Supplementary material

Benchmarking global hydrological and land surface models against GRACE in a medium-size tropical basin

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Journal of Hydrology and Earth System Sciences - HESS

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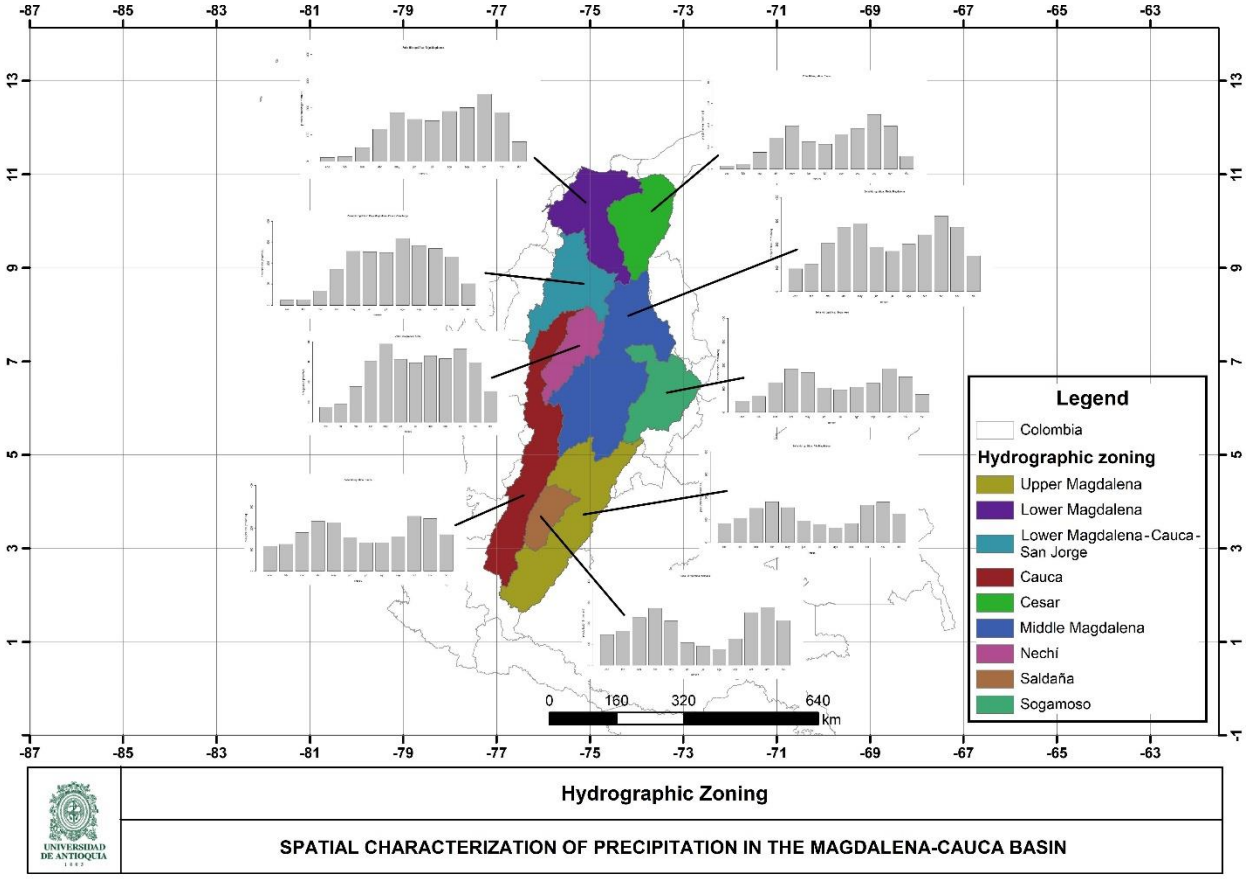

Figure S1. Hydrographic zoning of the Magdalena-Cauca basin. The annual precipitation cycle is shown for each zone. Source: Zapata, 2019.

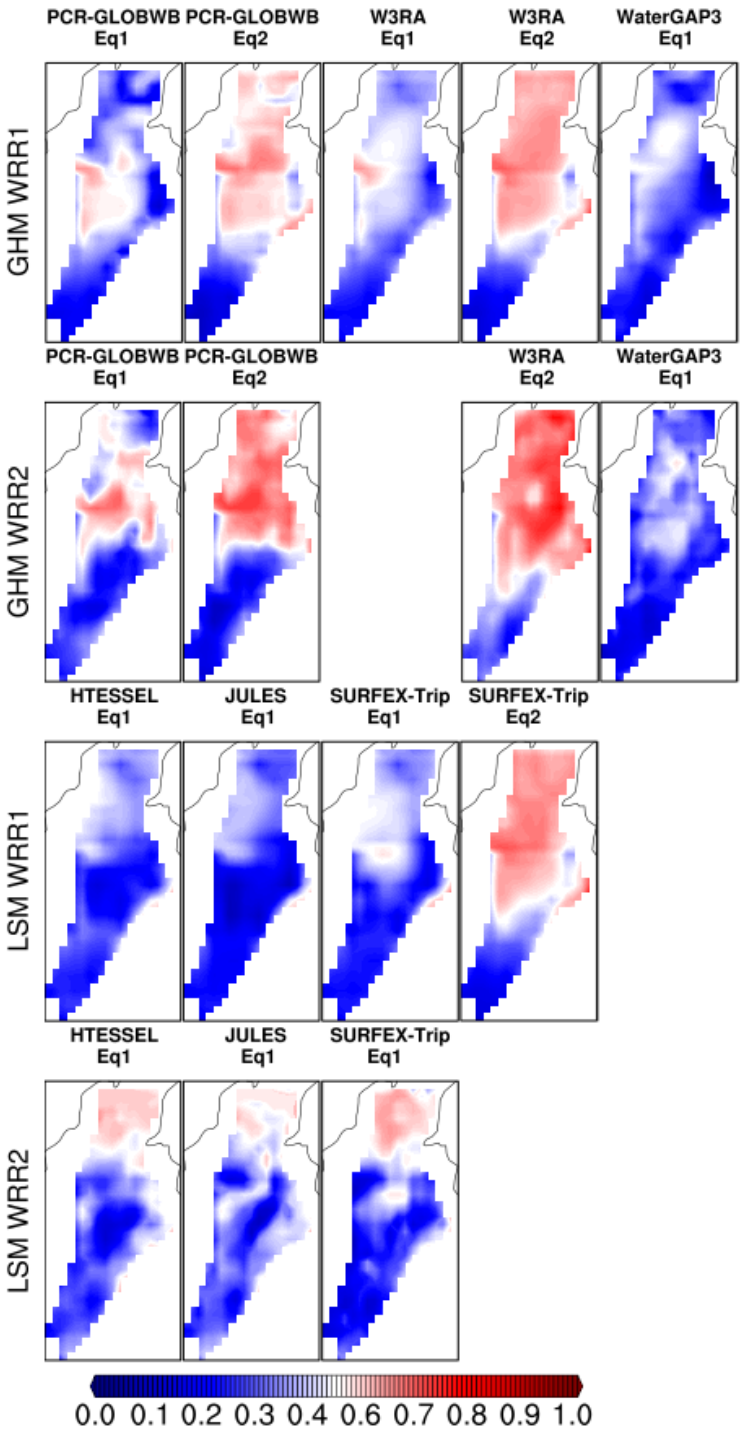

Figure S2. GRACE JPL vs Models correlation maps for whose that are available both in WRR1 and WRR2 for Eq1 and Eq2.

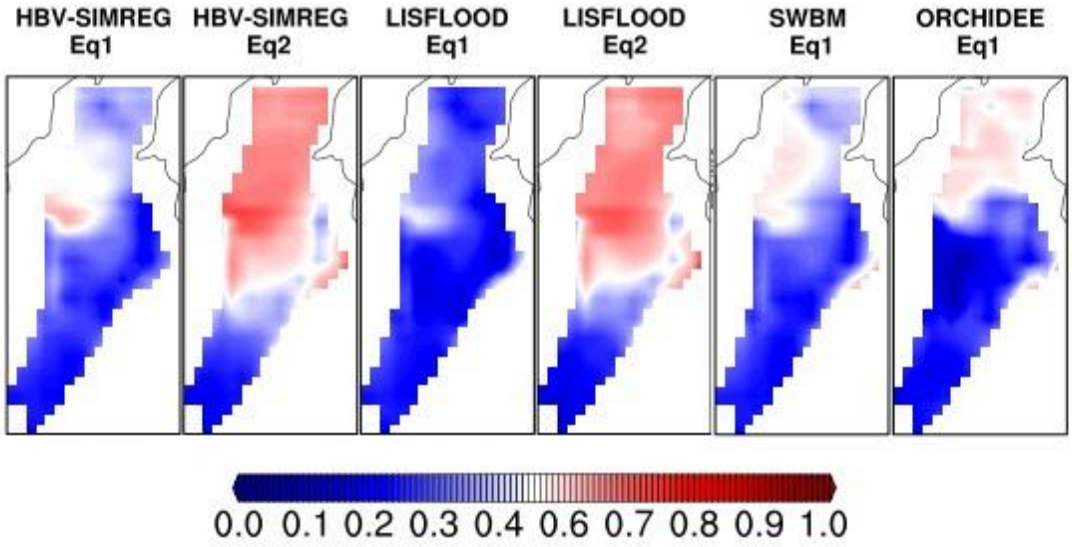

Figure S3. GRACE JPL vs Models correlation maps for whose that are available only in WRR1 for Eq1 and Eq2.

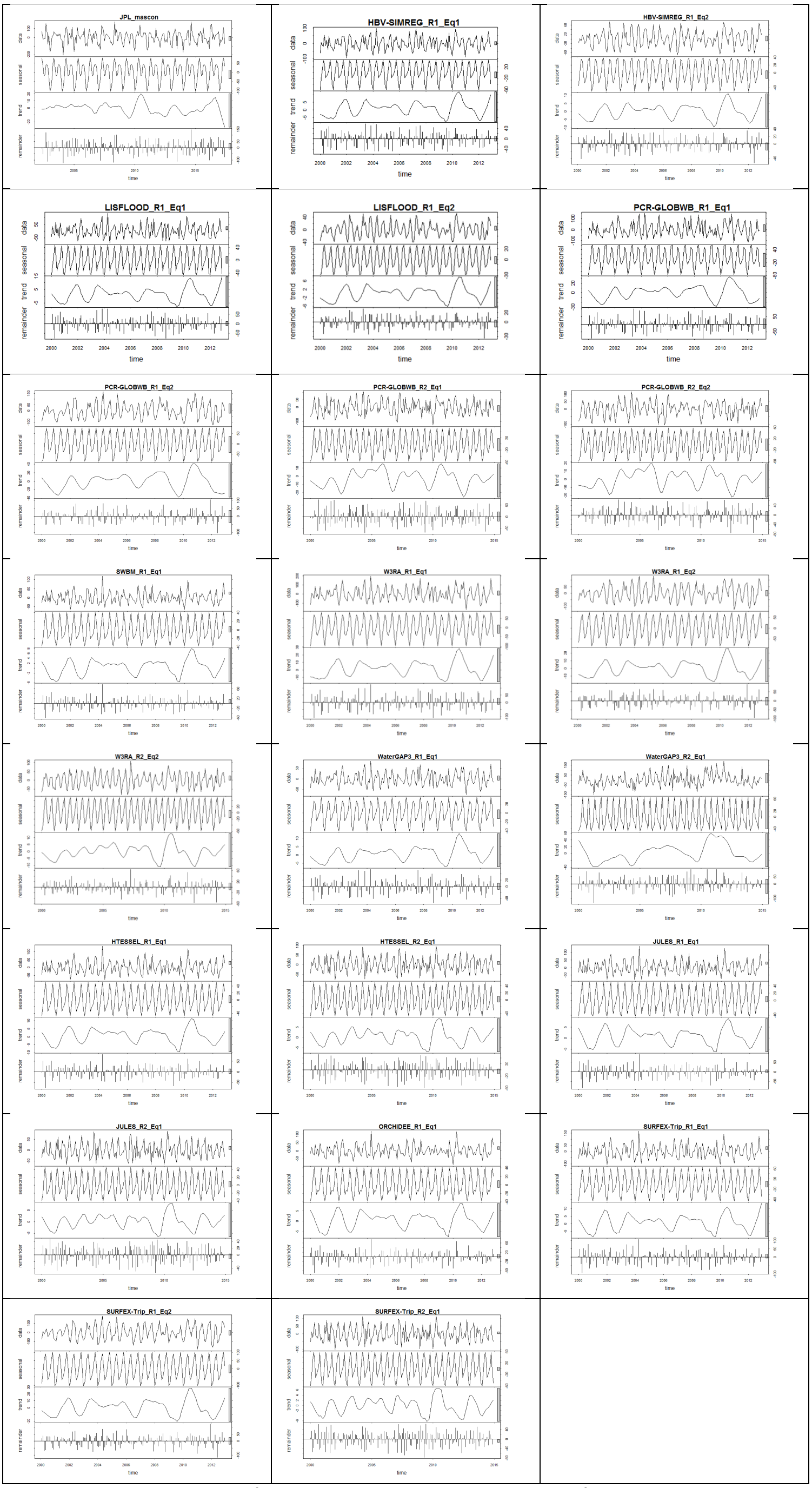

Figure S4. Decomposition by Loess STL for the JPL mascon GRACE product and TWS from models. Each diagram shows the original data and its decomposition into the seasonal, long-term trend, and residuals.

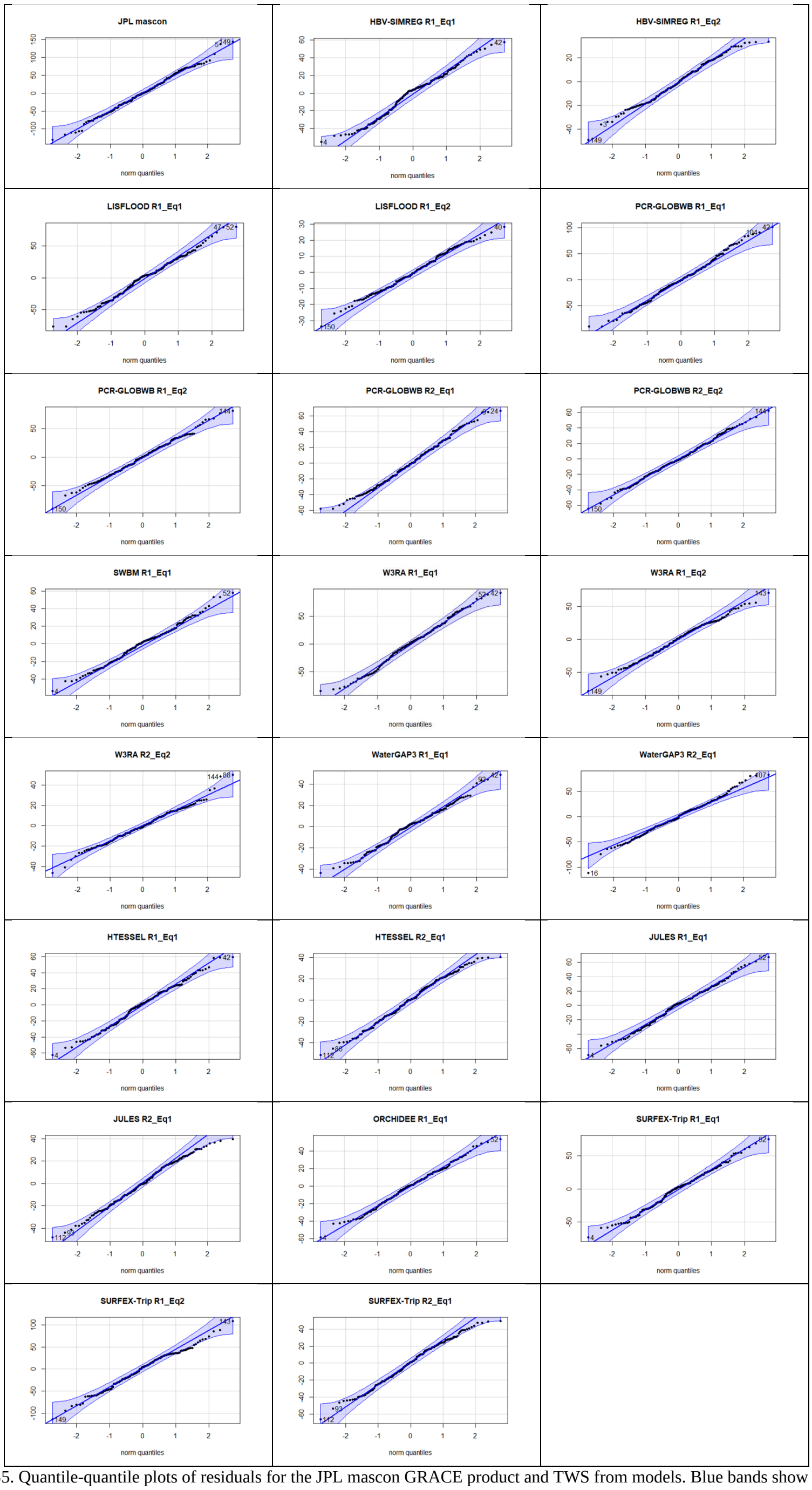

Figure S5. Quantile-quantile plots of residuals for the JPL mascon GRACE product and TWS from models. Blue bands show the 95% confidence bands.

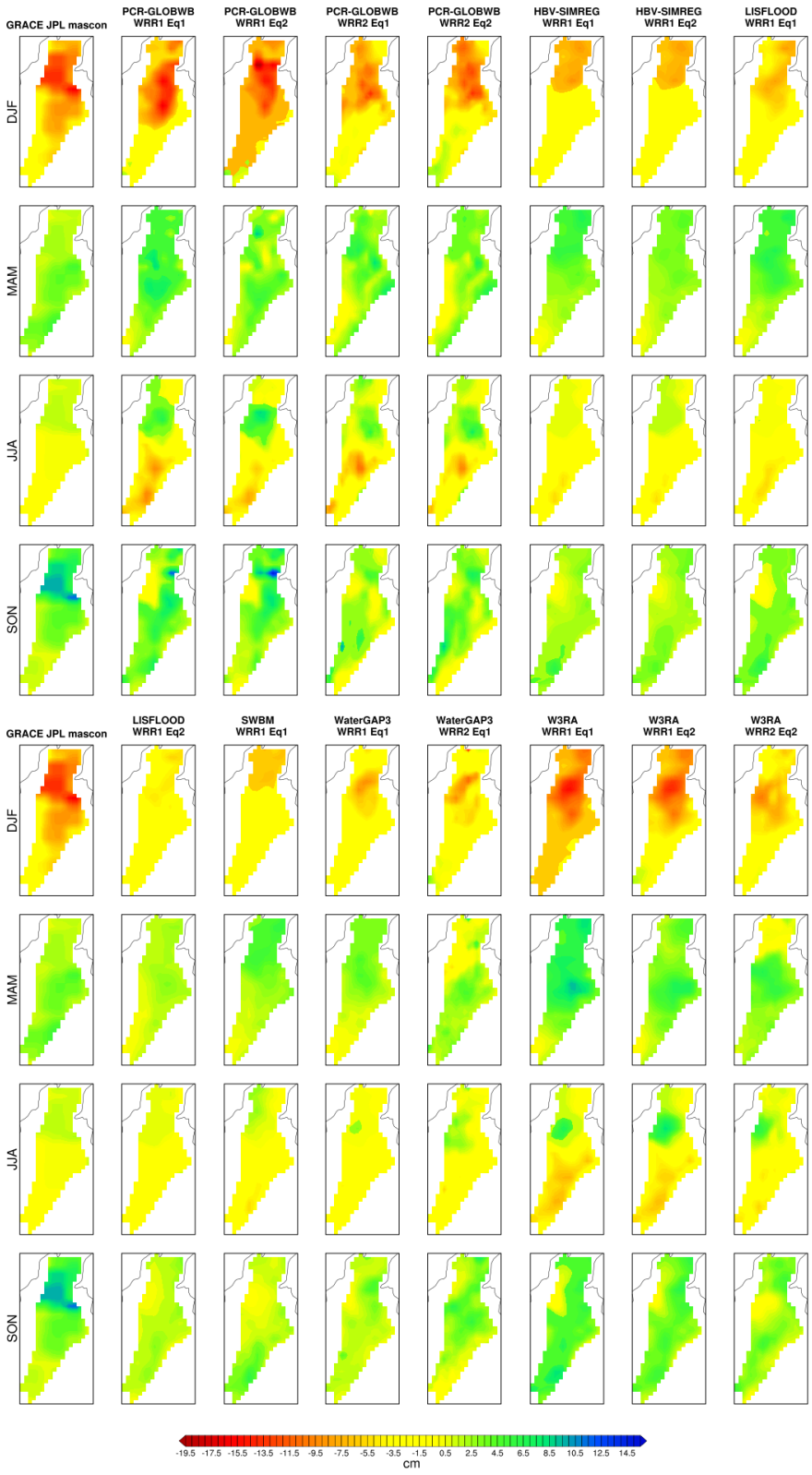

Figure S6. Seasonal maps for GRACE JPL and each GHM WRR1 and WRR2.

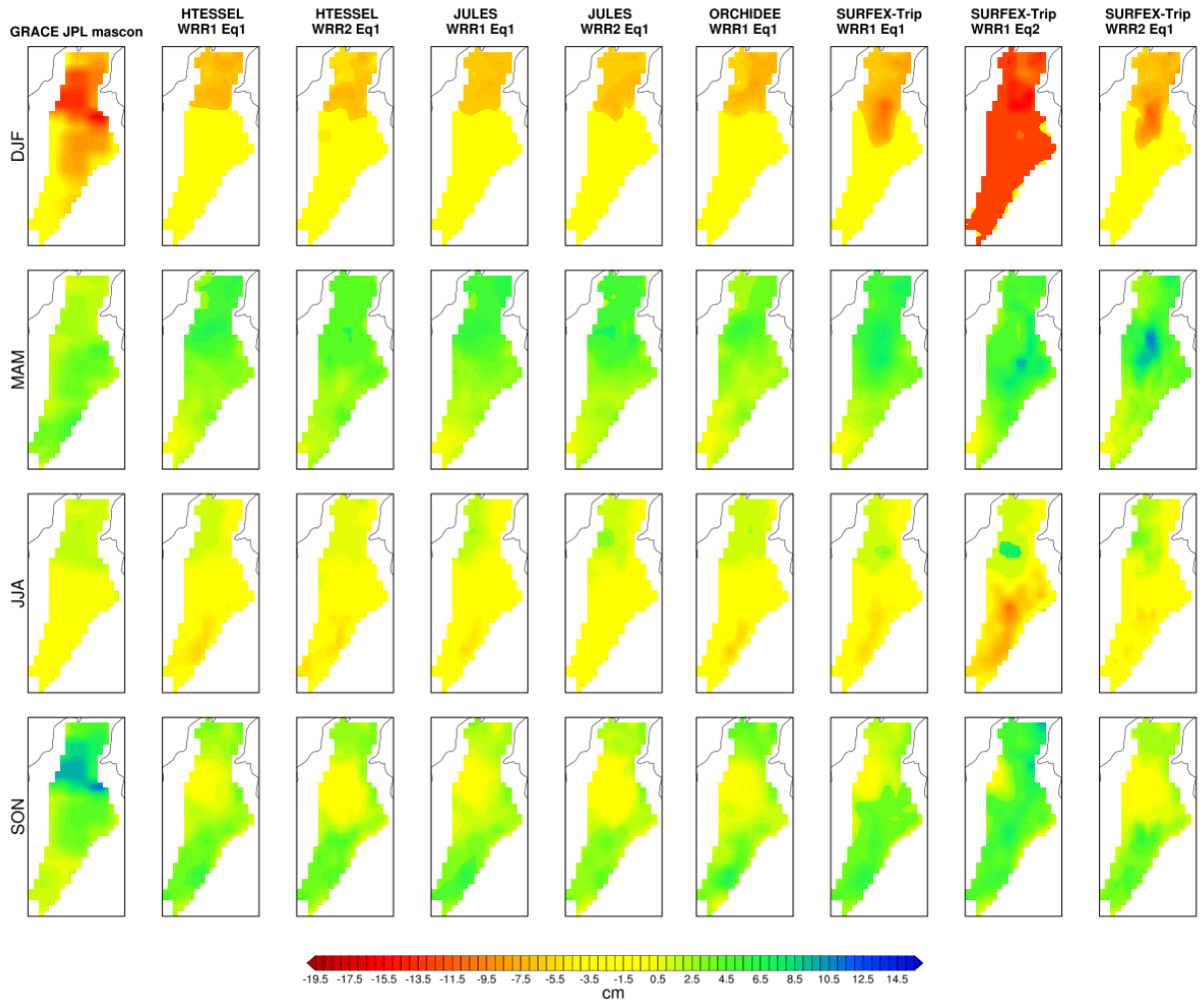

Figure S7. Seasonal maps for GRACE JPL and each LSM WRR1 and WRR2.

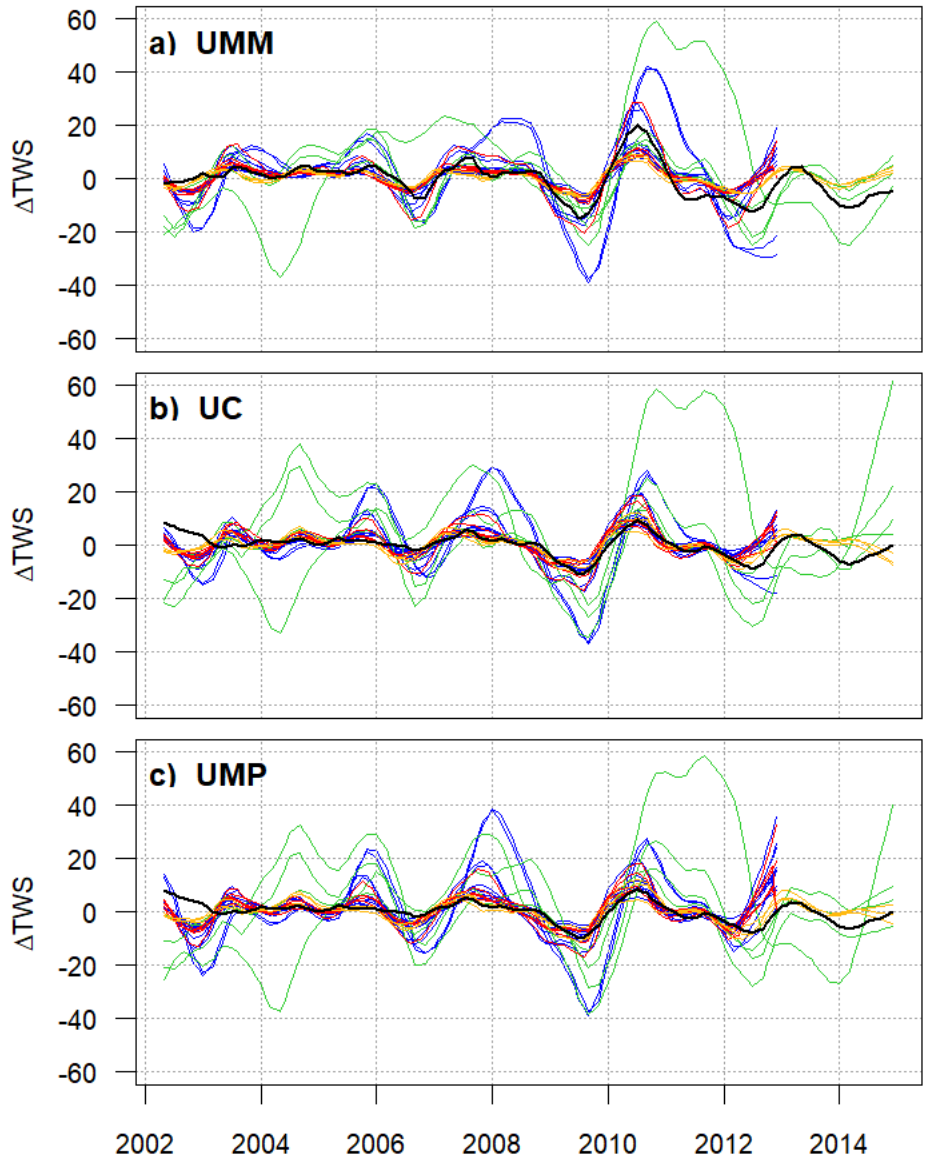

Figure S8. Long-term trends time series for the models and GRACE for a) UMM, b) UC and c) UMP basins. The black line indicates the GRACE JPL, the blue and red lines the GHMs WRR1 and WRR2 respectively, the yellow lines the LSM WRR1 and the green lines LSM WRR2.

The GRACE data utilized in this research were from JPL mascon RL05 (Watkins et al., 2015), and Earth2Observe models data were downloaded from the E2O Water Cycle Integrator portal https://wci.earth2observe.eu/ (last access: 20 November 2018). Data for this research are provided in the spreadsheets, see table S1 to S7.

Reference

EartH2Observe Water Cycle Integrator. (2018). Retrieved 20 November 2018, from https://wci.earth2observe.eu/

Watkins, M. M., Wiese, D. N., Yuan, D.-N., Boening, C., & Landerer, F. W. (2015). Improved methods for observing Earth's time variable mass distribution with GRACE using spherical cap mascons. *Journal of Geophysical Research: Solid Earth, 120*(4), 2648-2671.

Zapata, Andrés Felipe (2019). Caracterización espacial de la precipitación en la cuenca del Magdalena - Cauca. Universidad de Antioquia, Ingeniería Ambiental.