**Supplemental Information**

**Tables**

***Table 1:*** *18**CMIP6 models.*

|  |  |  |
| --- | --- | --- |
| **Model name** | **Country** | **Horizontal and vertical resolution** |
| ACCESS-ESM-1-5 | AUSTRALIA | 1.3°x1.9°, L38 |
| BCC-CSM2-MR | CHINA | 1.1°x1.1°, L46 |
| CAN-ESM5 | CANADA | 2.8°x2.8°, L49 |
| CESM2 | USA | 0.9°x1.3°, L32 |
| CNRM-ESM2-1 | FRANCE | 1.0°x1.0°, L91 |
| EC-Earth3-Veg | SWEDEN | 0.7°x0.7°, L91 |
| FGOALS-g3 | CHINA | 2.3°x2.0°, L26 |
| GFDL-ESM4 | USA | 1.0°x1.0°, L49 |
| HadGEM3-GC31-LL | UK | 1.3°x1.9°, L85 |
| INM-CM5-0 | RUSSIA | 1.5°x2.0°, L73 |
| IPSL-CM6A-LR | FRANCE | 1.3°x1.9°, L79 |
| MIROC6 | JAPAN | 1.4°x1.4°, L81 |
| MPI-ESM-1.2 | GERMAN | 0.9°x0.9°, L95 |
| MRI-ESM2-0 | JAPAN | 1.1°x1.1°, L80 |
| NESM3 | CHINA | 1.9°x1.9°, L47 |
| NorESM2-LM | NORWAY | 1.9°x2.5°, L32 |
| KACE | KOREA | 1.3°x1.9°, L85 |
| UKESM1-0-LL | UK | 1.3°x1.9°, L85 |

**Supplemental Figures**

**Fig. S1:** Same as Fig. 1, but for CMIP6 simulations.

Map

Description automatically generated

Stippling represents at least 80% of the models agree with the change sign.

**Fig. S2:**  Same as Fig. 1, but for MPI-GE.



Stippling represents statistical significance at 5% level in student-t test with respect to 100 ensemble variances.

**Fig. S3:** Same as Fig. 1, but for MIROC6-LES.



Stippling represents statistical significance at 5% level in student-t test with respect to 50 ensemble variances.

**Fig. S4:** Same as Fig. 2, but for CMIP6 simulations.

Graphical user interface, application, website

Description automatically generated

Stippling represents at least 80% of the models agree with the change sign.

**Fig. S5:** Same as Fig. 3 a-d, but for CMIP6 simulations.

Chart

Description automatically generated with medium confidence

Other panels in Fig. 3 are not calculated because the necessary 6-hourly model outputs are not available. Stippling represents at least 80% of the models agree with the change sign.

**Fig. S6:** Scaling of surface evaporation from CESM1-LES

Diagram

Description automatically generated

**a** for JJA and **b** for DJF (unit in %/K). **c** and **d** are the same except from CMIP6 simulations.