



Supplement of

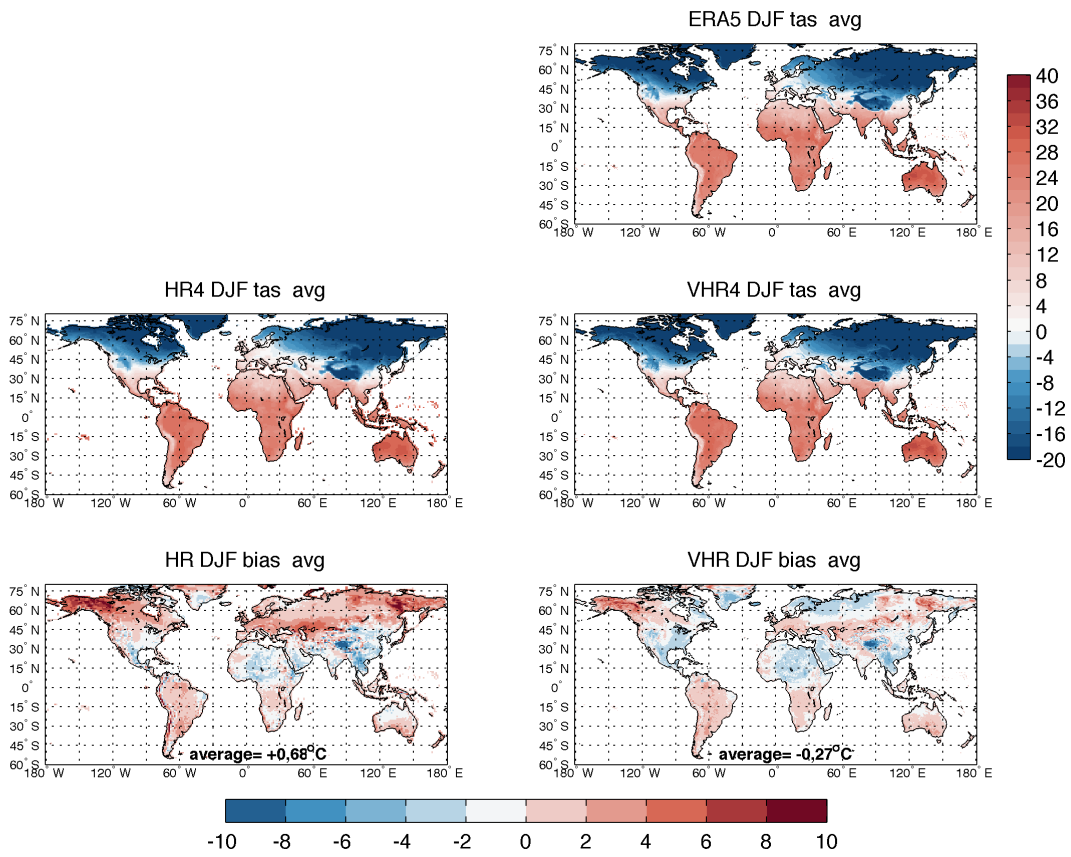
Extreme events representation in CMCC-CM2 standard and high-resolution general circulation models

Enrico Scoccimarro et al.

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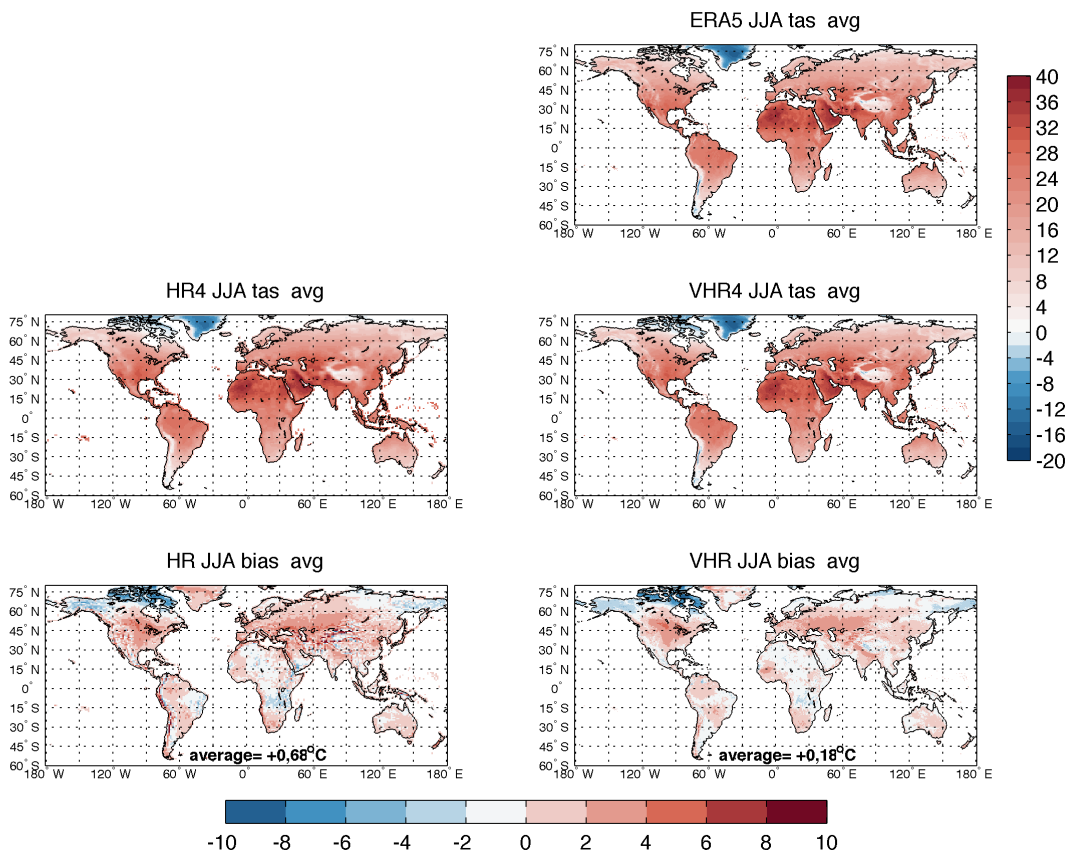
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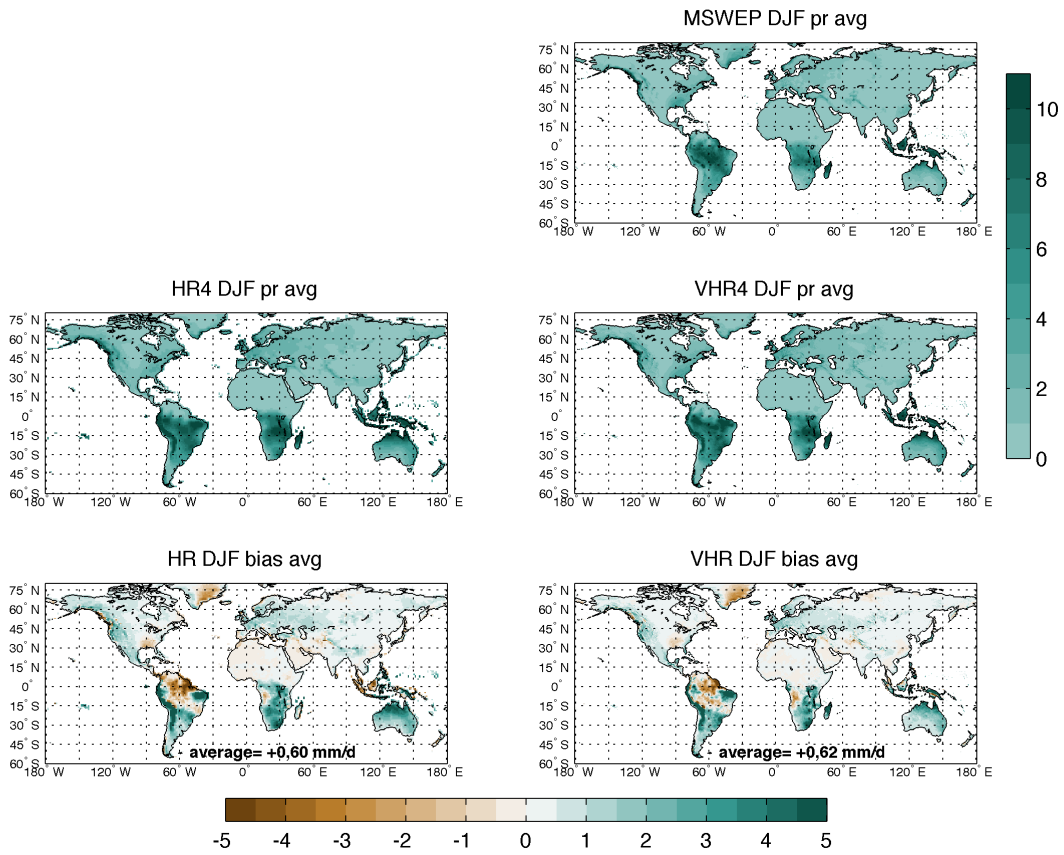
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Figure S1. Winter (DJF) Averaged Temperature. Upper panel shows ERA5 results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [°C]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.



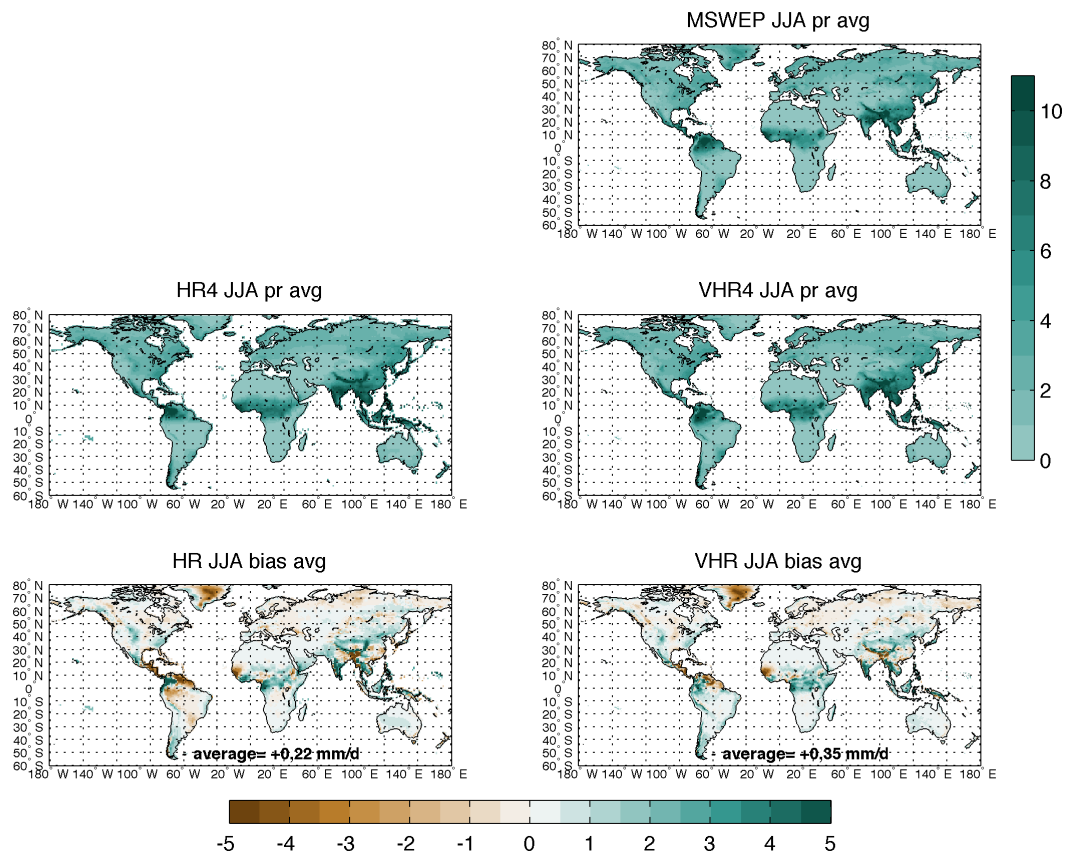
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 34 **Figure S2. Summer (JJA) Average Temperature. Upper panel shows ERA5 results. Central panels show model results**
 35 **(HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [°C]. Vertical colorbar**
 36 **refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.**
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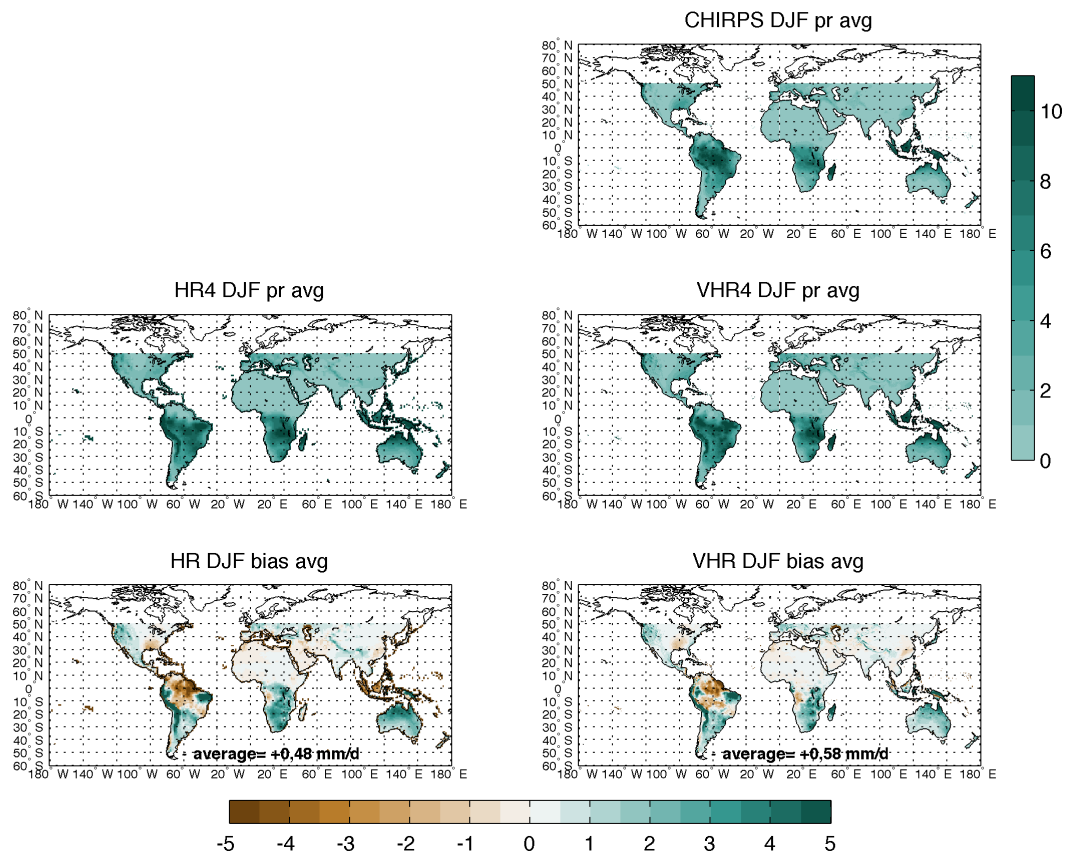
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Figure S3. Winter (DJF) Precipitation. Upper panel shows MSWEP observational results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [mm/d]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.

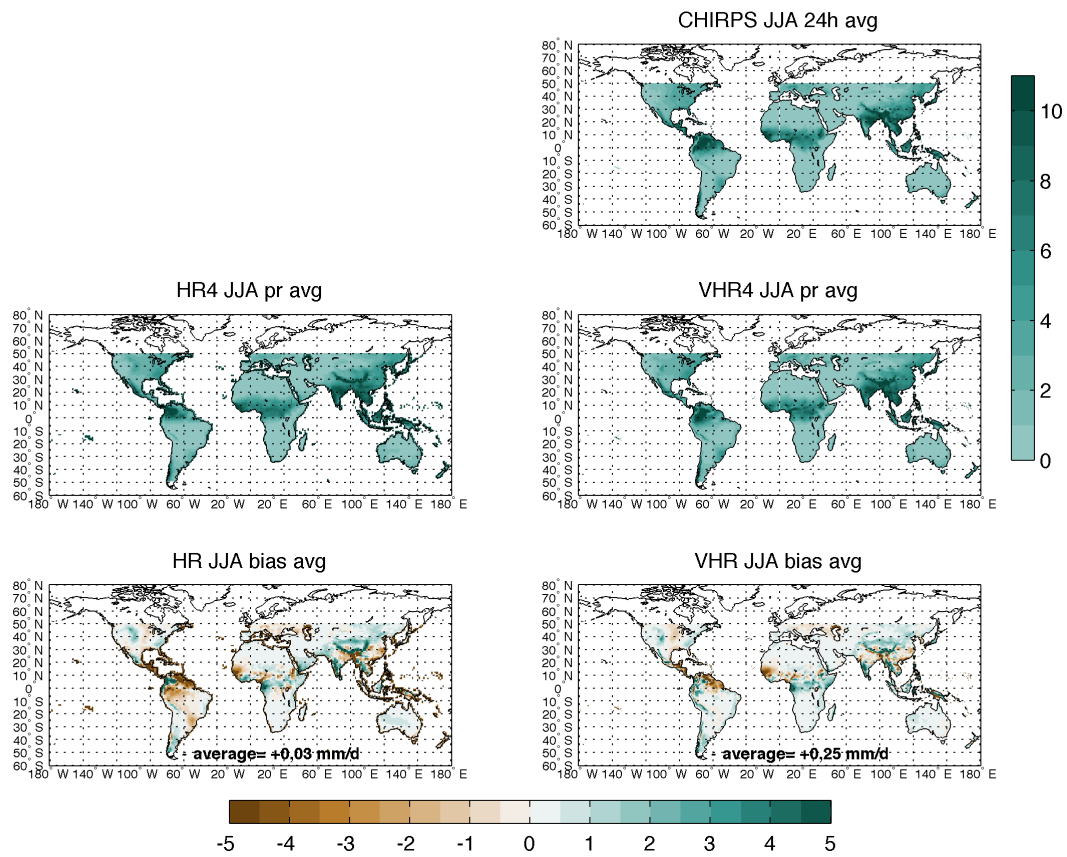


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 54 **Figure S4. Summer (JJA) Precipitation. Upper panel shows MSWEP observational results. Central panels show**
 55 **model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are**
 56 **[mm/d]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom**
 57 **panels.**

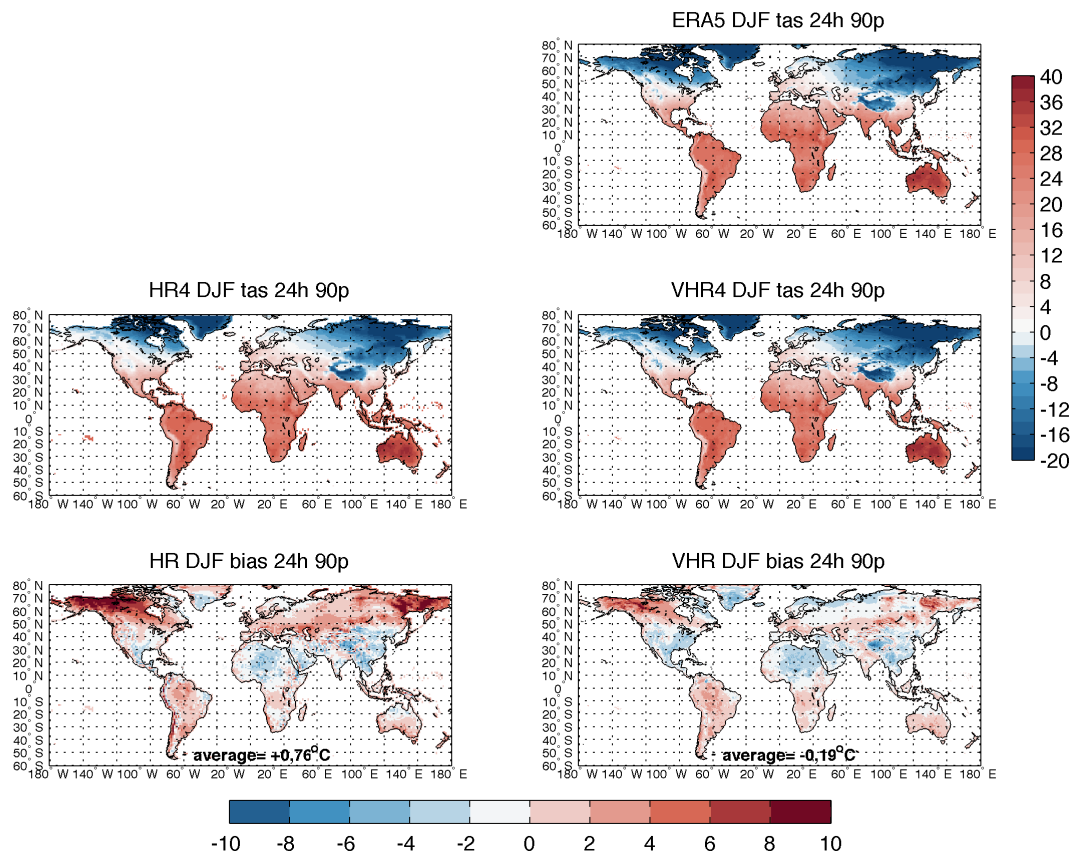
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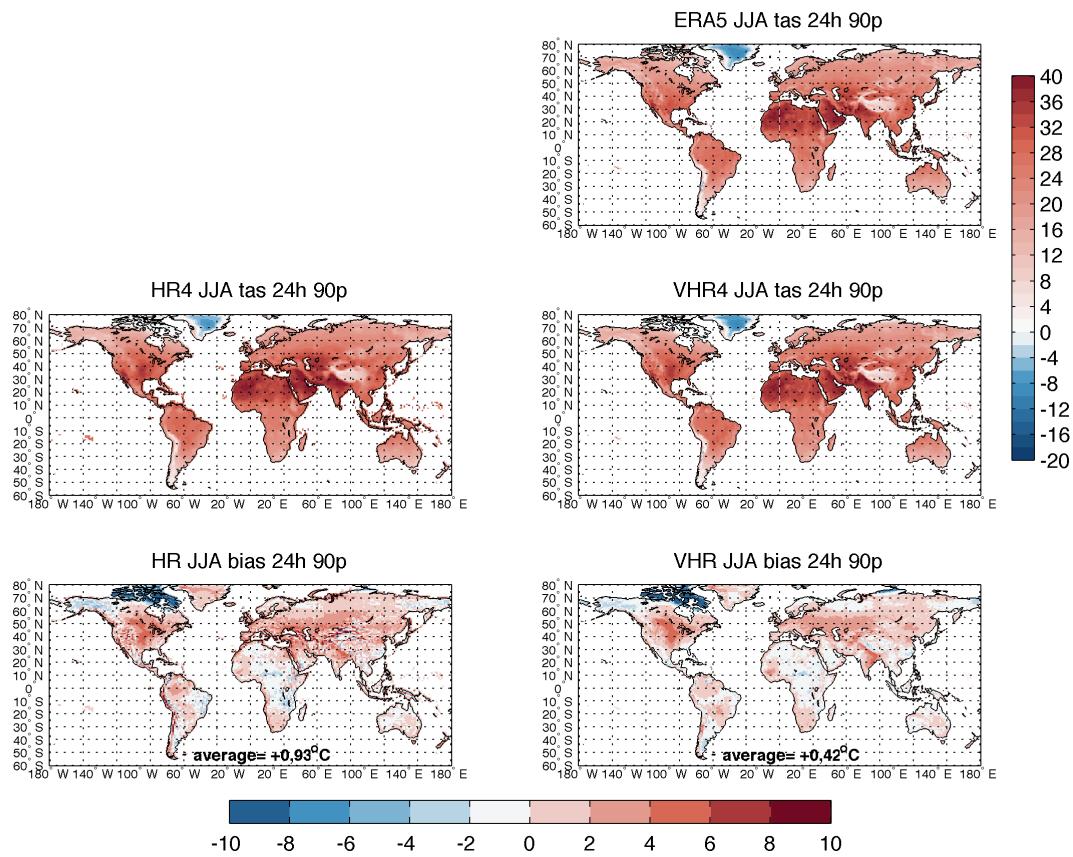
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 65 **Figure S5.** Same as Figure S3 but compared to CHIRPS observations instead of MSWEP. Winter (DJF)
 66 **Precipitation.** Upper panel shows CHIRPS observational results. Central panels show model results (HR
 67 **on the left and VHR on the right) and lower panels show the relative model bias. Units are [mm/d]. Vertical**
 68 **colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.**
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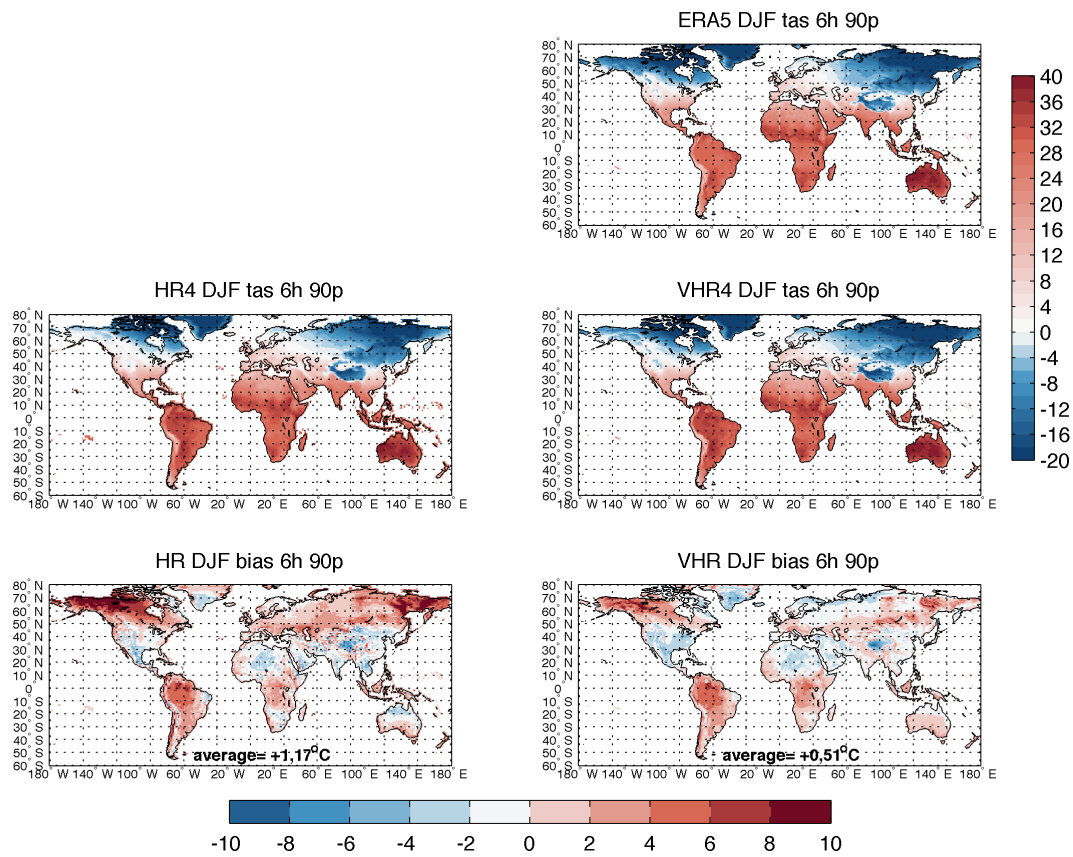
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 71 **Figure S6. Same as Figure S4 but compared to CHIRPS observations instead of MSWEP. Summer (JJA) Precipitation.**
 72 **Upper panel shows CHIRPS observational results. Central panels show model results (HR on the left and VHR on the**
 73 **right) and lower panels show the relative model bias. Units are [mm/d]. Vertical colorbar refers to the three upper**
 74 **panels, while the horizontal colorbar refers to the two bottom panels.**
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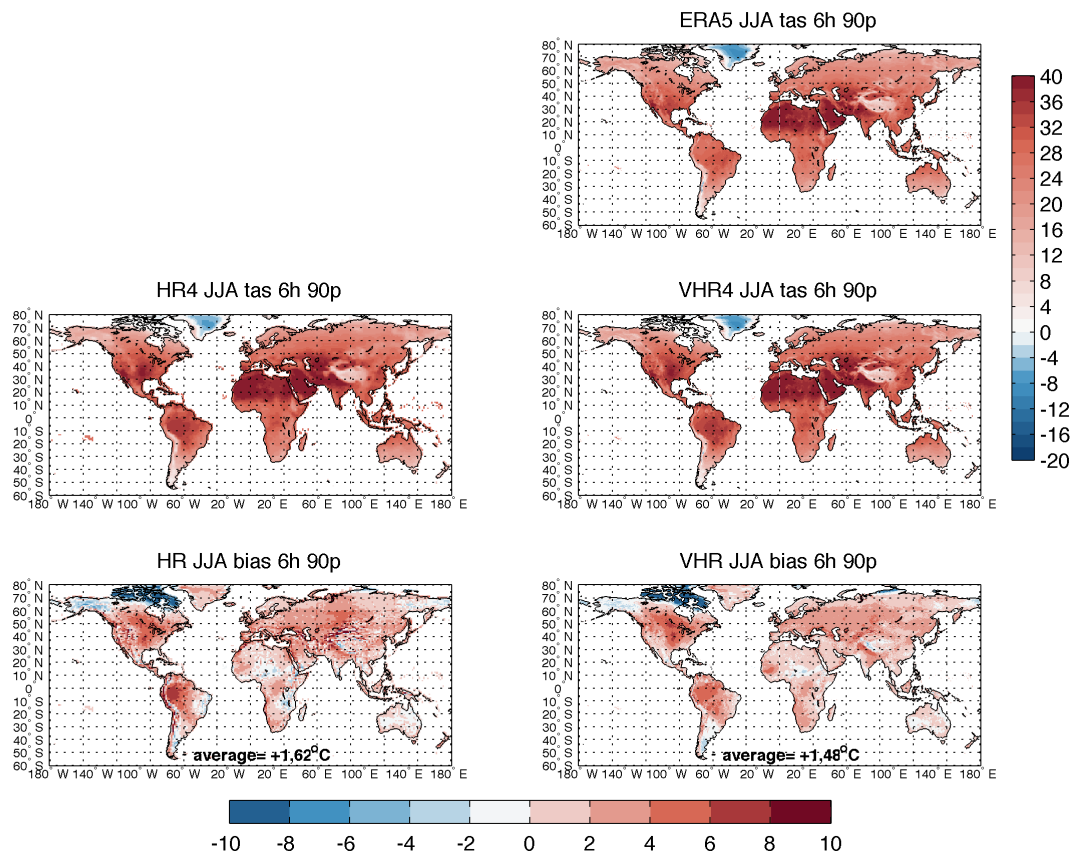
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 77 **Figure S7: Same as figure 1 but for 90p instead of 99p. Winter (DJF) Intense Temperature (90th percentile, 90p)**
 78 **computed at the daily frequency. Upper panel shows ERA5 results. Central panels show model results (HR on the left**
 79 **and VHR on the right) and lower panels show the relative model bias. Units are [°C]. Vertical colorbar refers to the**
 80 **three upper panels, while the horizontal colorbar refers to the two bottom panels.**
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 83 **Figure S8: Same as figure 2 but for 90p instead of 99p. Summer (DJF) Intense Temperature (90th percentile, 90p)**
 84 **computed at the daily frequency. Upper panel shows ERA5 results. Central panels show model results (HR on the left**
 85 **and VHR on the right) and lower panels show the relative model bias. Units are [°C]. Vertical colorbar refers to the**
 86 **three upper panels, while the horizontal colorbar refers to the two bottom panels.**
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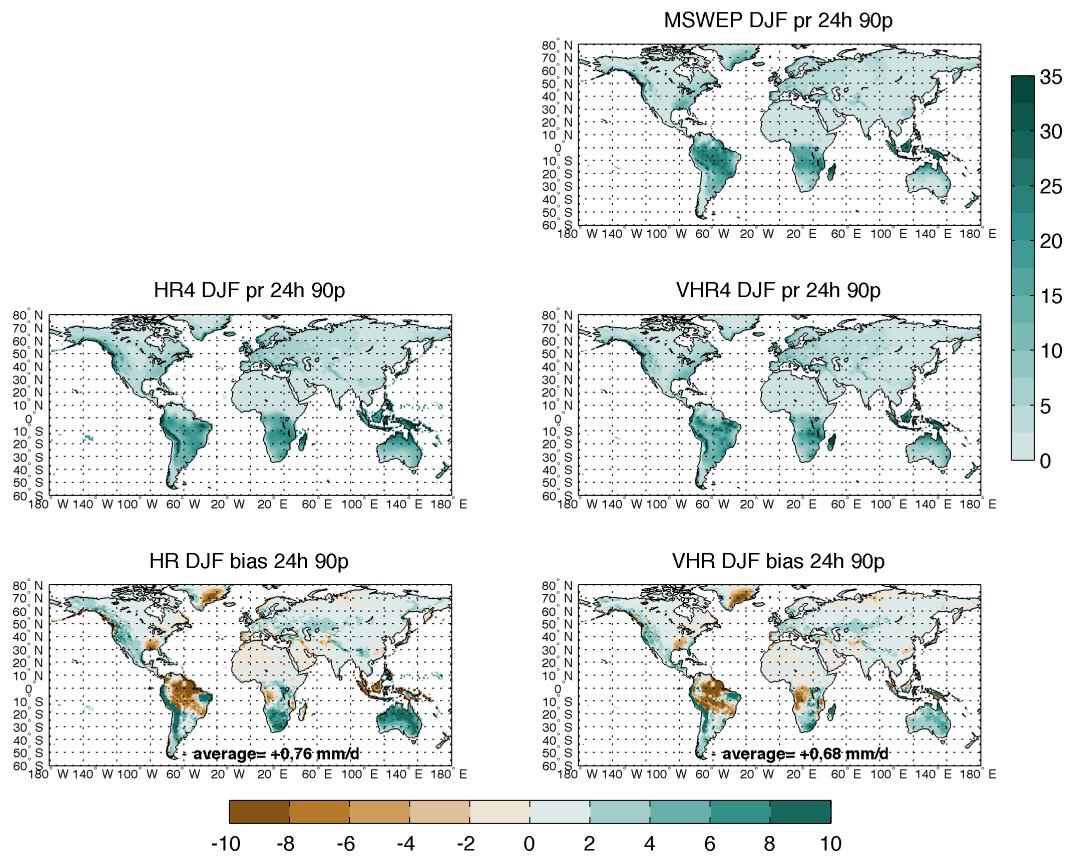


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 90 **Figure S9: Same as figure 3 but for 90p instead of 99p. Winter (DJF) Intense Temperature (90th percentile, 90p)**
 91 **computed at the six-hourly frequency. Upper panel shows ERA5 results. Central panels show model results (HR on**
 92 **the left and VHR on the right) and lower panels show the relative model bias. Units are [°C]. Vertical colorbar refers**
 93 **to the three upper panels, while the horizontal colorbar refers to the two bottom panels.**
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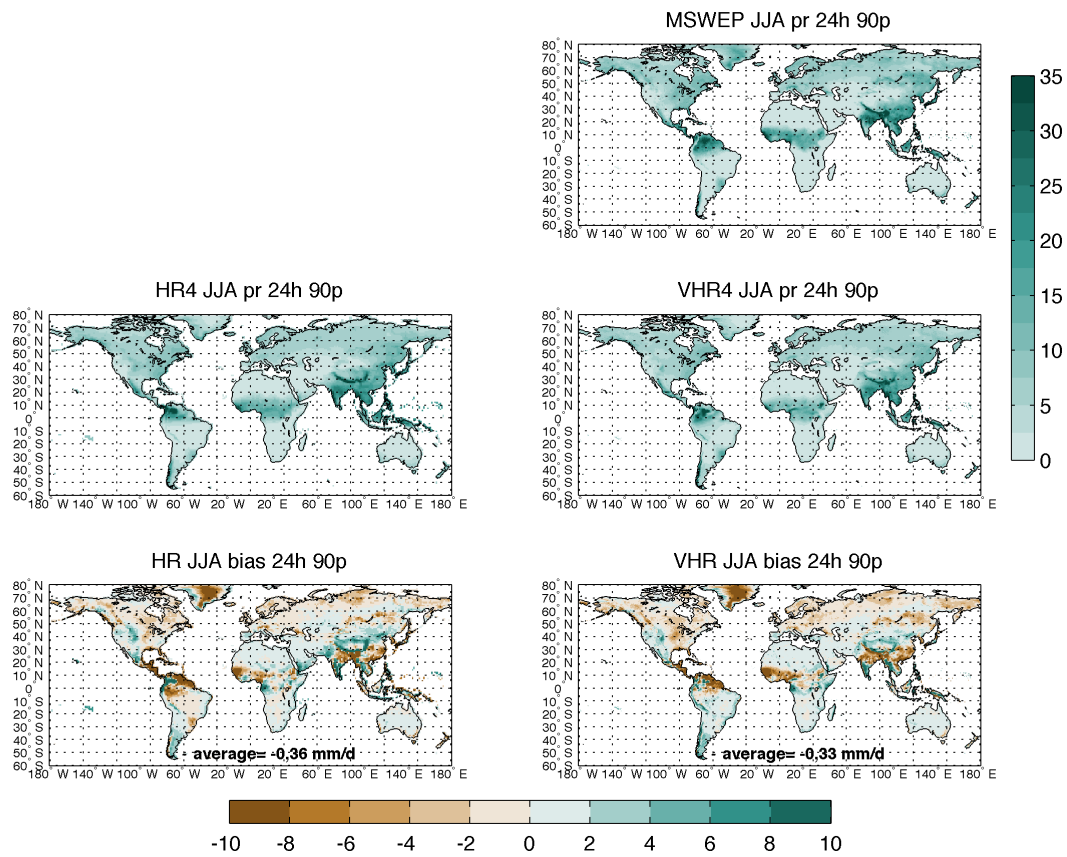
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Figure S10: Same as figure 4 but for 90p instead of 99p. Summer (JJA) Intense Temperature (90th percentile, 90p) computed at the six-hourly frequency. Upper panel shows ERA5 results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [°C]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.



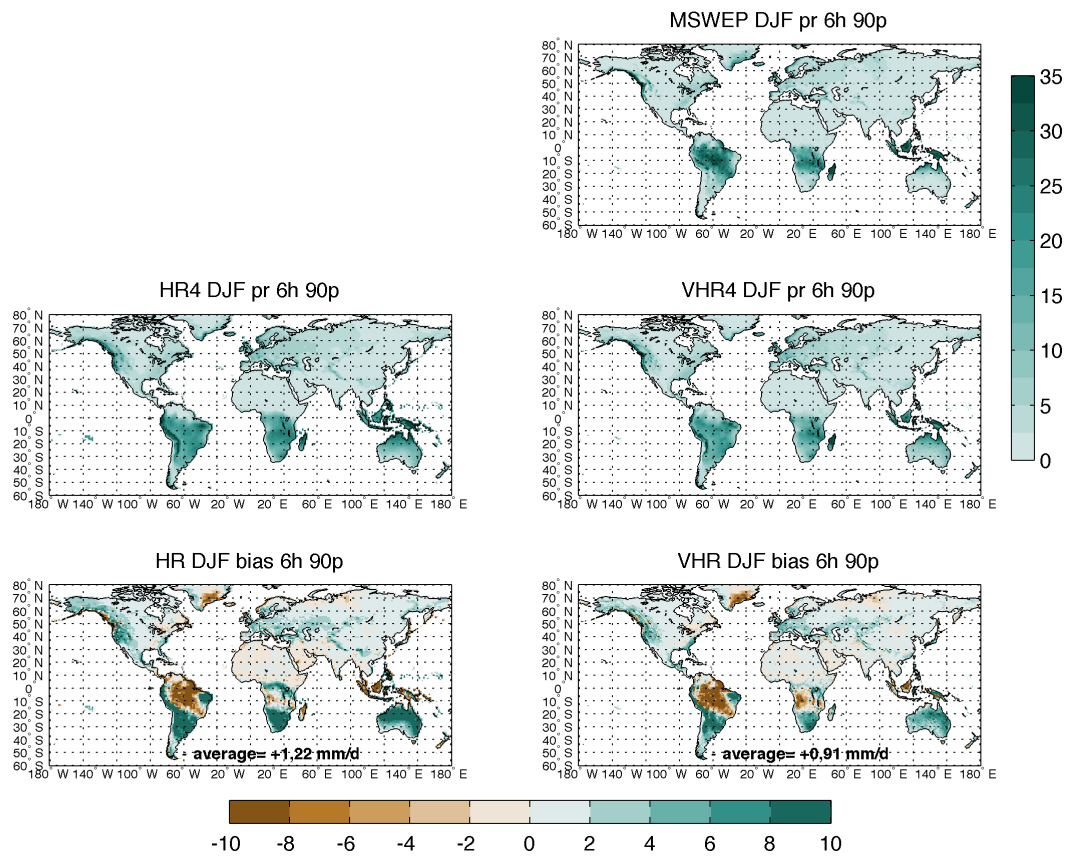
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Figure S11: Same as figure 5 but for 90p instead of 99p. Winter (DJF) Intense Precipitation (90th percentile, 90p) computed at the daily frequency. Upper panel shows MSWEP observational results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [mm/d]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.



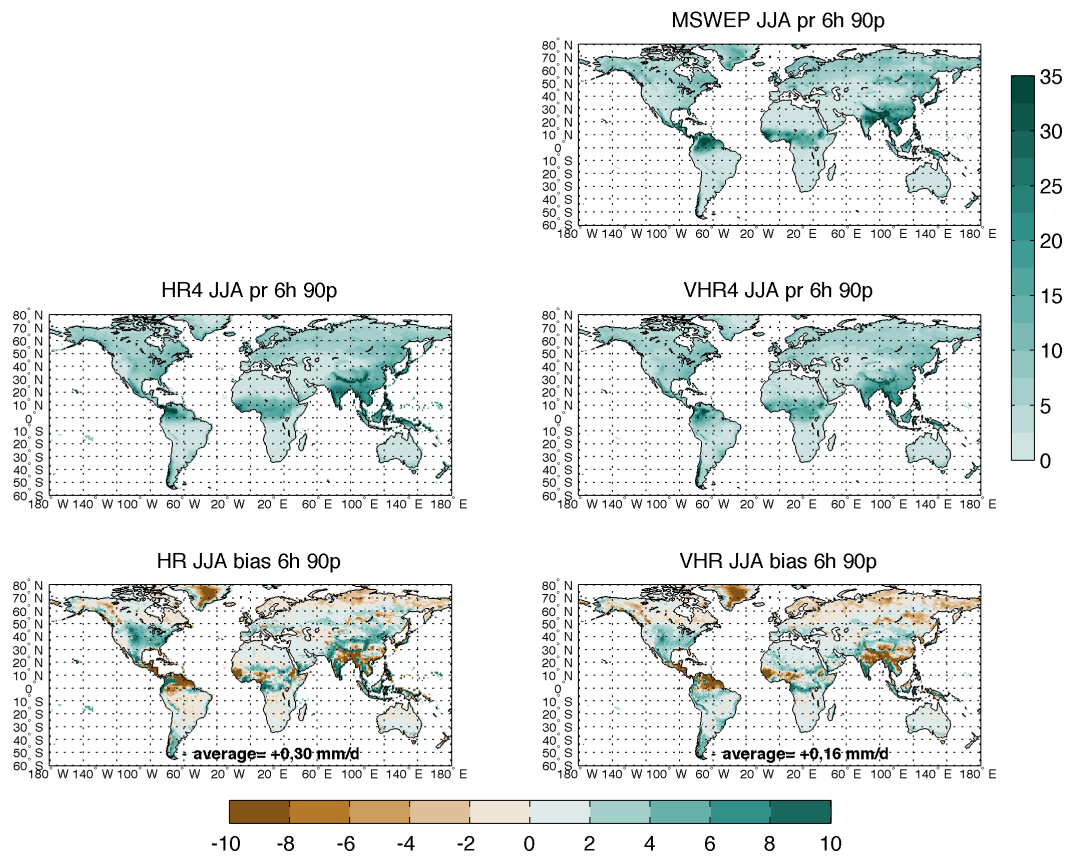
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Figure S12: Same as figure 6 but for 90p instead of 99p. Summer (JJA) Intense Precipitation (90th percentile, 90p) computed at the daily frequency. Upper panel shows MSWEP observational results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [mm/d]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.



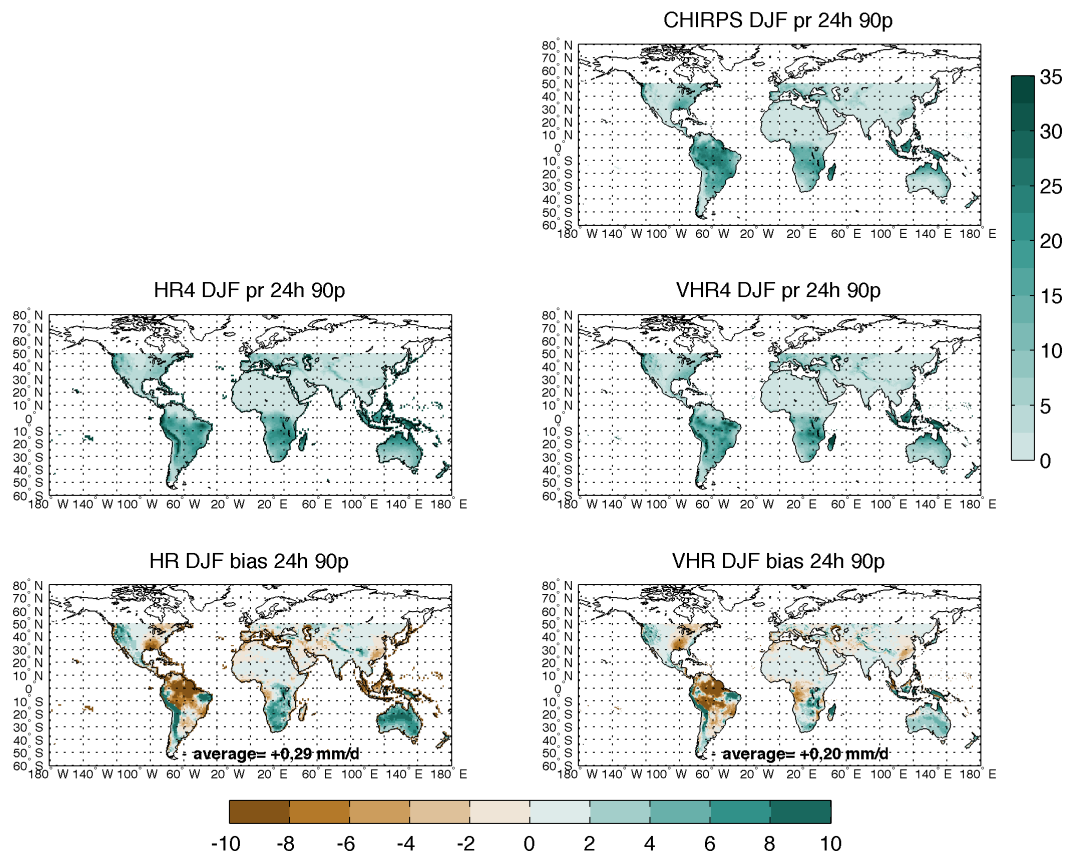
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Figure S13: Same as figure 7 but for 90p instead of 99p. Winter (DJF) Intense Precipitation (90th percentile, 90p) computed at the six-hourly frequency. Upper panel shows MSWEP observational results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [mm/d]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.



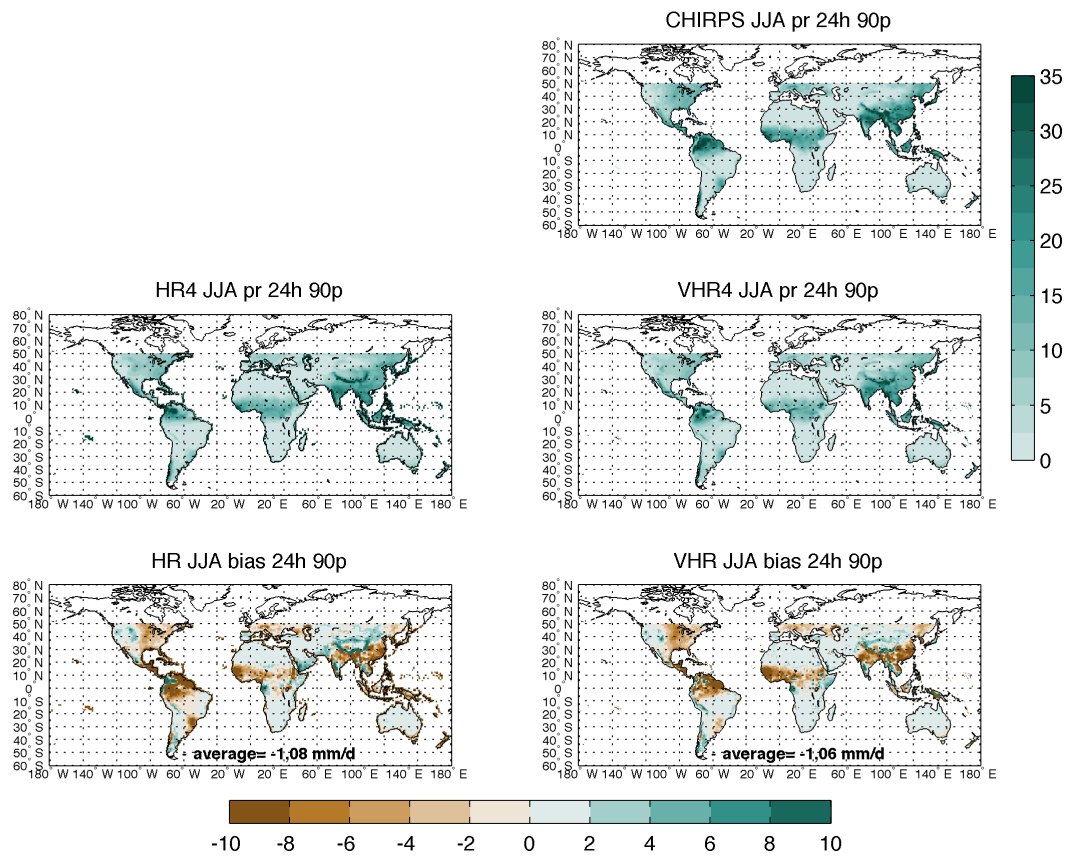
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Figure S14: Same as figure 8 but for 90p instead of 99p. Summer (JJA) Intense Precipitation (90th percentile, 90p) computed at the six-hourly frequency. Upper panel shows MSWEP observational results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [mm/d]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.



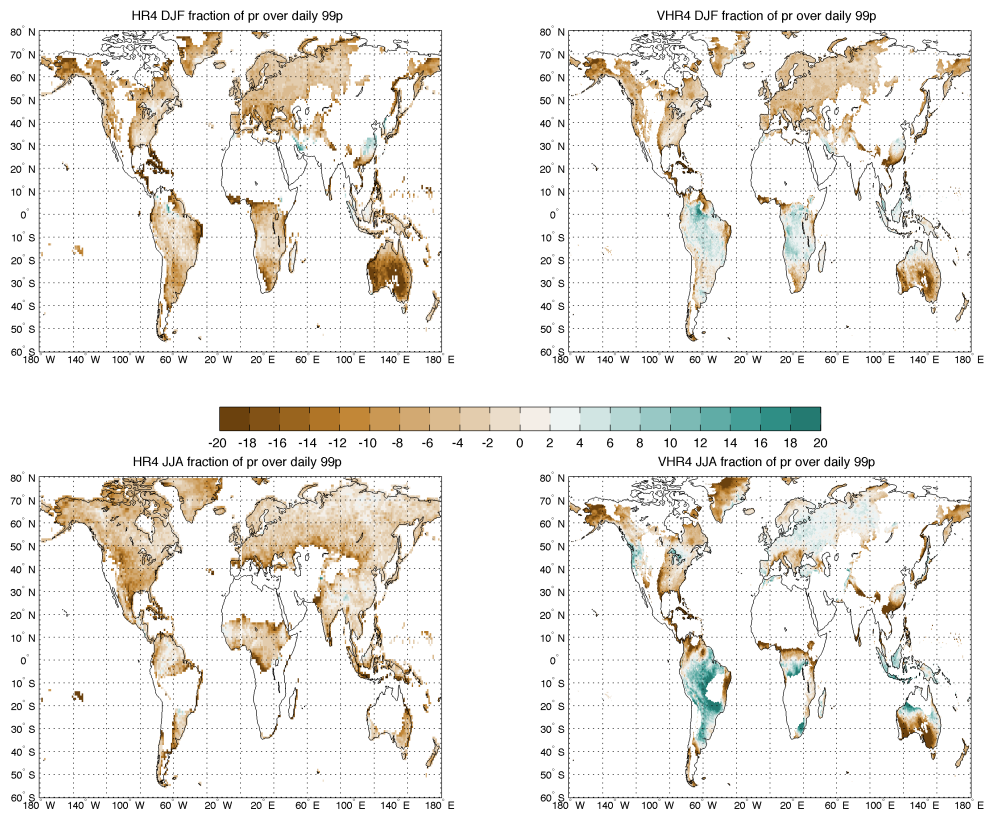
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Figure S15: Same as figure S11 but based on CHIRPS observations. Winter (DJF) Intense Precipitation (90th percentile, 90p) computed at the daily frequency. Upper panel shows CHIRPS observational results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [mm/d]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.



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Figure S16: Same as figure S12 but based on CHIRPS observations. Summer (JJA) Intense Precipitation (90th percentile, 90p) computed at the daily frequency. Upper panel shows CHIRPS observational results. Central panels show model results (HR on the left and VHR on the right) and lower panels show the relative model bias. Units are [mm/d]. Vertical colorbar refers to the three upper panels, while the horizontal colorbar refers to the two bottom panels.



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 140 **Figure S17.** Bias (compared with MSWEP) of the fraction of precipitation associated with extreme events (higher
 141 or equal to the 99th percentile) with respect to the total precipitation. Left/Right panel shows HR/VHR results.
 142 Upper/Lower panel shows boreal winter (DJF)/summer (JJA) results. Units are [%]. White areas over land
 143 represent regions where the seasonal average precipitation is lower than 0.5 mm/d.
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