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.
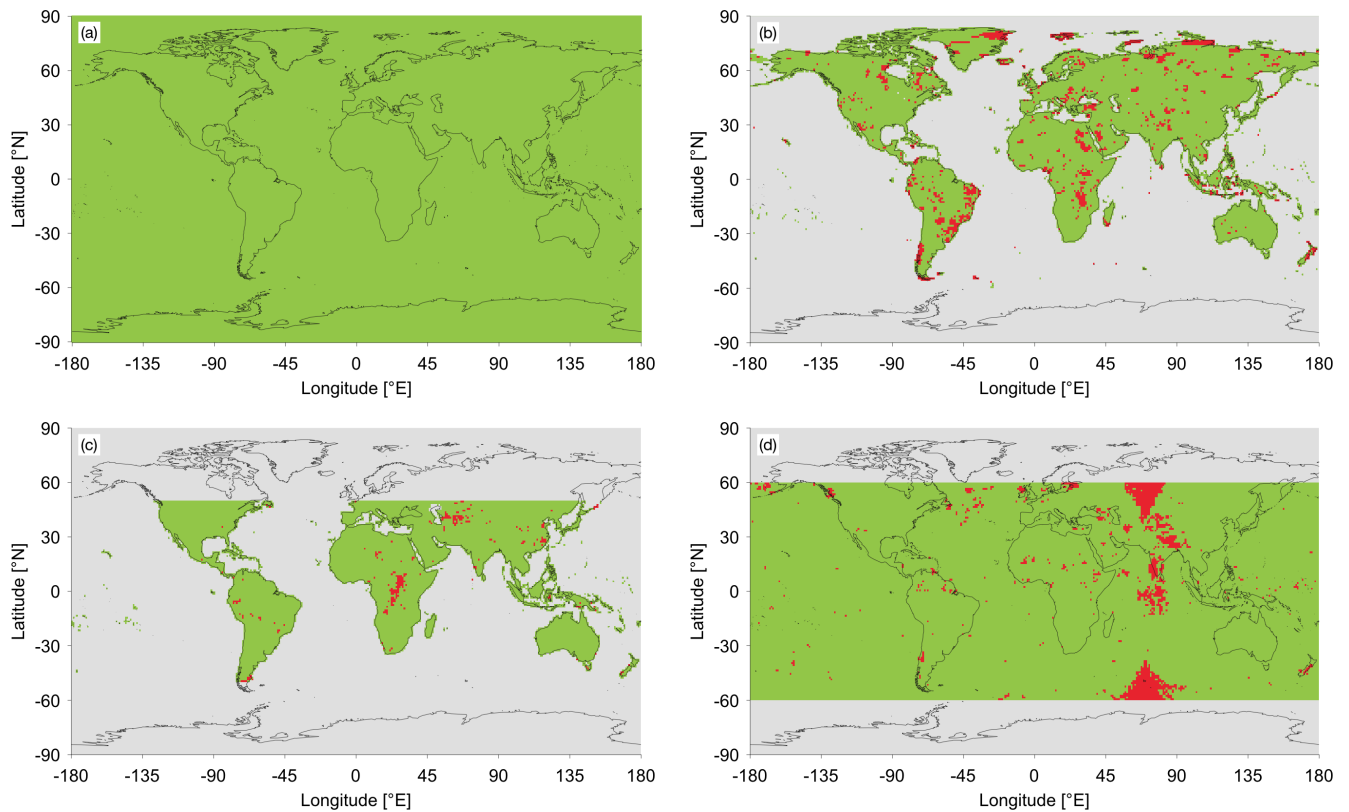
Figure S2. Spatial distribution of statistical significant temporal trends (red grid points), obtained from the FDR test of Benjamini and Hochberg (1995), as described in Ventura et al. (2004), applied on multiple p values associated with the Mann-Kendall trend tests applied for the 99.9th percentile of daily precipitation for **(a)** the EPS data and the **(b)** REGEN, **(c)** CHIRPS and **(d)** PERSIANN observations.