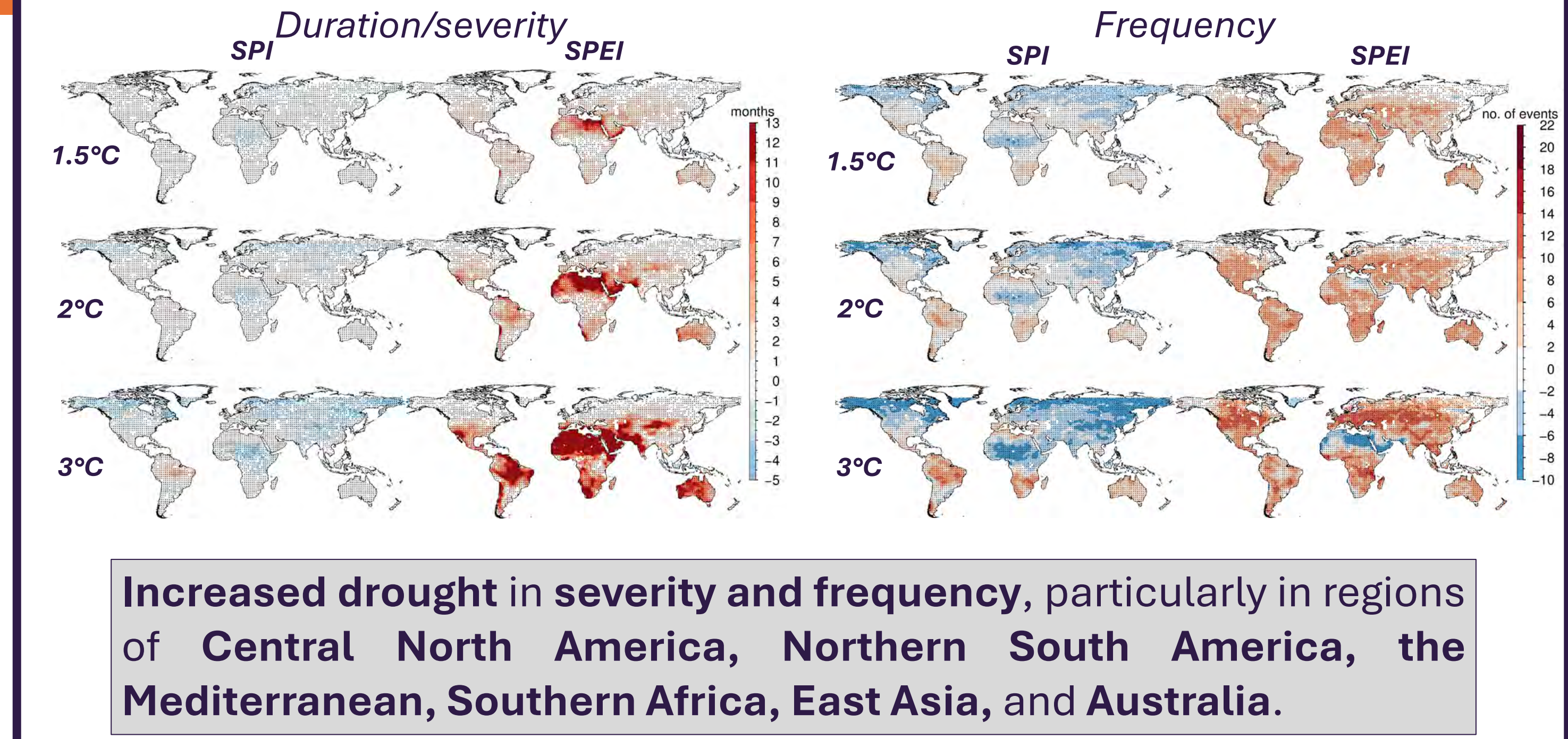


Regional historical bias in CMIP6 meteorological droughts

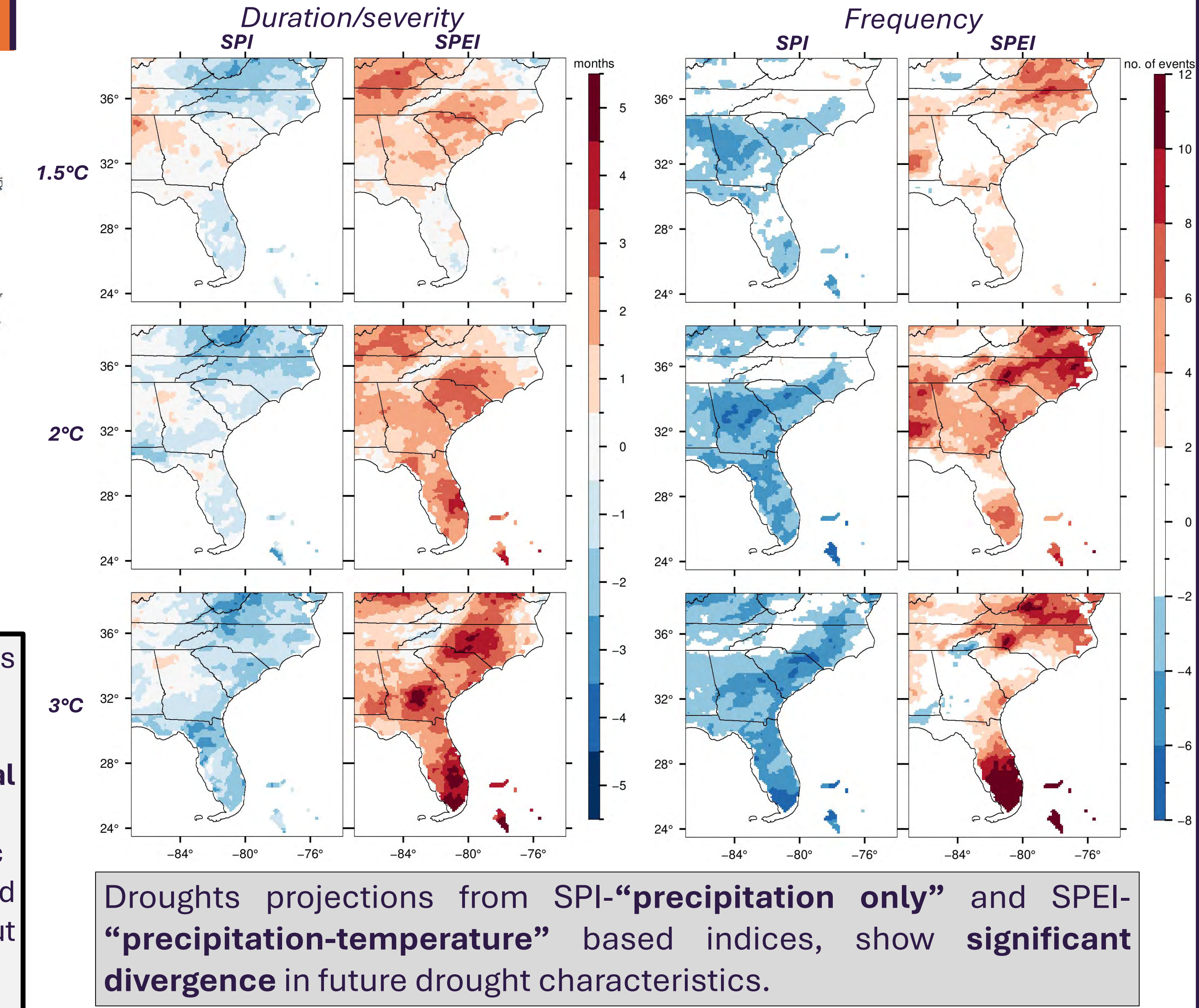


CMIP6 models effectively capture average global drought characteristics via SPI and SPEI but exhibit significant biases replicating extreme historical drought conditions.

Projected changes in meteorological droughts:



Regional projected changes in meteorological droughts



References

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