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**Table S1.** Spatial RMSE and  $r$  for the climatological mean HWMId under the recent past climate (1981–2020). Numbers are given the three pairs of simulations for the GCMs\* as well as for each of the four RCMs driven by the three GCMs (i.e., columns of Fig. 3).

| GCM          |      | HIRHAM5 |   | RACMO22E |      | RCA4 |      | REMO2015 |   |      |
|--------------|------|---------|---|----------|------|------|------|----------|---|------|
| <b>RMSE:</b> |      |         |   |          |      |      |      |          |   |      |
|              | E    | H       |   | E        | H    |      | E    | H        |   |      |
| H            | 1.44 |         | H | 0.78     |      | H    | 1.13 |          | H | 1.04 |
| N            | 1.57 | 1.36    | N | 0.95     | 0.92 | N    | 1.03 | 1.27     | N | 1.11 |
|              |      |         |   |          |      |      |      |          |   |      |
| $r^{**}$ :   |      |         |   |          |      |      |      |          |   |      |
|              | E    | H       |   | E        | H    |      | E    | H        |   |      |
| H            | 0.48 |         | H | 0.86     |      | H    | 0.79 |          | H | 0.75 |
| N            | 0.29 | 0.08    | N | 0.65     | 0.71 | N    | 0.50 | 0.51     | N | 0.56 |
|              |      |         |   |          |      |      |      |          |   |      |

\* Abbreviations: E for EC-EARTH, H for HadGEM2-ES, and N for NorESM1-M.

\*\* All are statistically significant at  $p < 0.01$ .

**Table S2.** Similar to Table S1 but for the ten pairs of simulations (RCM simulations along with their driving GCM simulation) regarding a single driving GCM (i.e., rows of Fig. 3).

|                    | RMSE |         |          |      | $r^*$ |         |          |      |
|--------------------|------|---------|----------|------|-------|---------|----------|------|
|                    | GCM  | HIRHAM5 | RACMO22E | RCA4 | GCM   | HIRHAM5 | RACMO22E | RCA4 |
| <b>EC-EARTH:</b>   |      |         |          |      |       |         |          |      |
| HIRHAM5            | 1.21 |         |          |      | 0.35  |         |          |      |
| RACMO22E           | 0.92 | 0.87    |          |      | 0.57  | 0.71    |          |      |
| RCA4               | 1.29 | 0.92    | 0.90     |      | 0.37  | 0.73    | 0.71     |      |
| REMO2015           | 1.15 | 0.80    | 1.05     | 1.08 | 0.30  | 0.81    | 0.63     | 0.68 |
| <b>HadGEM2-ES:</b> |      |         |          |      |       |         |          |      |
| HIRHAM5            | 1.42 |         |          |      | 0.28  |         |          |      |
| RACMO22E           | 0.99 | 1.14    |          |      | 0.58  | 0.63    |          |      |
| RCA4               | 1.21 | 1.00    | 0.97     |      | 0.51  | 0.65    | 0.70     |      |
| REMO2015           | 1.50 | 0.90    | 1.39     | 1.25 | 0.42  | 0.79    | 0.72     | 0.61 |
| <b>NorESM1-M:</b>  |      |         |          |      |       |         |          |      |
| HIRHAM5            | 1.29 |         |          |      | 0.56  |         |          |      |
| RACMO22E           | 1.14 | 0.96    |          |      | 0.51  | 0.50    |          |      |
| RCA4               | 1.42 | 0.87    | 0.92     |      | 0.40  | 0.51    | 0.53     |      |
| REMO2015           | 1.40 | 0.76    | 1.03     | 0.90 | 0.61  | 0.71    | 0.52     | 0.49 |

\* All are statistically significant at  $p < 0.01$ .

**Table S3.** Similar to Table S2 but for the ensemble means and spreads along the GCM dimension (i.e., rows of Fig. 5).

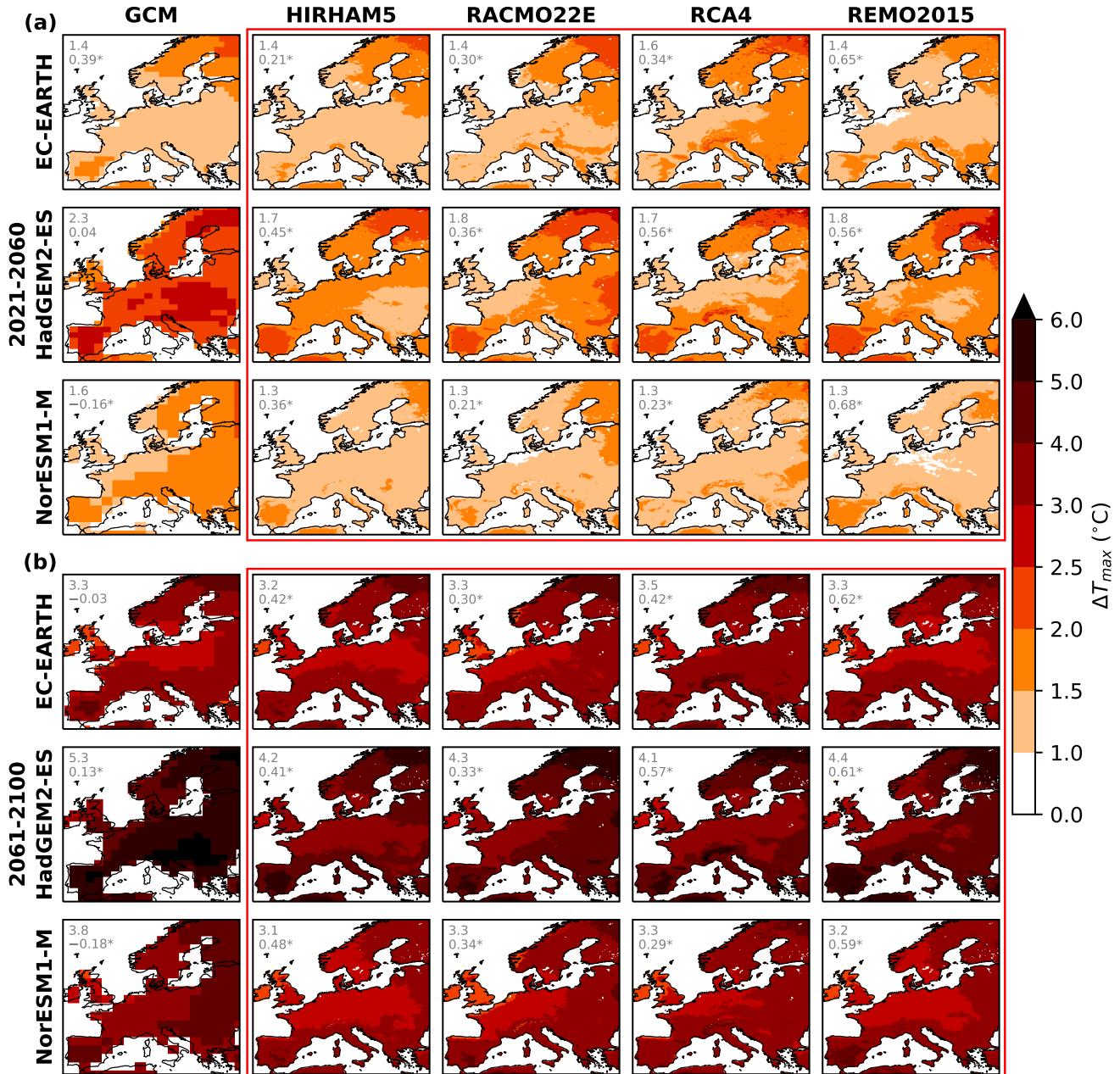
| RMSE             |         |          |      | $r^*$ |              |          |      |
|------------------|---------|----------|------|-------|--------------|----------|------|
| GCM              | HIRHAM5 | RACMO22E | RCA4 | GCM   | HIRHAM5      | RACMO22E | RCA4 |
| Ensemble mean:   |         |          |      |       |              |          |      |
| HIRHAM5          | 1.03    |          |      |       | 0.37         |          |      |
| RACMO22E         | 0.75    | 0.85     |      |       | 0.58         | 0.66     |      |
| RCA4             | 0.90    | 0.76     | 0.69 |       | 0.46         | 0.68     | 0.73 |
| REMO2015         | 1.09    | 0.60     | 0.98 | 0.85  | 0.38         | 0.89     | 0.70 |
|                  |         |          |      |       |              |          | 0.69 |
| Ensemble spread: |         |          |      |       |              |          |      |
| HIRHAM5          | 1.01    |          |      |       | <u>-0.02</u> |          |      |
| RACMO22E         | 1.01    | 0.78     |      |       | 0.11         | 0.33     |      |
| RCA4             | 1.21    | 0.81     | 0.87 |       | -0.14        | 0.41     | 0.30 |
| REMO2015         | 1.00    | 0.65     | 0.83 | 0.95  | <u>-0.02</u> | 0.20     | 0.27 |
|                  |         |          |      |       |              |          | 0.12 |

\* All other than those underlined are statistically significant at  $p < 0.01$ .

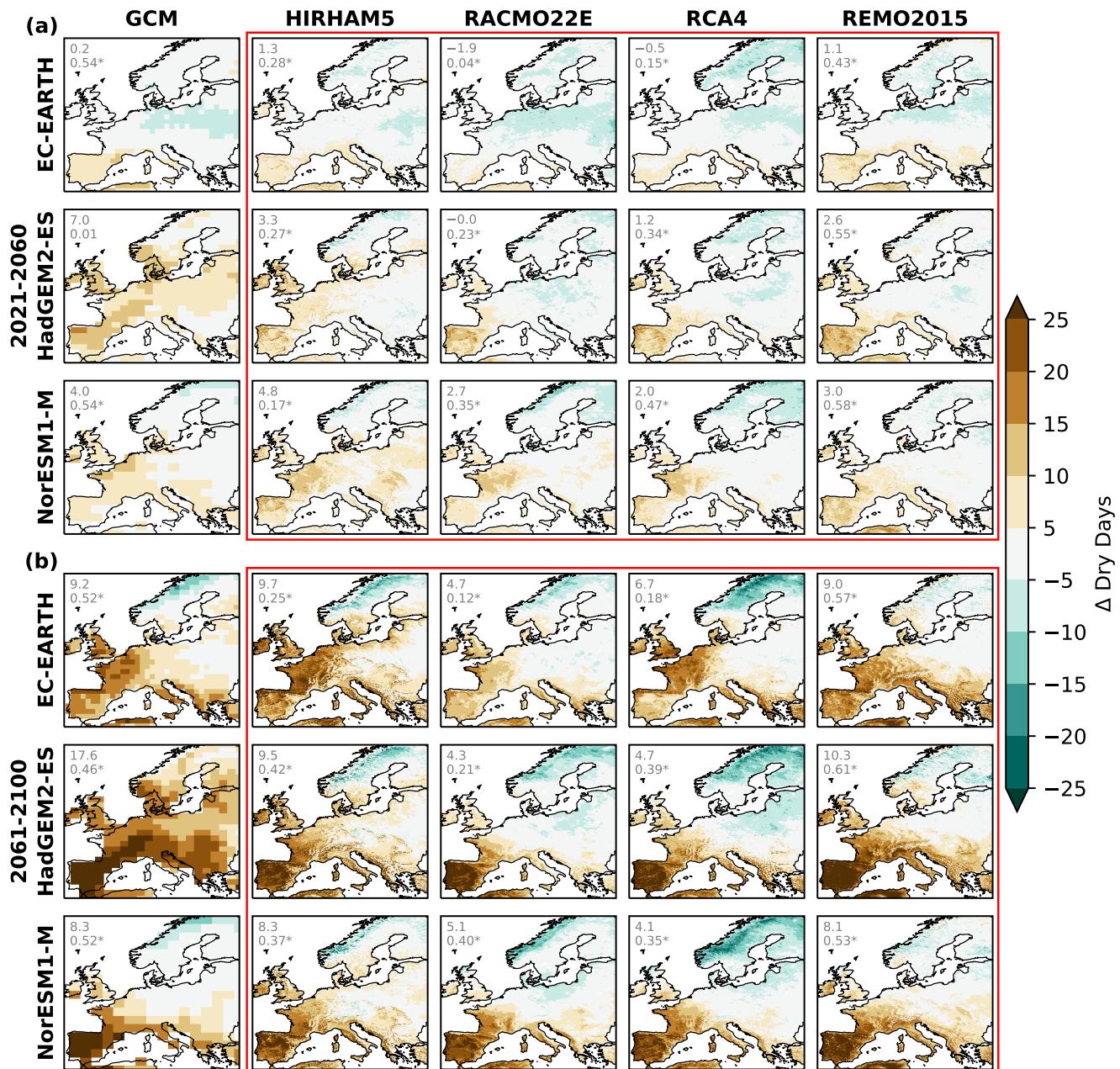
**Table S4.** Spatial RMSE and  $r$  for the change in the annual mean of daily maximum temperature in the nearest decades (2021–2060) and in the end of the century (2061–2100) relative to the recent past climate (Fig. S1) between each RCM simulation and its driving GCM simulation.

|                   | RMSE |         |          |      | $r^*$ |         |          |      |
|-------------------|------|---------|----------|------|-------|---------|----------|------|
|                   | GCM  | HIRHAM5 | RACMO22E | RCA4 | GCM   | HIRHAM5 | RACMO22E | RCA4 |
| <b>2021–2060:</b> |      |         |          |      |       |         |          |      |
| EC-EARTH          | 0.13 | 0.18    | 0.27     | 0.15 | 0.89  | 0.85    | 0.82     | 0.83 |
| HadGEM2-ES        | 0.77 | 0.68    | 0.76     | 0.71 | 0.12  | 0.34    | 0.30     | 0.17 |
| NorESM1-M         | 0.38 | 0.33    | 0.33     | 0.46 | 0.60  | 0.78    | 0.70     | 0.36 |
| <b>2061–2100:</b> |      |         |          |      |       |         |          |      |
| EC-EARTH          | 0.18 | 0.30    | 0.41     | 0.23 | 0.92  | 0.82    | 0.86     | 0.88 |
| HadGEM2-ES        | 1.37 | 1.20    | 1.39     | 1.14 | 0.47  | 0.53    | 0.51     | 0.58 |
| NorESM1-M         | 0.86 | 0.65    | 0.64     | 0.75 | 0.60  | 0.81    | 0.71     | 0.63 |

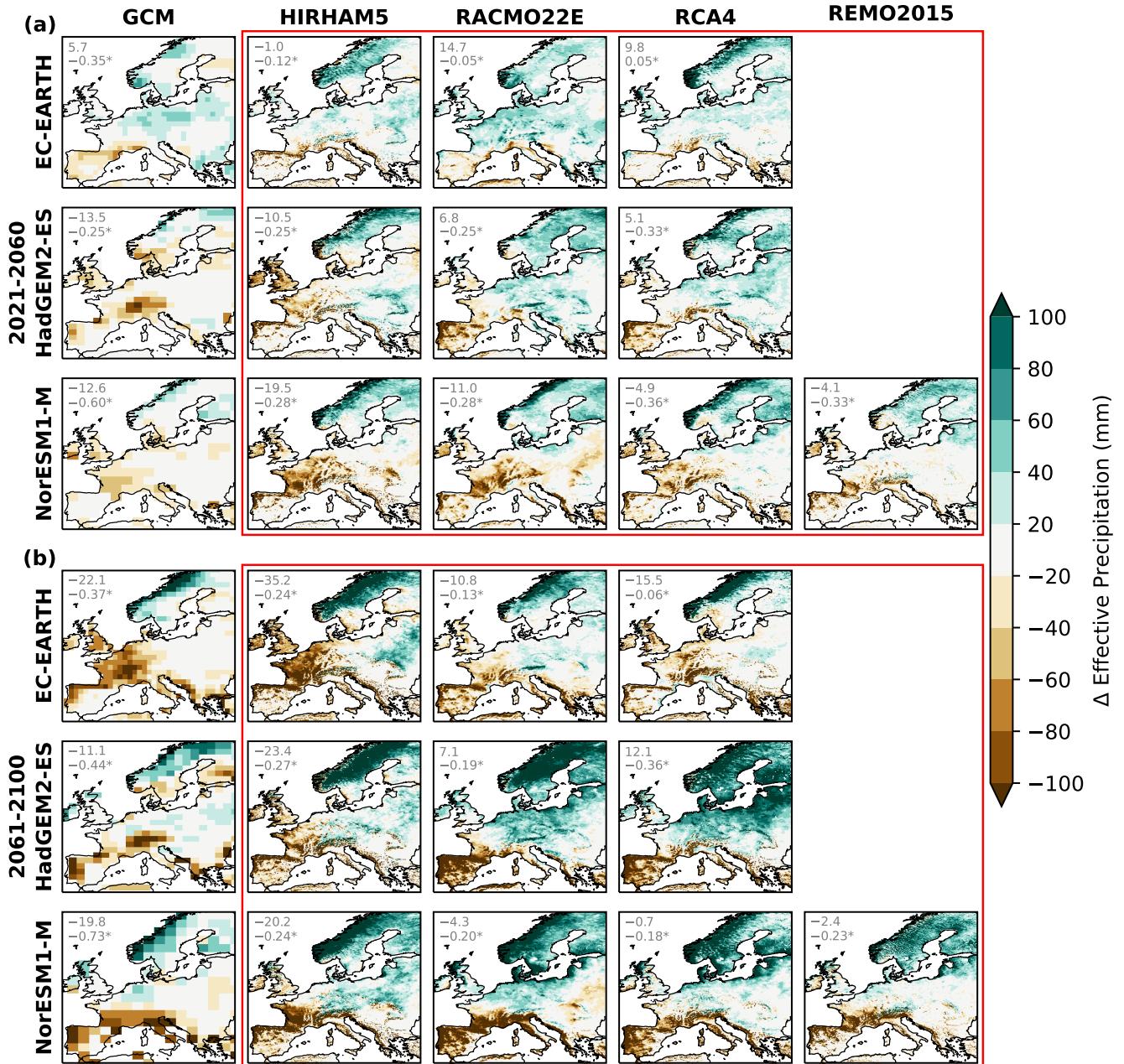
\* All are statistically significant at  $p < 0.01$ .



**Figure S1.** Change in the annual mean of daily maximum temperature in the nearest decades (**a**: 2021–2060) and in the end of the century (**b**: 2061–2100) relative to the recent past climate. The numerals in each map show the area-weighted average and the spatial  $r$  with the relevant change in HWMid (with '\*' indicating statistically significant at  $p < 0.05$ ).



**Figure S2.** As Fig. S1 but for the change in the annual number of dry days (with precipitation less than 1 mm).



**Figure S3.** As Fig. S1 but for the change in the annual mean of effective precipitation. Due to the missing evaporation data in the simulations of REMO2015 driven by EC-EARTH and HadGEM2-ES, the relevant places are left blank.