Supplementary figures

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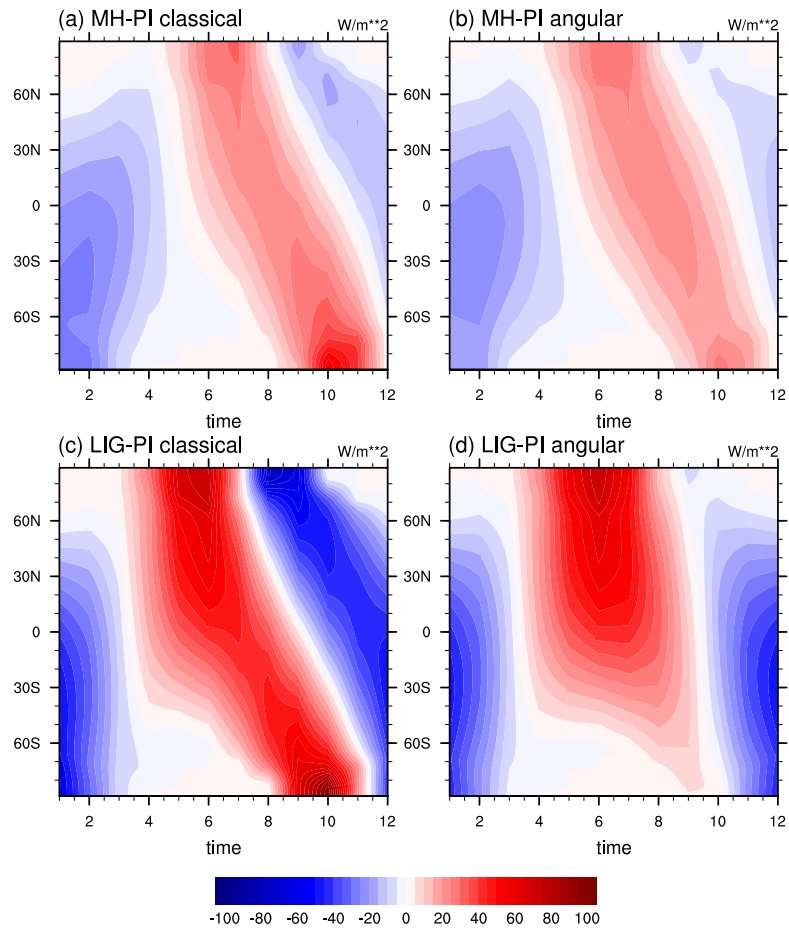**Correspondence:** Xiaoxu Shi (xiaoxu.shi@awi.de)

Figure S1. Insolation anomalies relative to PI in (a-b) MH and (c-d) LIG in classical and angular calendar.
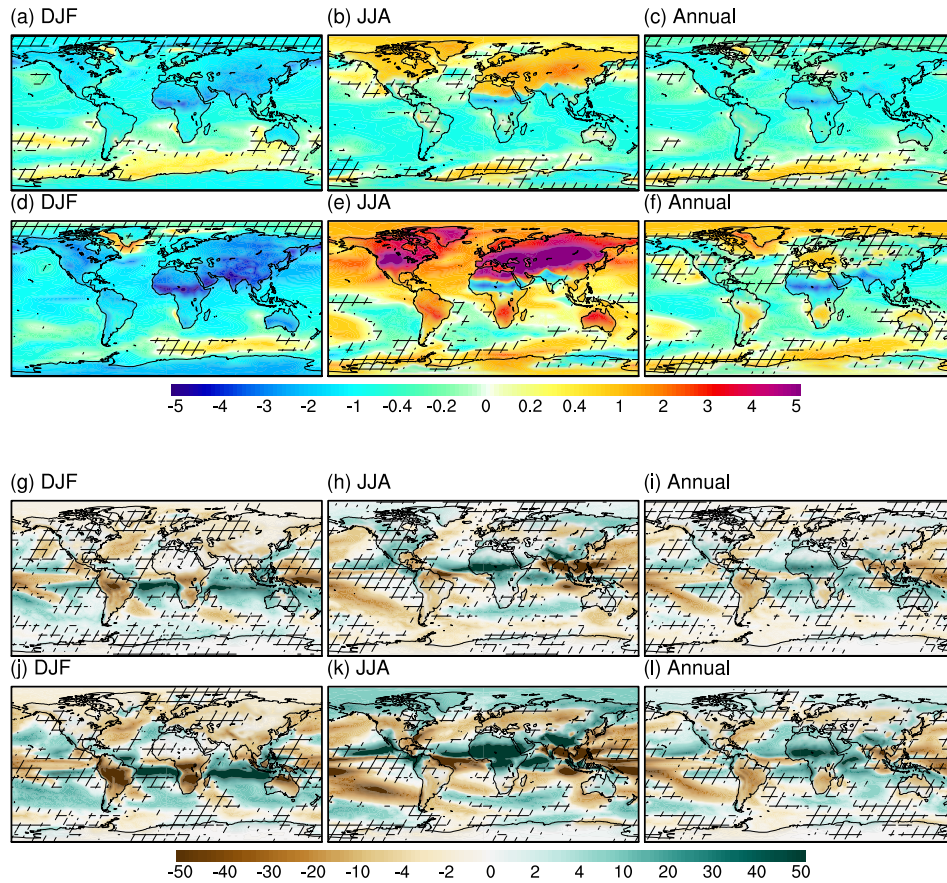
Figure S2. (a-c) Anomalies of surface air temperature between MH and PI for (a) DJF, (b) JJA, and (c) annual mean. Units: K. (d-f) As in a-c, but for anomalies of surface air temperature between LIG and PI. (g-l) As in a-d, but for precipitation. The unmarked area indicates that at least 7 out of the 9 models show the same sign. Units: mm/month.
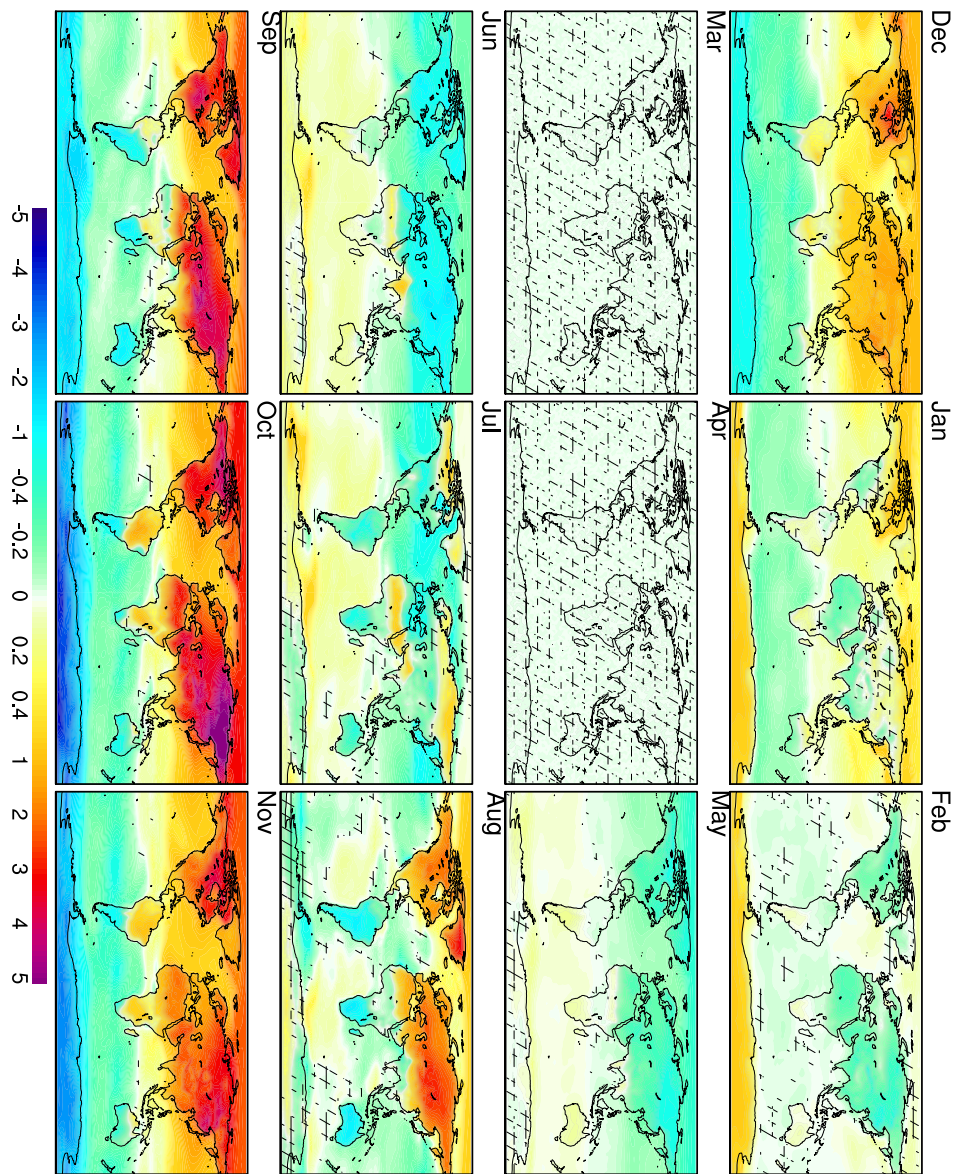
Figure S3. Anomalies of surface air temperature between angular and classical means in LIG for each month. The unmarked area indicates that at least 7 out of the 9 models show the same sign. Units: K.
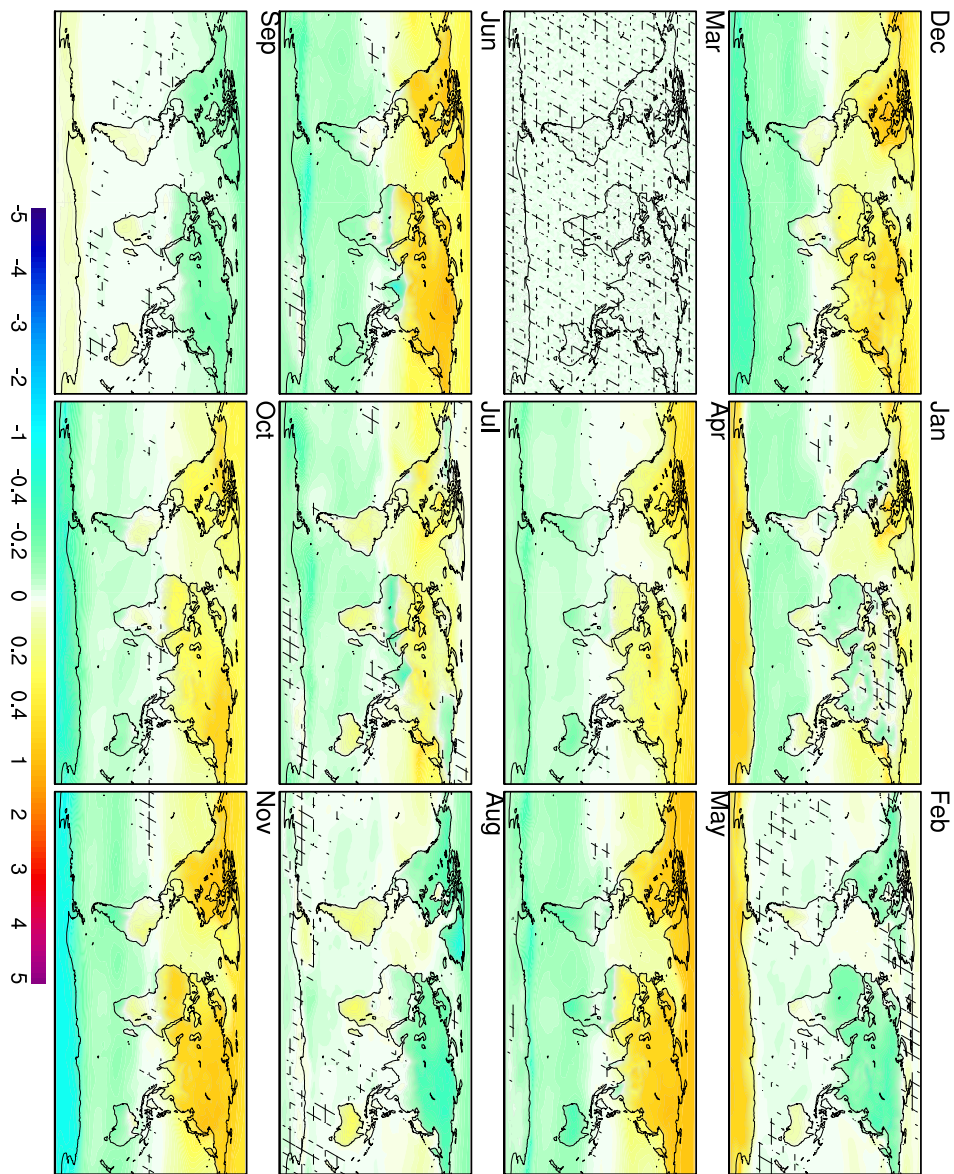
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Figure S4. Anomalies of surface air temperature between angular and classical means in MH for each month. The unmarked area indicates that at least 7 out of the 9 models show the same sign. Units: K.
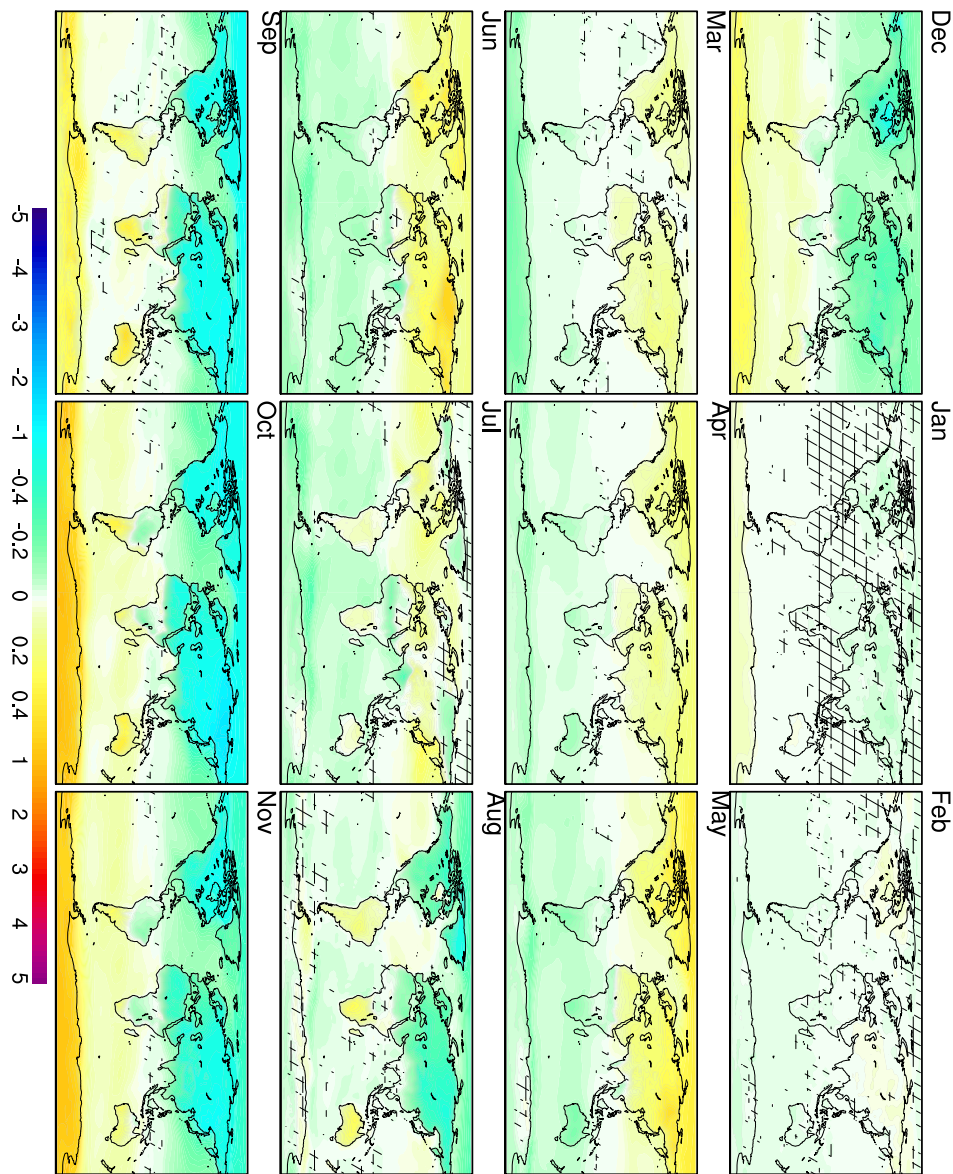
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Figure S5. Anomalies of surface air temperature between angular and classical means in PI for each month. The unmarked area indicates that at least 7 out of the 9 models show the same sign. Units: K.
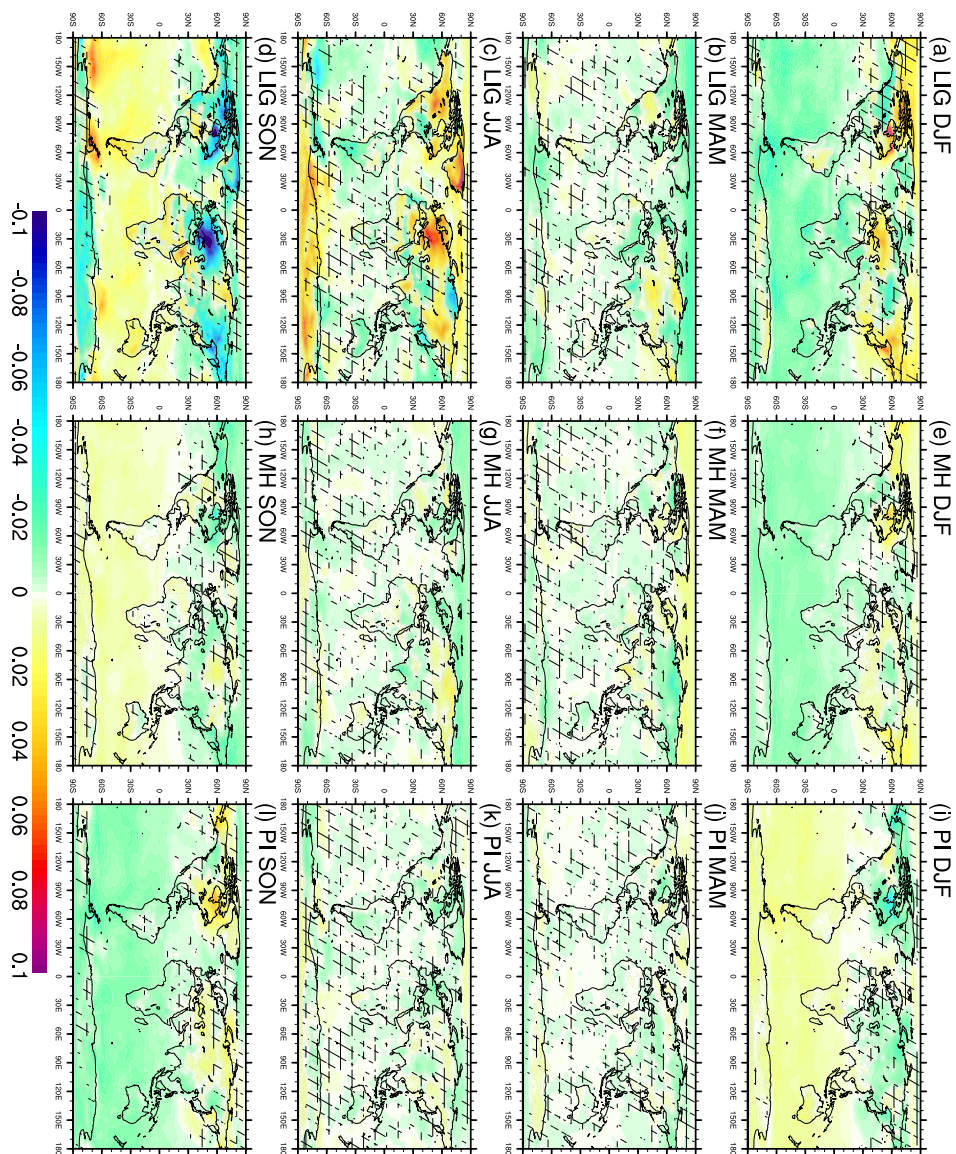
Figure S6. Anomalies of surface air temperature between day-length adjusted values and month-length adjusted values. The unmarked area indicates that at least 7 out of the 9 models show the same sign. Units: K.

Figure S7. Anomalies of precipitation between day-length adjusted values and month-length adjusted values. The unmarked area indicates that at least 7 out of th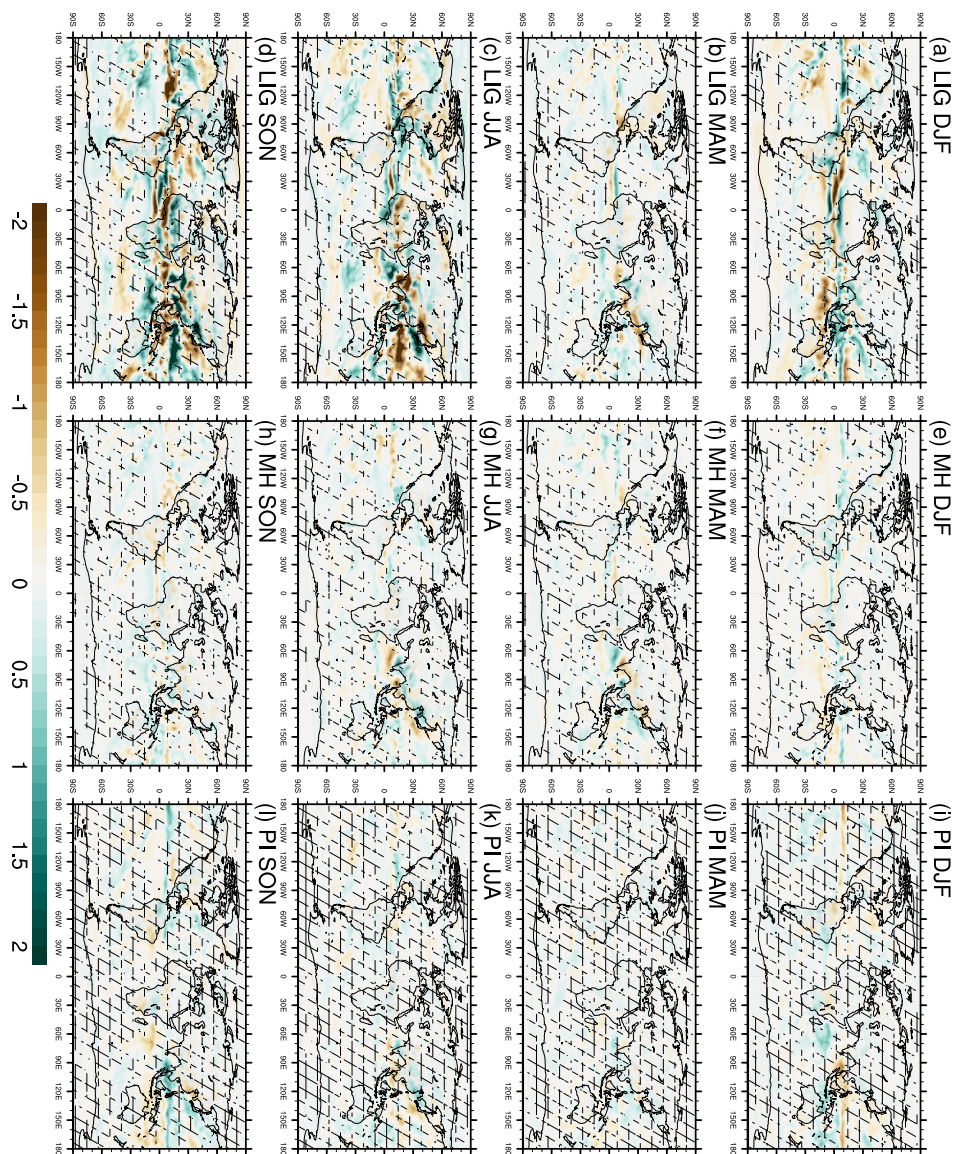e 9 models show the same sign. Units: K.