

1 **Supplementary material**

2

3 **Global meteorological drought: Part I - probabilistic**  
4 **monitoring**

5

6 **E. Dutra<sup>1</sup>, F. Wetterhall<sup>1</sup>, F. Di Giuseppe<sup>1</sup>, G. Naumann<sup>2</sup>, P. Barbosa<sup>2</sup>, J. Vogt<sup>2</sup>, W.**  
7 **Pozzi<sup>3</sup>, and F. Pappenberger<sup>1</sup>**

8 [1]{European Centre for Medium-Range Weather Forecasts, Reading, United Kingdom }

9 [2]{Joint Research Centre, Institute for Environment and Sustainability, Ispra, Italy }

10 [3]{Group on Earth Observations, Geneva, Switzerland }

11 Correspondence to: E. Dutra (emanuel.dutra@ecmwf.int)

12

13 **List of figures**

14 Figure S1. As Figure 4 but for a different group of 6 regions..... 3

15 Figure S2. As Figure 5 but for the SPI-6..... 4

16 Figure S3. As Figure 4 but for the SPI-12..... 5

17 Figure S4. SPI-3 spread about the ensemble mean of ENS4 (top right) and root mean square  
18 error of the ensemble mean of ENS4 (top left), TRMM (middle left), ERAI (middle right) and  
19 GPCC FG (bottom left)..... 6

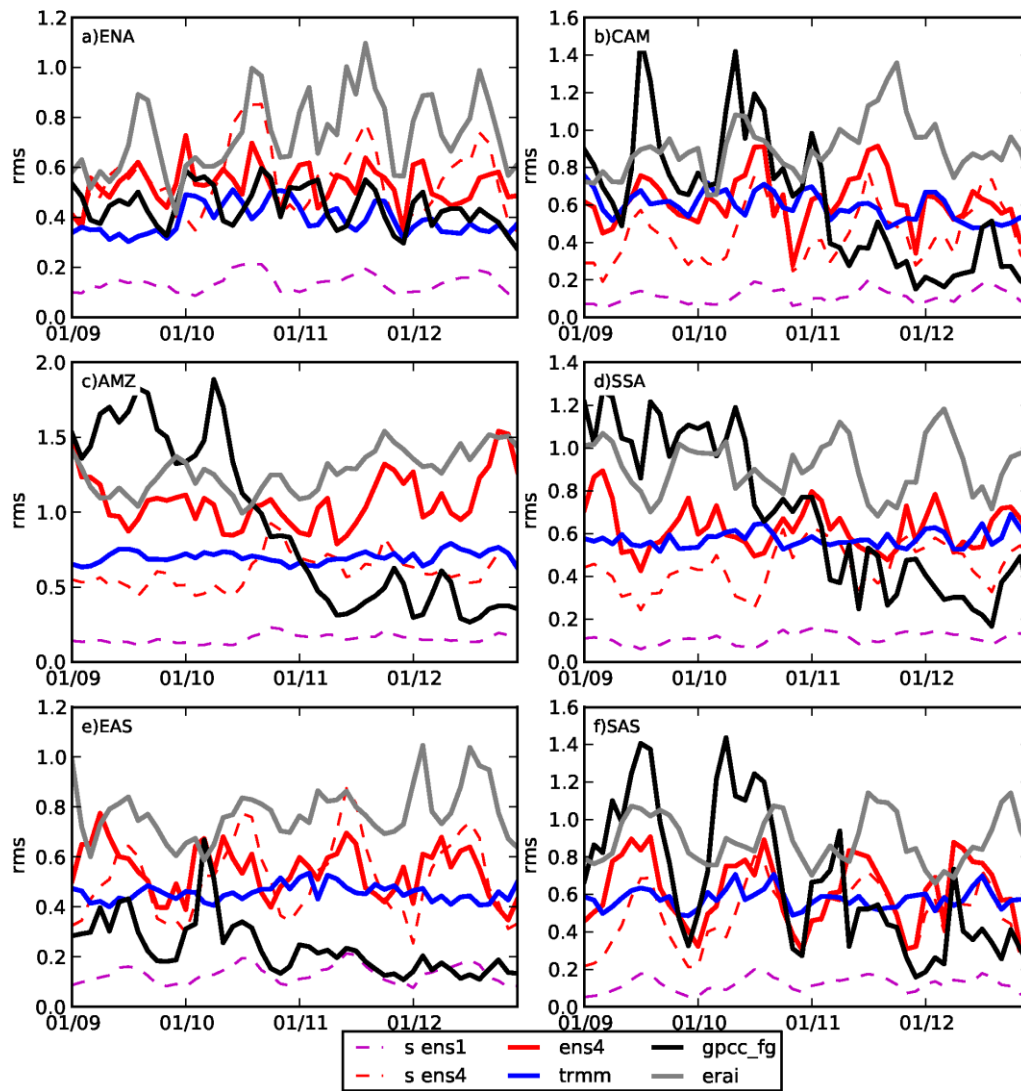
20 Figure S5. As Figure S4 but for the SPI-12. .... 7

21 Figure S6. As Figure 6 but for the SPI-12..... 8

22 Figure S7. Spatial mean of the grid-point temporal correlation of the GPCC SPI-3 versus  
23 ERAI, GPCC FG, ENS4 (ensemble mean) and TRMM in the bottom pannel and the top  
24 pannel displays the fraction of grid-points with correlations significantly different from zero  
25 with 95% confidence. The error bars in both pannels represent 95% confidence intervals of  
26 the spatial mean computed from a 1000 bootstrap re-sampling procedure..... 9

1	<u>Figure S8. As Figure S7 but for the SPI-12. ....</u>	<u>10</u>
2	<u>Figure S9. As Figure 7 but for the SPI-3.....</u>	<u>11</u>
3	<u>Figure S10. Spatial mean of the grid-point temporal correlation of the FAPAR versus SPI-3</u>	
4	<u>of GPCC, TRMM and ERAI (1999-2012) in the bottom panel and the top panel displays</u>	
5	<u>the fraction of grid-points with correlations significantly different from zero with 95%</u>	
6	<u>confidence. The error bars in both panels represent 95% confidence intervals of the spatial</u>	
7	<u>mean computed from a 1000 bootstrap re-sampling procedure. ....</u>	<u>12</u>
8	<u>Figure S11. Figure S10 but for the SPI-12.....</u>	<u>13</u>
9	<u>Figure S12. Temporal grid-point correlations of the GPCC monthly precipitation versus (a)</u>	
10	<u>TRMM, (b) ERAI, (c) GPCC FG and (d) ENS4. The correlation were calculated for the</u>	
11	<u>overlap period 2009-2012 and the mean annual cycle of the period was removed, in each</u>	
12	<u>dataset, prior to the correlations calculation.....</u>	<u>14</u>
13	<u>Figure S13. As figure 7 but for the monthly grid-point temporal correlations of GPCC versus</u>	
14	<u>the remaining products. The correlation were calculated for the overlap period 2009-2012</u>	
15	<u>and the mean annual cycle of the period was removed, in each dataset, prior do the</u>	
16	<u>correlations calculation. ....</u>	<u>15</u>
17	<u>Figure S14. Root mean square error of the monthly precipitation of (a) TRMM, (b) ERAI, (c)</u>	
18	<u>GPCC FG, and (d) ENS4 in respect to GPCC. The RMSE were calculated for the overlap</u>	
19	<u>period 2009-2012 and the mean annual cycle of the period was removed, in each dataset, prior</u>	
20	<u>do the RMSE calculations. ....</u>	<u>16</u>
21	<u>Figure S15. Regional averages of the root mean square error of the monthly precipitation of</u>	
22	<u>TRMM, ERAI, GPCP FG and ENS4 in respect to GPCC. The RMSE was calculated for the</u>	
23	<u>overlap period 2009-2012 and the mean annual cycle of the period was removed, in each</u>	
24	<u>dataset, prior do the RMSE calculations. The error bars represent the 95% confidence</u>	
25	<u>intervals of the spatial mean computed from a 1000 bootstrap re-sampling procedure. ....</u>	<u>17</u>
26	<u>Figure S16. As Figure 8 but for the U.A Great Plains region ( 35N-45N, 110W-90W). ....</u>	<u>18</u>
27		

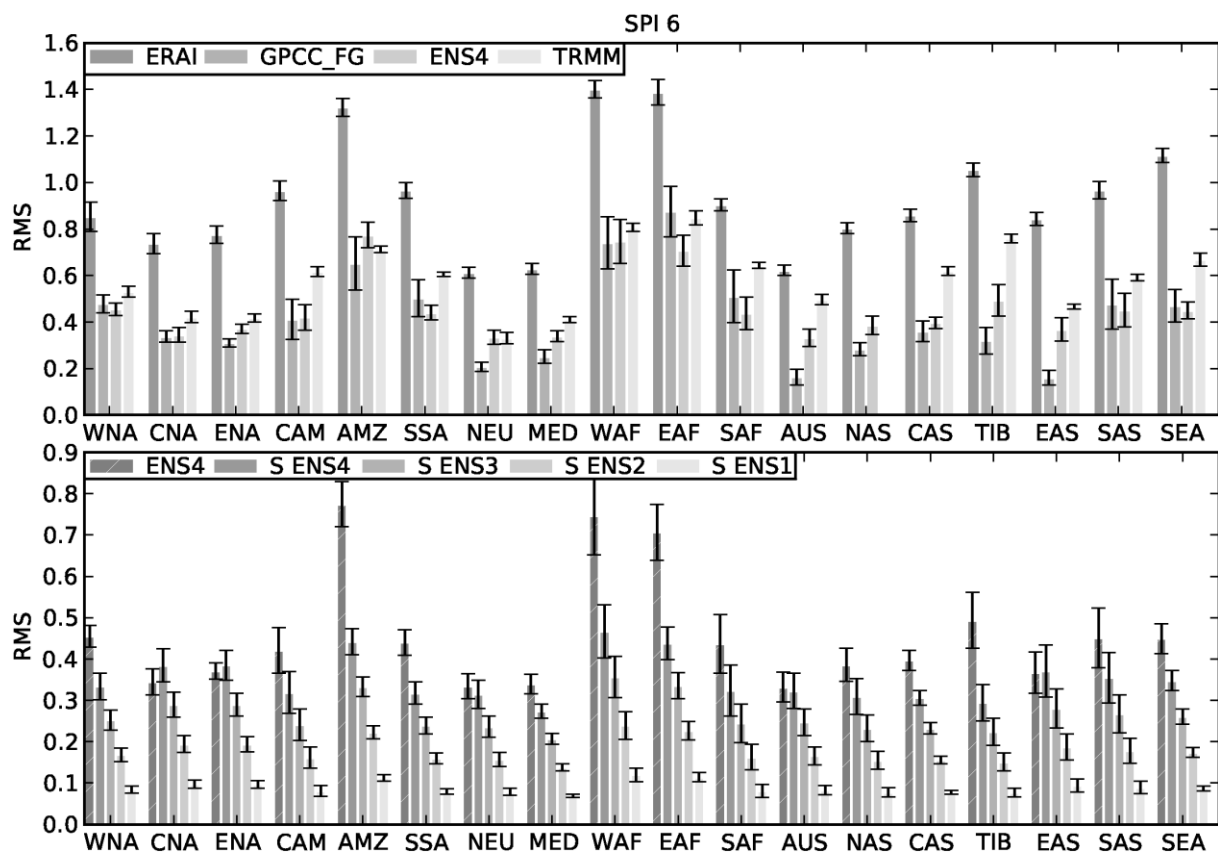
1 Figures



2

3 Figure S1. As Figure 4 but for a different group of 6 regions.

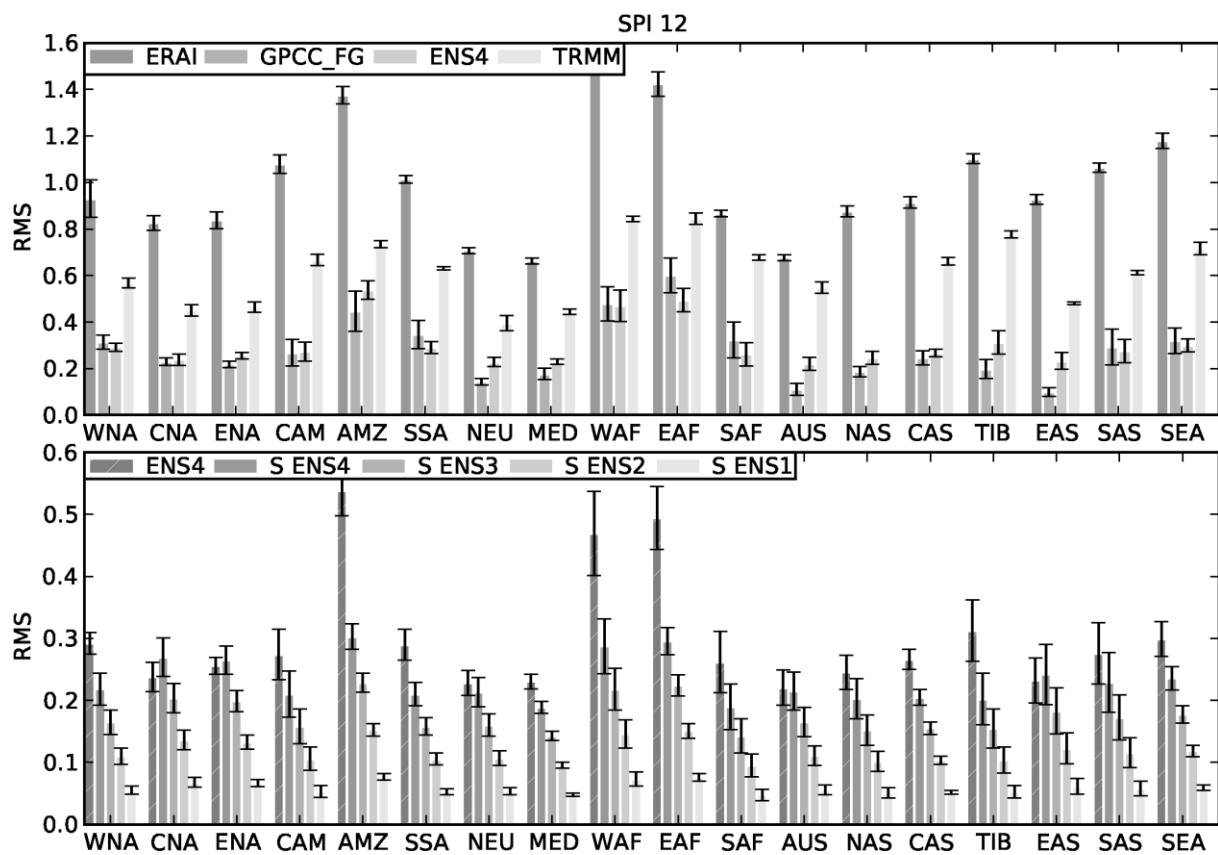
4



1

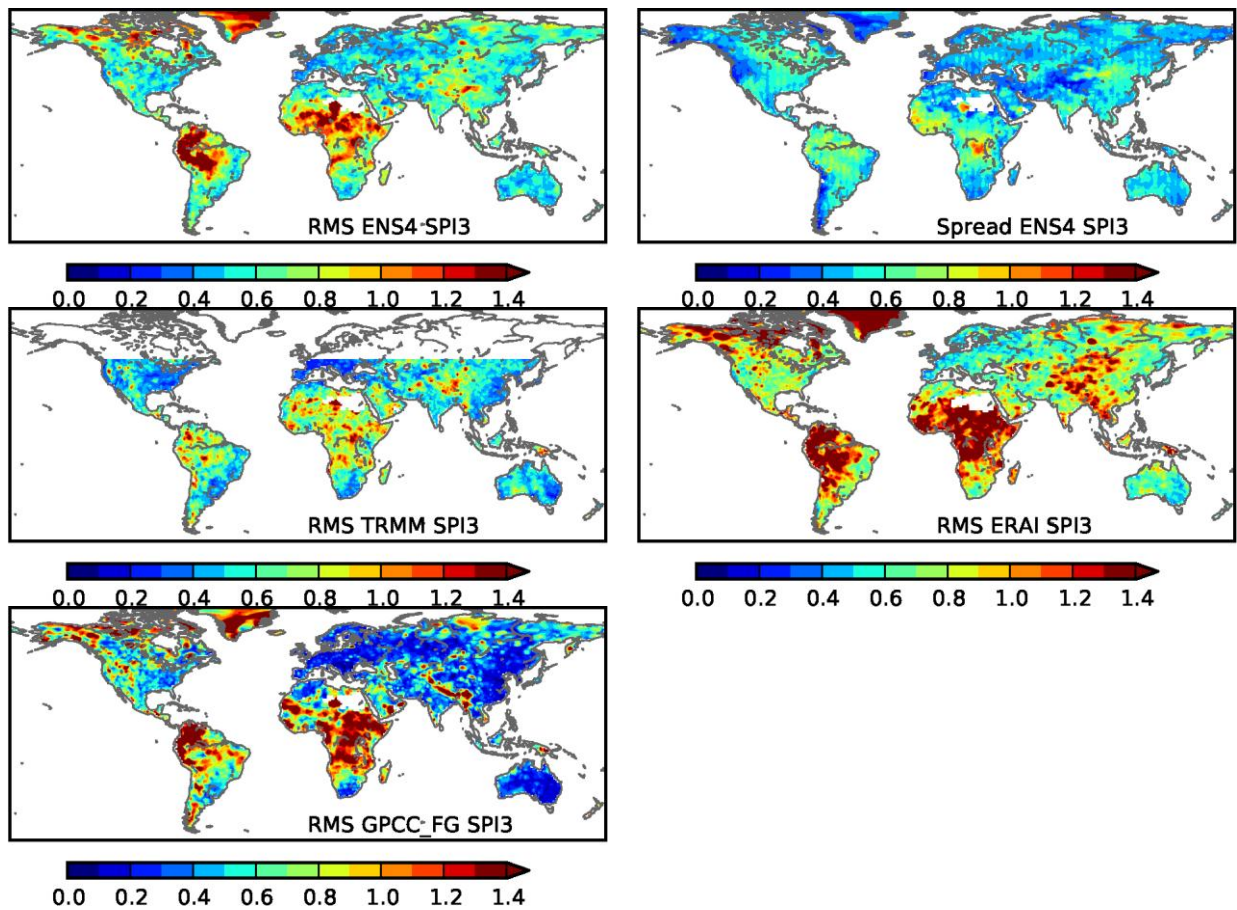
2 Figure S2. As Figure 5 but for the SPI-6.

3

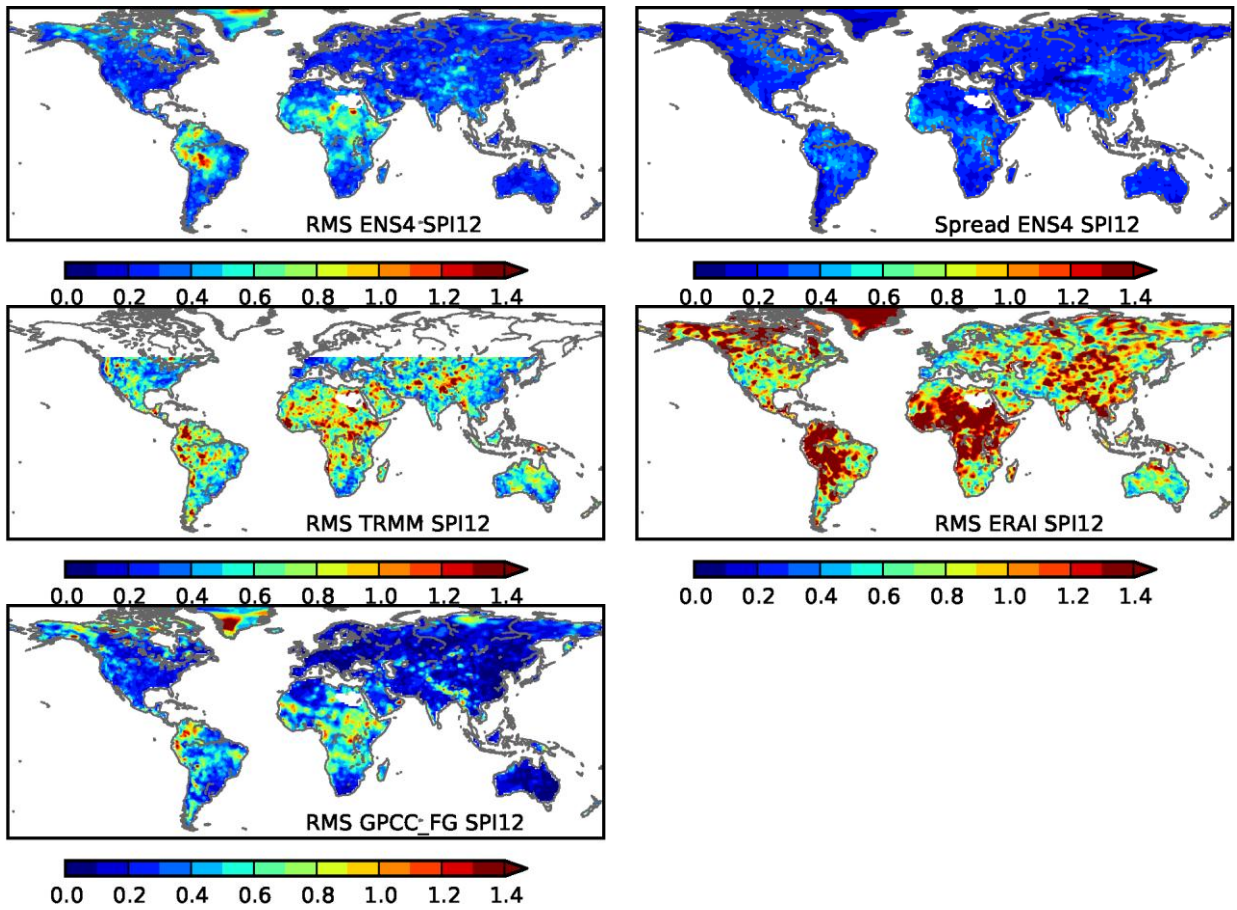


1

2 Figure S3. As Figure 4 but for the SPI-12.



1 Figure S4. SPI-3 spread about the ensemble mean of ENS4 (top right) and root mean square  
 2 error of the ensemble mean of ENS4 (top left), TRMM (middle left), ERAI (middle right) and  
 3 GPCG\_FG (bottom left).



1 Figure S5. As Figure S4 but for the SPI-12.

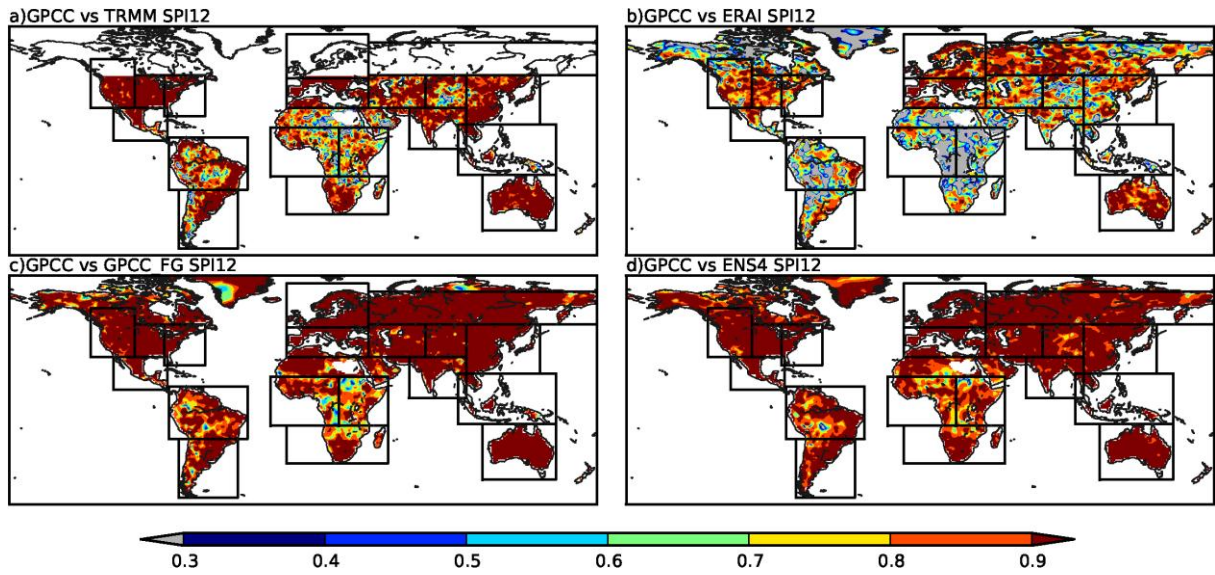
2

3

4

5

6



1

2 Figure S6. As Figure 6 but for the SPI-12.

3

4



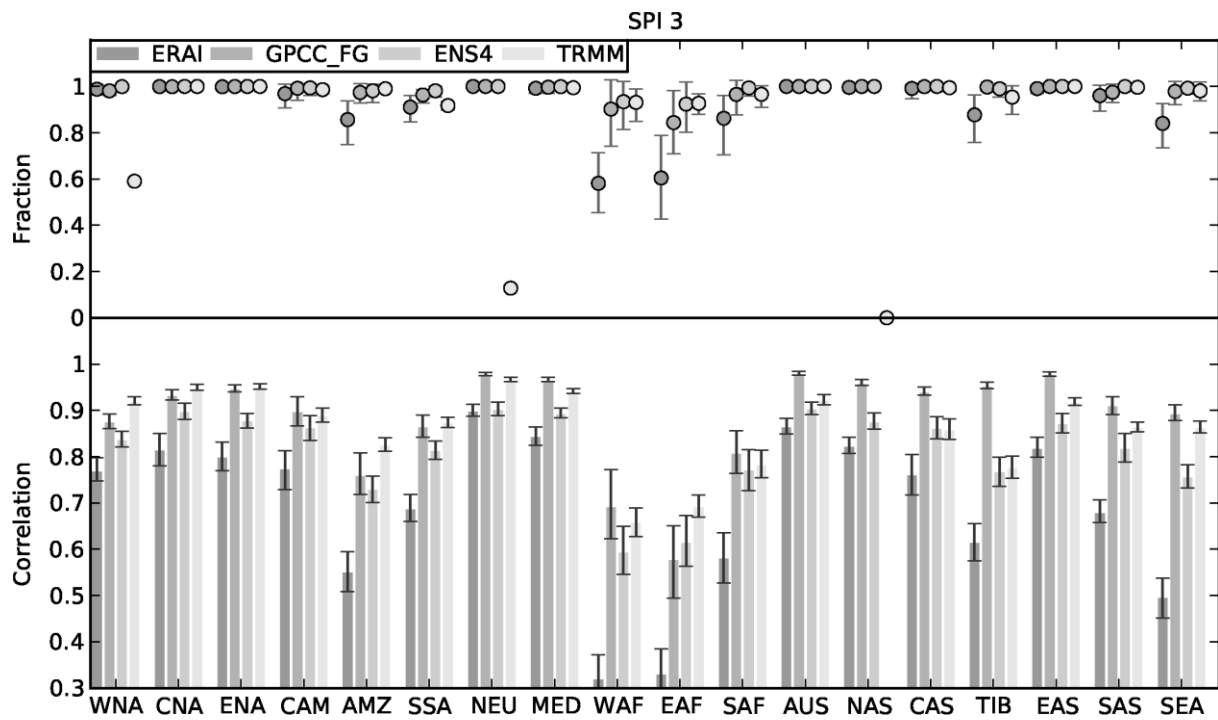
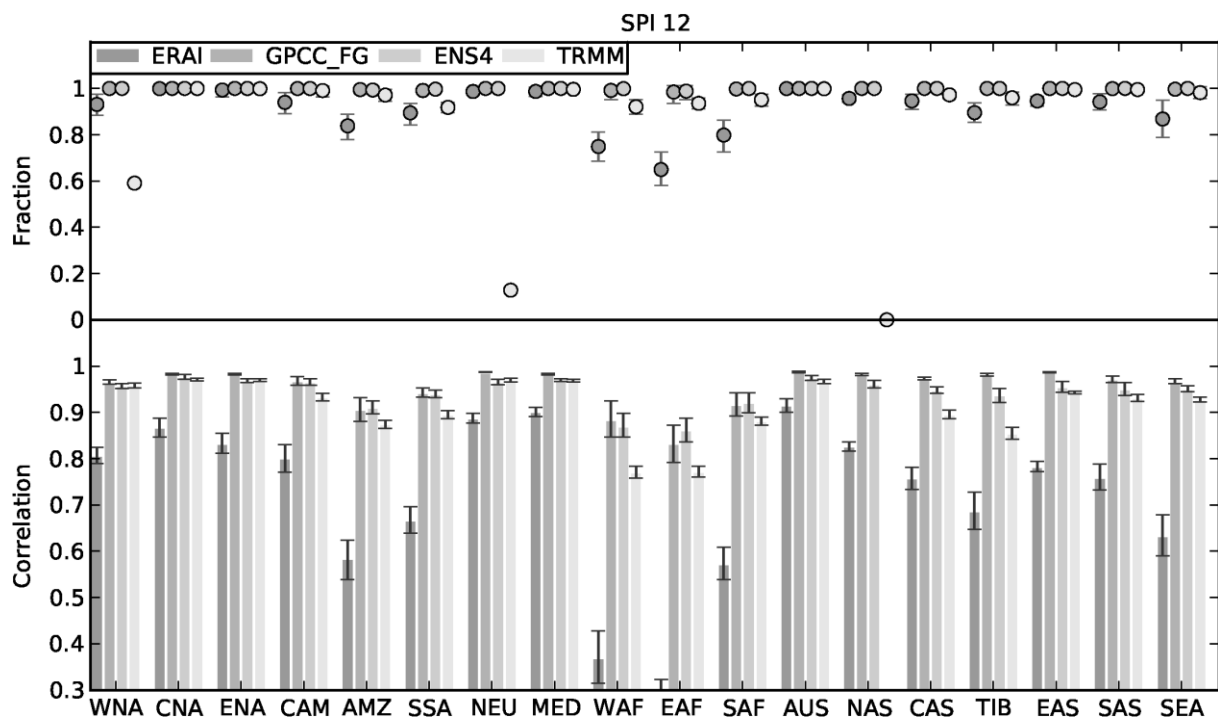


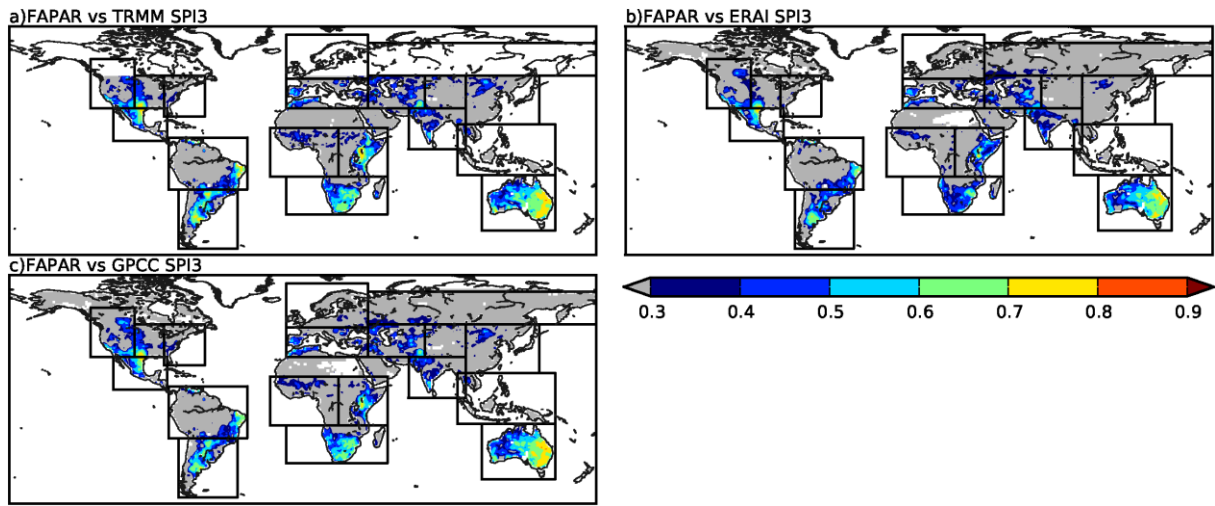
Figure S7. Spatial mean of the grid-point temporal correlation of the GPCCI SPI-3 versus ERAI, GPCCI\_FG, ENS4 (ensemble mean) and TRMM in the bottom panel and the top panel displays the fraction of grid-points with correlations significantly different from zero with 95% confidence. The error bars in both panels represent 95% confidence intervals of the spatial mean computed from a 1000 bootstrap re-sampling procedure.



1

2 Figure S8. As Figure S7 but for the SPI-12.

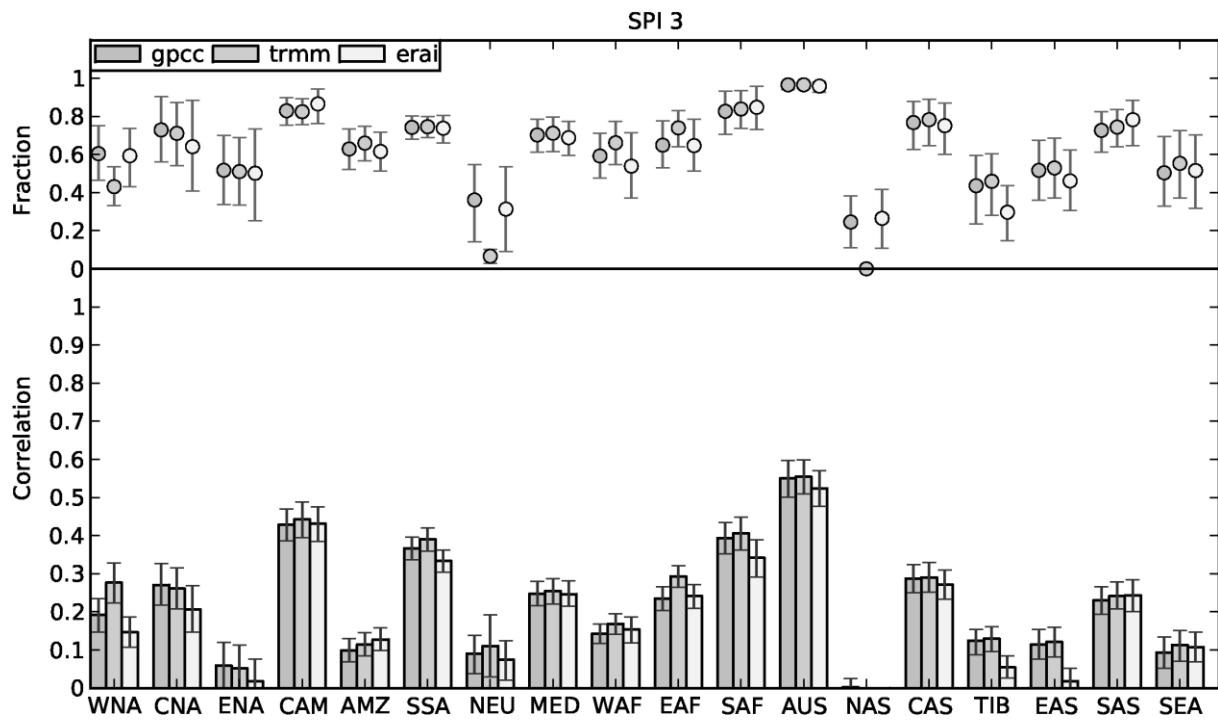
3



1

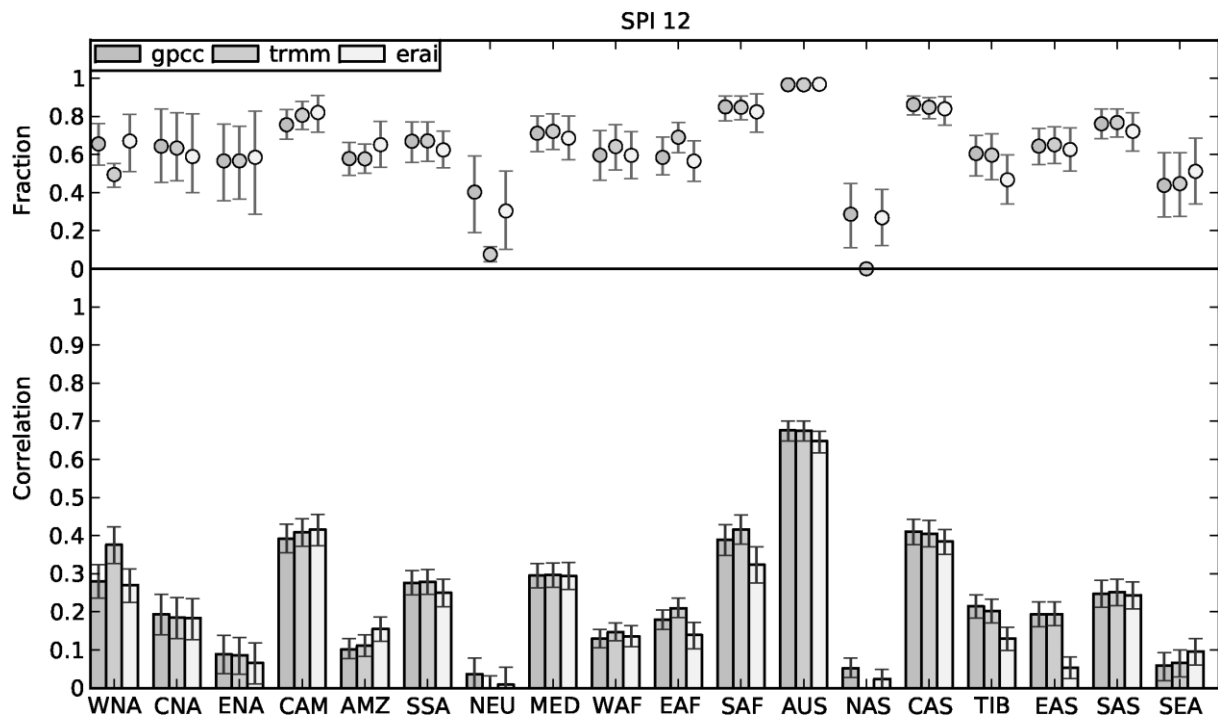
2 Figure S9. As Figure 7 but for the SPI-3.

3



1  
 2 Figure S10. Spatial mean of the grid-point temporal correlation of the FAPAR versus SPI-3  
 3 of GPCC, TRMM and ERAI (1999-2012) in the bottom panel and the top panel displays  
 4 the fraction of grid-points with correlations significantly different from zero with 95%  
 5 confidence. The error bars in both panels represent 95% confidence intervals of the spatial  
 6 mean computed from a 1000 bootstrap re-sampling procedure.

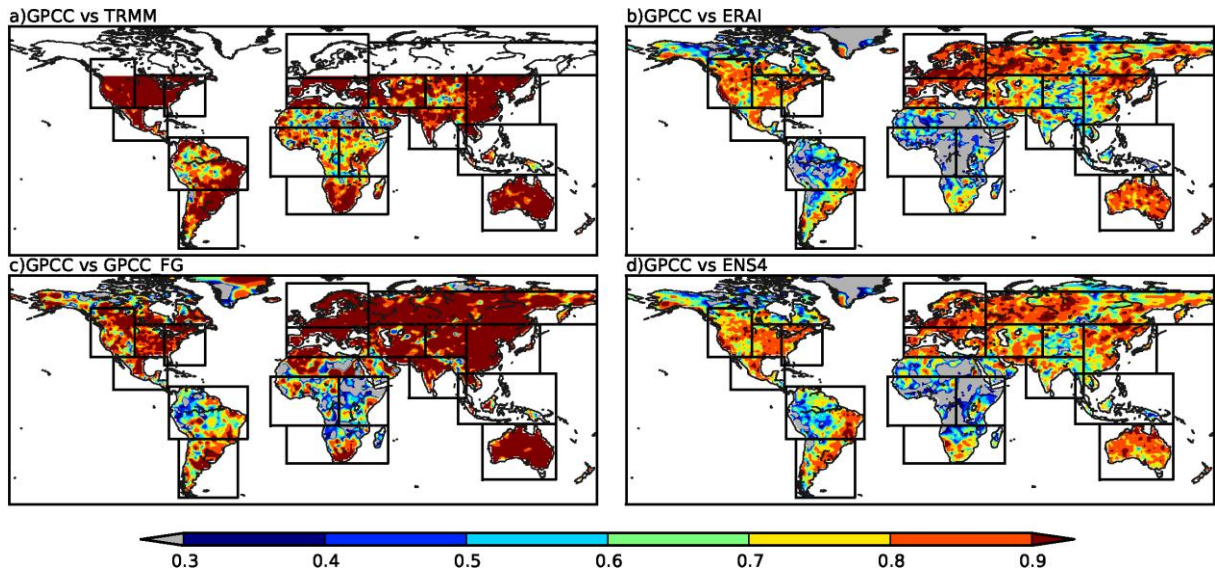
7



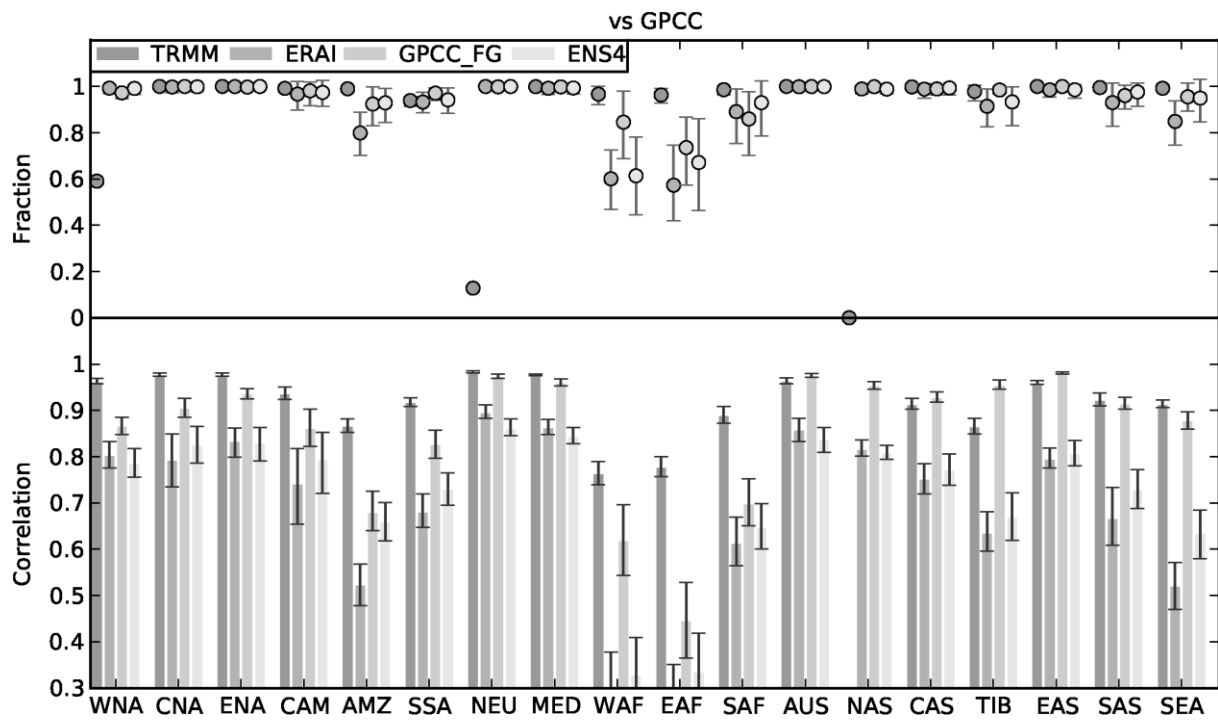
1

2 Figure S11. Figure S10 but for the SPI-12.

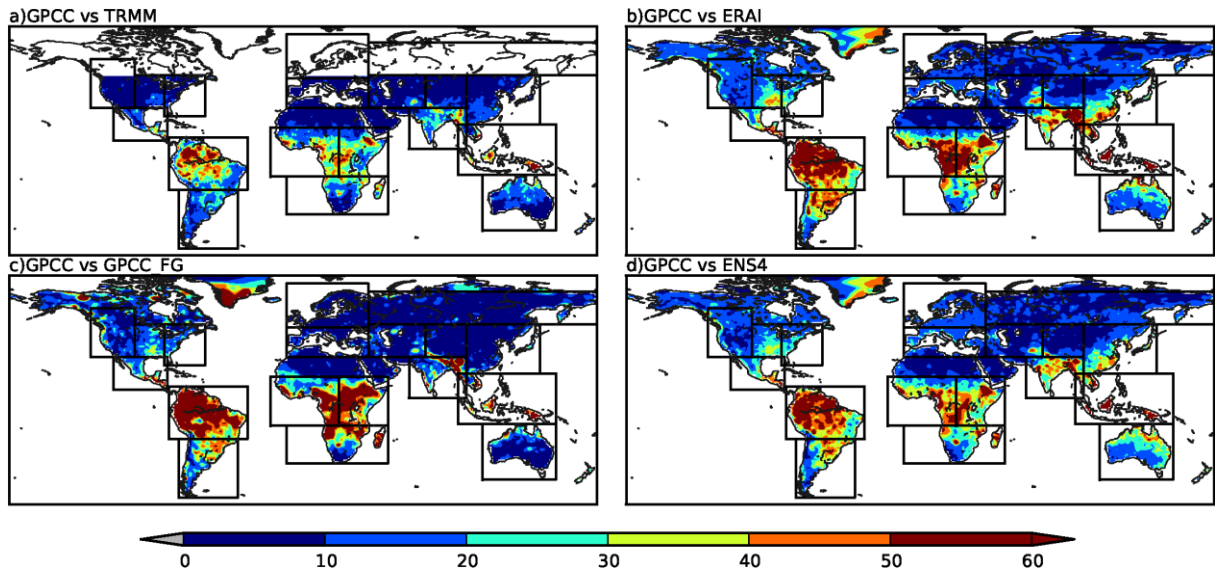
3



1  
 2 Figure S12. Temporal grid-point correlations of the GPCC monthly precipitation versus (a)  
 3 TRMM, (b) ERAI, (c) GPCC\_FG and (d) ENS4. The correlation were calculated for the  
 4 overlap period 2009-2012 and the mean annual cycle of the period was removed, in each  
 5 dataset, prior to the correlations calculation.  
 6

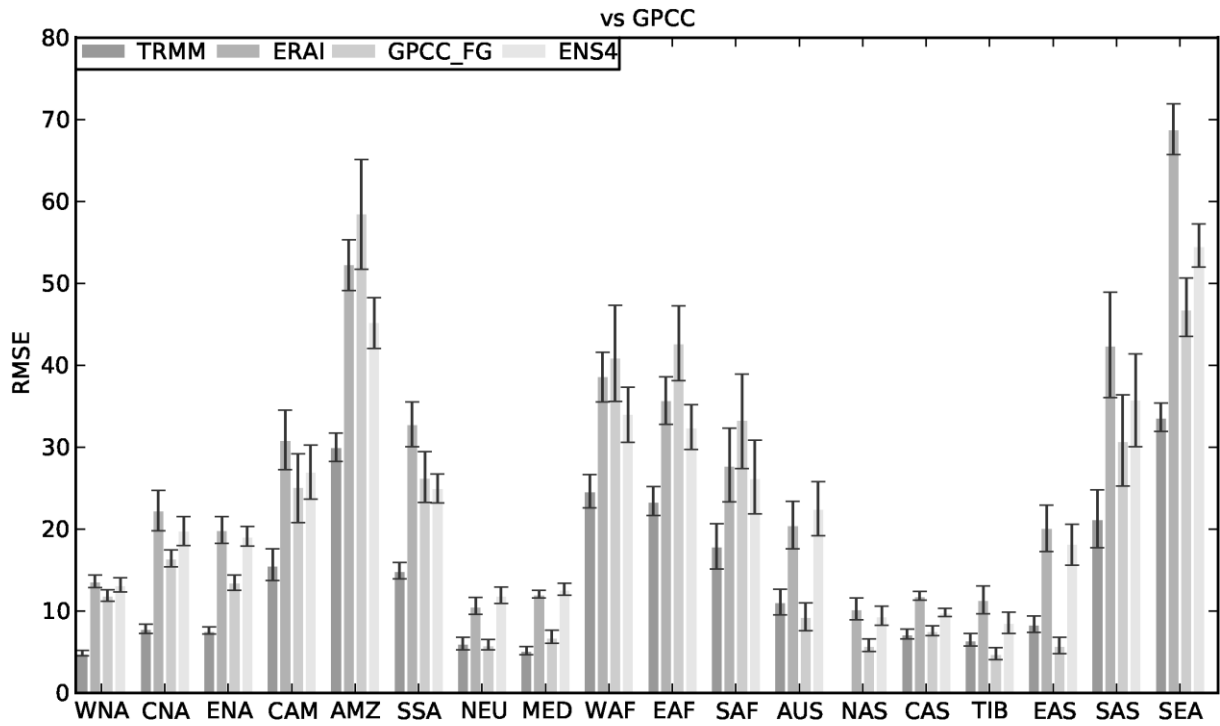


1  
 2 Figure S13. As figure 7 but for the monthly grid-point temporal correlations of GPCP versus  
 3 the remaining products. The correlation were calculated for the overlap period 2009-2012  
 4 and the mean annual cycle of the period was removed, in each dataset, prior do the  
 5 correlations calculation.  
 6



1  
 2 Figure S14. Root mean square error of the monthly precipitation of (a) TRMM, (b) ERAI, (c)  
 3 GPCC\_FG, and (d) ENS4 in respect to GPCC. The RMSE were calculated for the overlap  
 4 period 2009-2012 and the mean annual cycle of the period was removed, in each dataset, prior  
 5 do the RMSE calculations.  
 6





1

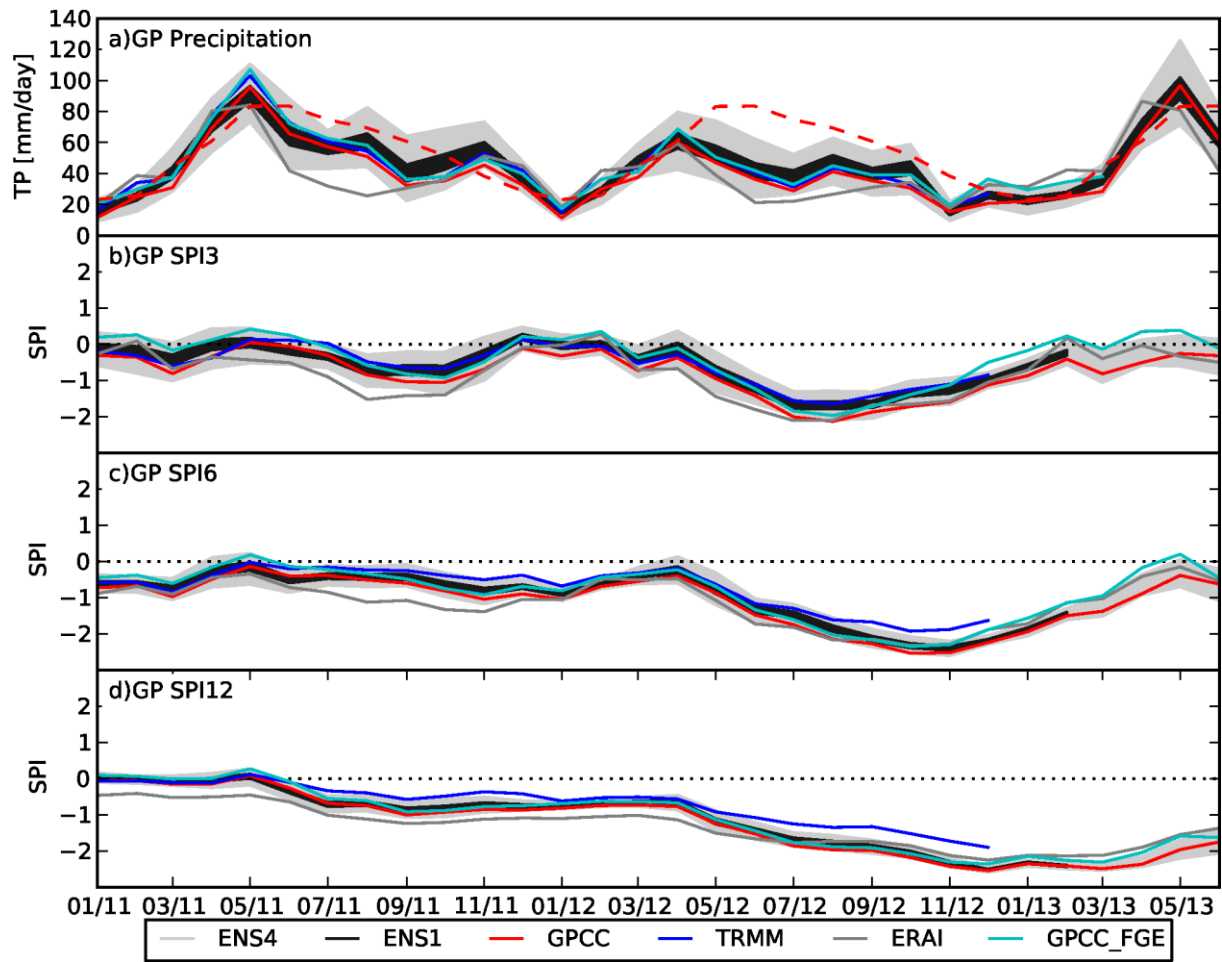
2 Figure S15. Regional averages of the root mean square error of the monthly precipitation of  
 3 TRMM, ERAI, GPCP\_FG and ENS4 in respect to GPCC. The RMSE was calculated for the  
 4 overlap period 2009-2012 and the mean annual cycle of the period was removed, in each  
 5 dataset, prior do the RMSE calculations. The error bars represent the 95% confidence  
 6 intervals of the spatial mean computed from a 1000 bootstrap re-sampling procedure.

7

8

9

10



1

2 Figure S16. As Figure 8 but for the U.A Great Plains region ( 35N-45N, 110W-90W).

3

4