Natural Hazards
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Supplement of

Global estimates of 100-year return values of daily precipitation from ensemble weather prediction data

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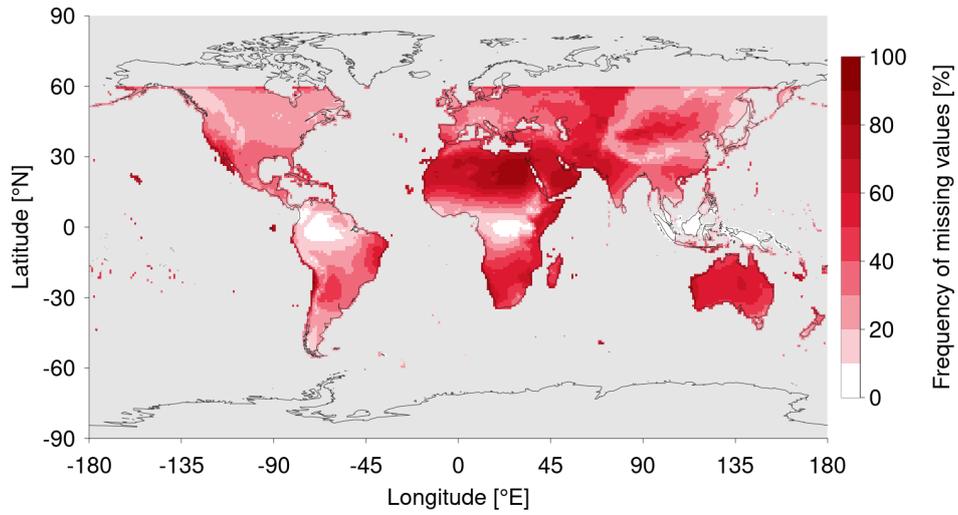
Supplementary Material

Figure S1. Frequency of missing values (either dry days or days when satellite data are not available) in the original PERSIANN observations for a data period of 1983 to 2021.
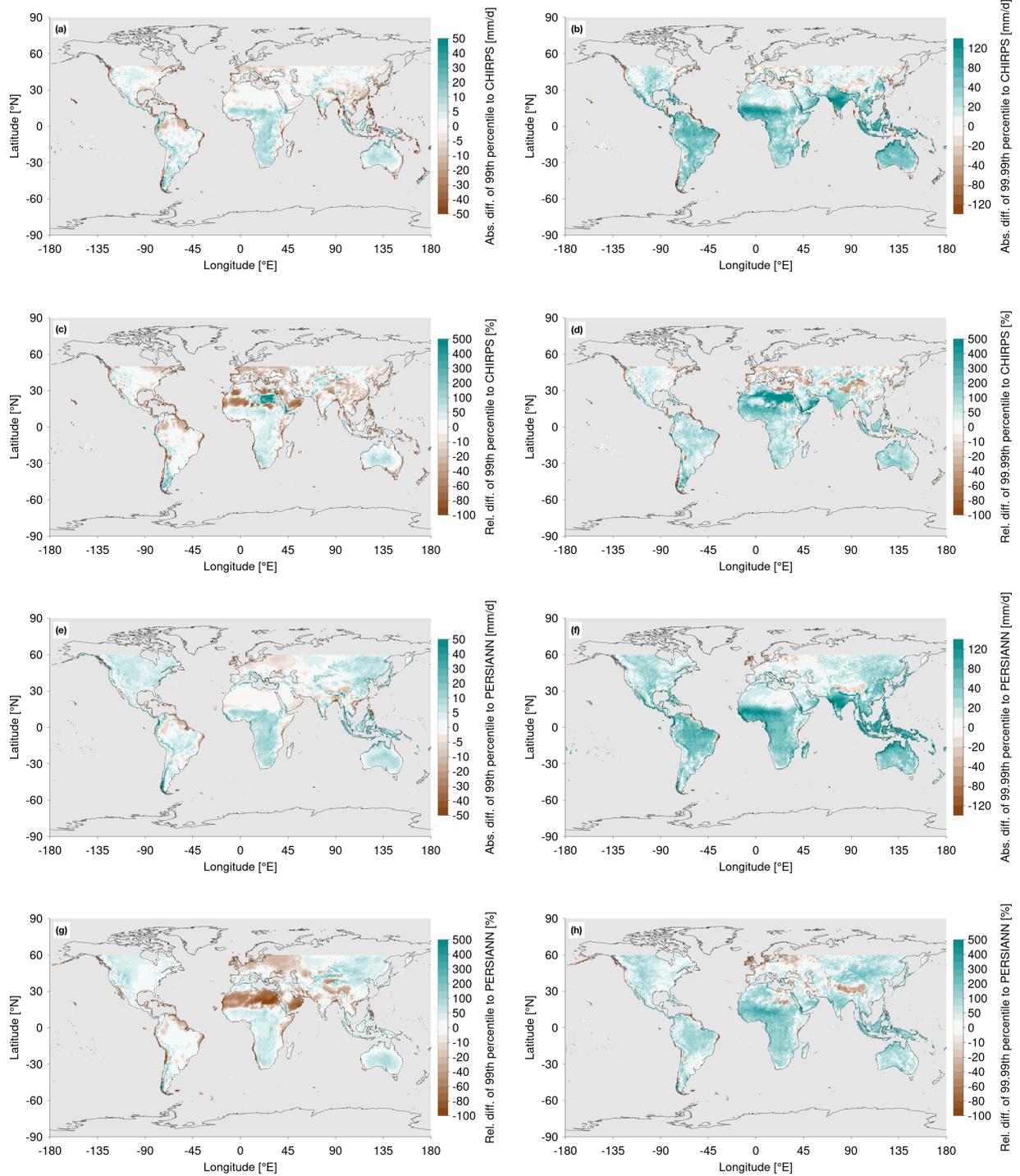
Figure S2. Difference of the (left) 99th and (right) 99.99th percentile of daily precipitation between the EPS data and the **(a-d)** CHIRPS or **(e-h)** PERSIANN observations, for **(a,b,e,f)** absolute and **(c,d,g,h)** relative differences. Note the non-linear colour scales.
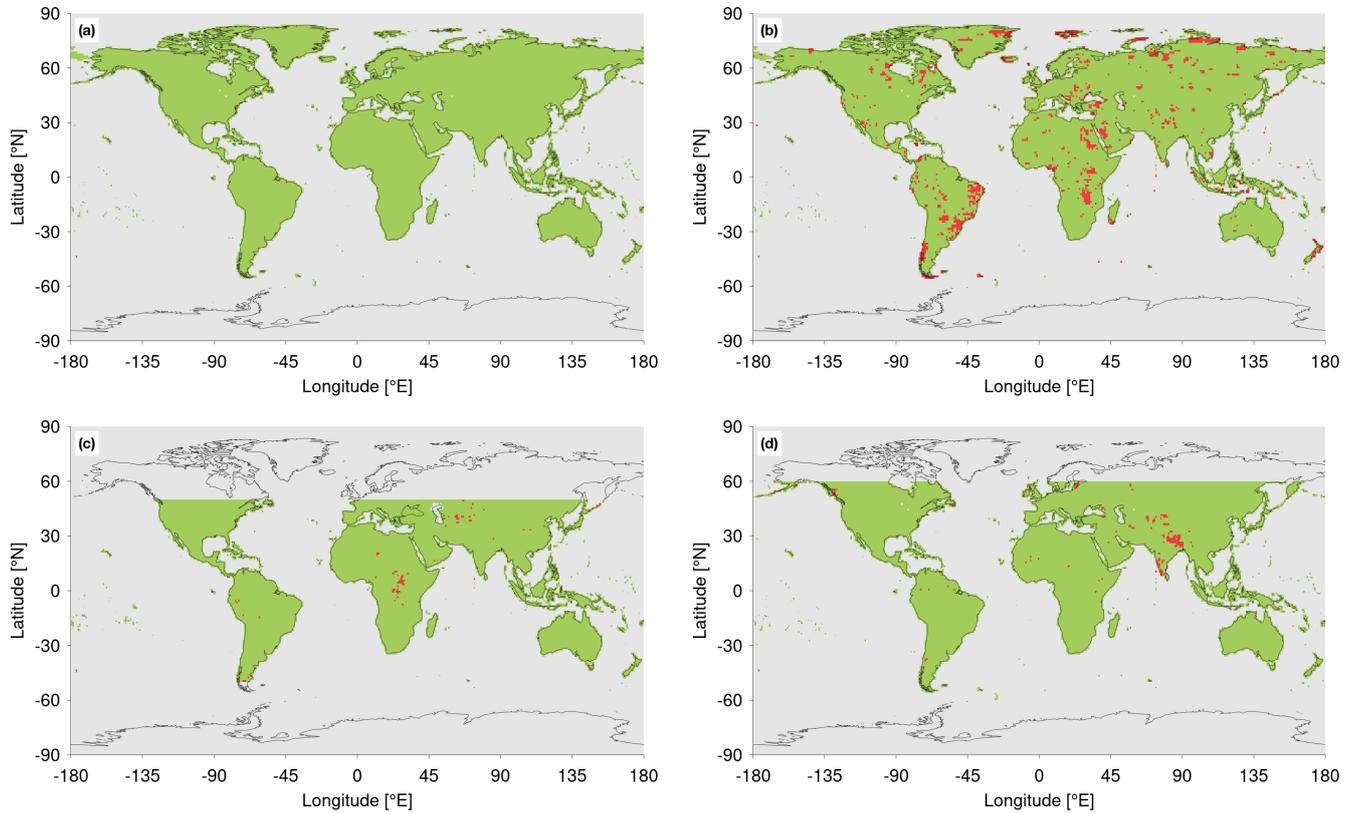
Figure S3. Spatial distribution of statistical significant temporal trends (red grid points), obtained from the FDR test of Benjamini and Hochberg (1995), as described in Ventura et al. (2004), applied on multiple p values associated with the Mann-Kendall trend tests applied for the 99.9th percentile of daily precipitation for **(a)** the EPS data and the **(b)** REGEN, **(c)** CHIRPS and **(d)** PERSIANN observations.
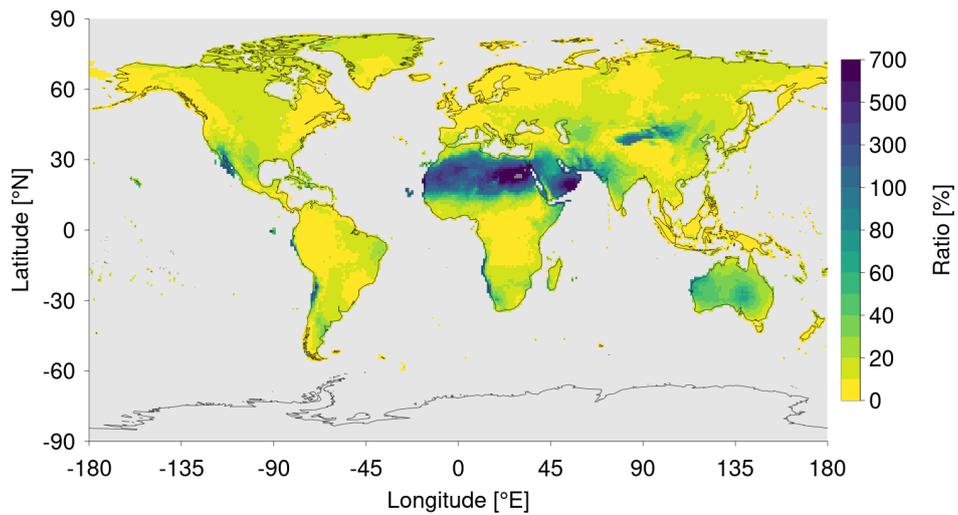
Figure S4. Ratio between the precipitation amount of a 100-year event of daily precipitation and the annual mean precipitation from the EPS data. The annual mean precipitation is averaged over all ensemble members and over the years 2008 to 2019. Dark grey shading indicates grid points for which the GEV parameters are outside the allowed range and thus no return values can be estimated. Note the non-linear colour scale.
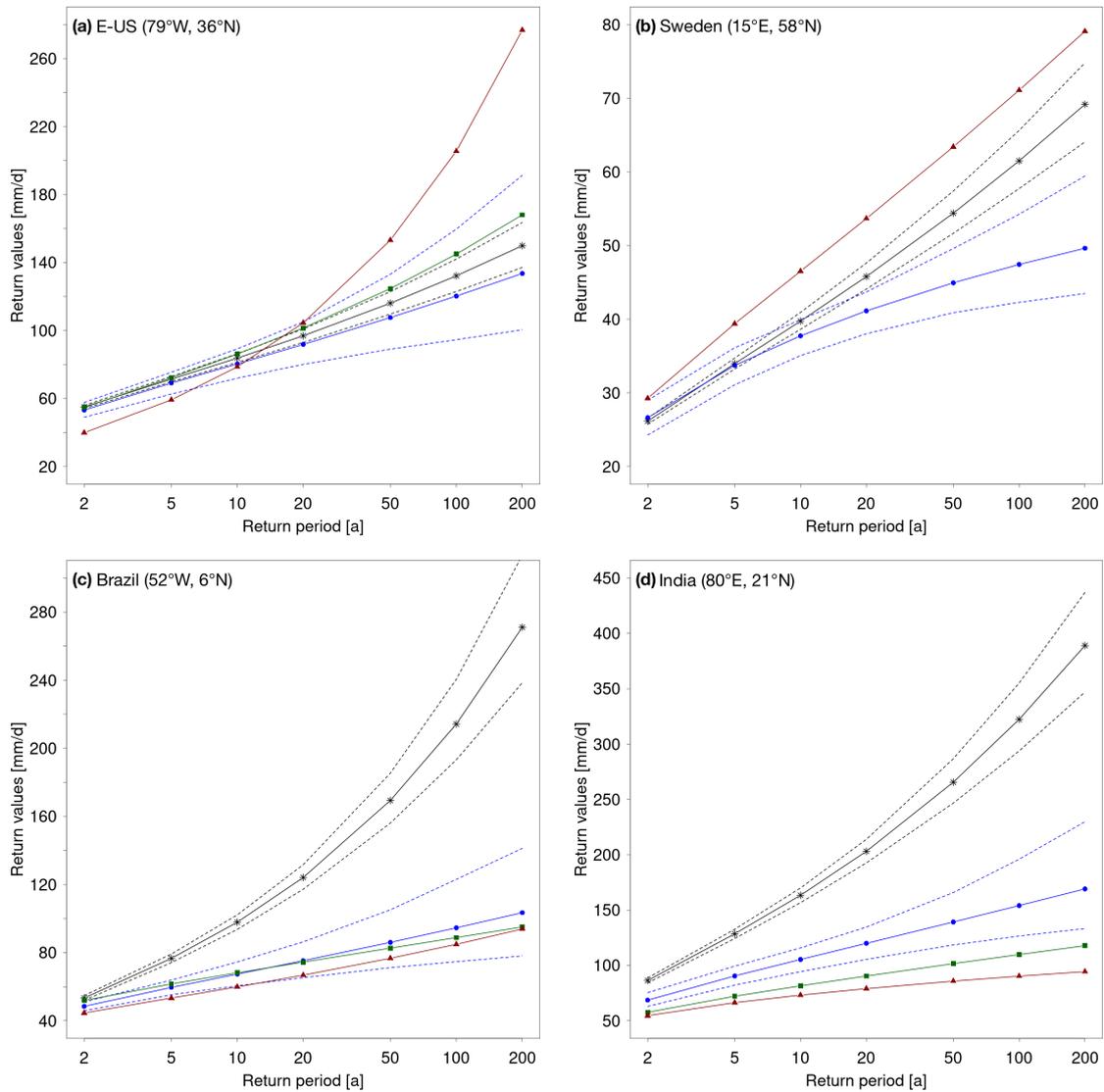
Figure S5. Return value plots of daily precipitation at individual grid boxes in **(a)** the eastern US (79°W, 36°N), **(b)** Sweden (15°E, 58°N), **(c)** Brazil (52°W, 6°S) and **(d)** India (80°E, 21°N), for the EPS data (black) and the observational data sets REGEN (blue), CHIRPS (green) and PERSIANN (red). Confidence intervals on a 95% level are added for the EPS data and REGEN observations.
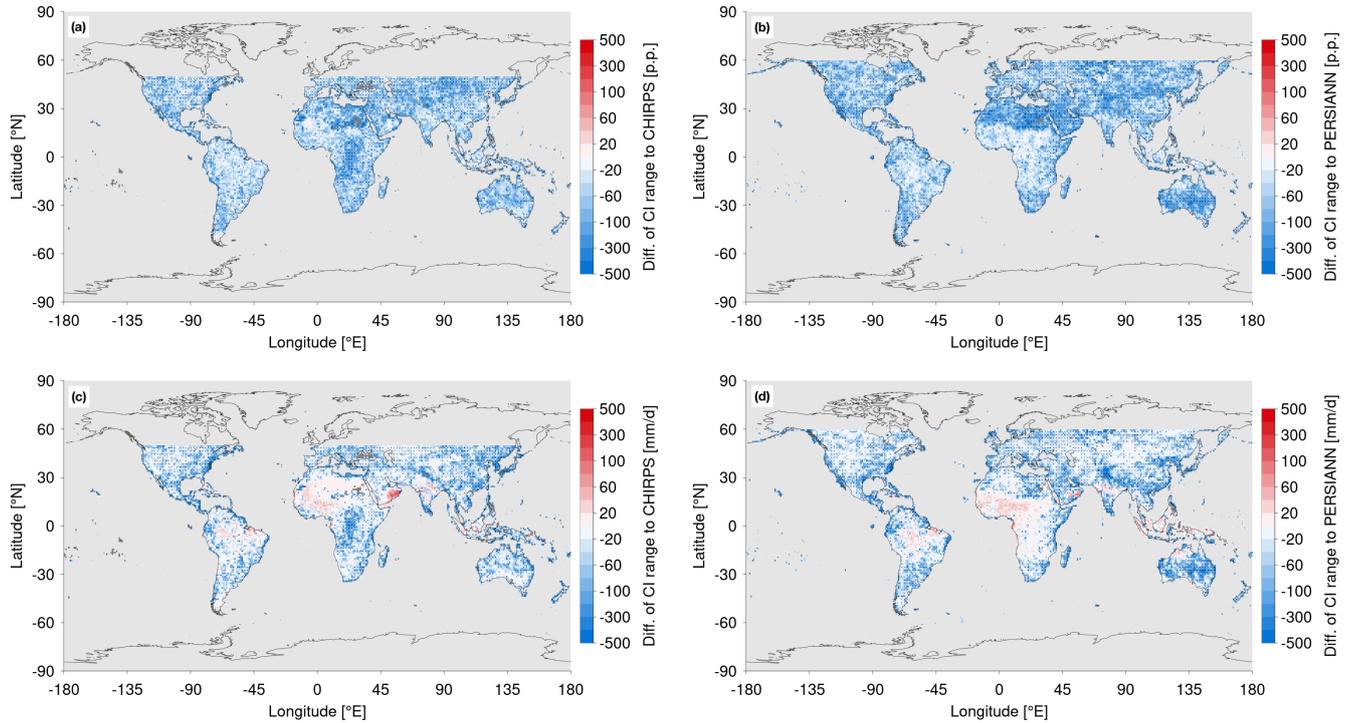
Figure S6. Difference of the **(a,b)** relative range, relative to the associated return values, and the **(c,d)** absolute range of confidence intervals on a 95% level between the EPS data and the estimates from **(a,c)** CHIRPS or **(b,d)** PERSIANN observations. Dark grey shading indicates grid points for which the GEV parameters are outside the allowed range and thus no return values can be estimated. Stippling indicates where the confidence interval of the EPS data overlaps with the confidence interval from the specific observations. Note the non-linear colour scales.