CHIRPS v2 vs. v3 (2020, Jan to June — Africa region)
Summary of how CHIRPS v3 differs from v2

CHIRPS v3 shows a modest overall increase in precipitation relative to v2 but with substantial spatial heterogeneity. The area-average **annual total** (region-mean) **increased from ~405.1 mm (v2) to ~429.5 mm (v3)**, a net **increase of ~24.5 mm/year (≈ +6.1%).**

However, cellwise differences are large in places:
mean absolute cellwise difference ≈ 189.5 mm/year (≈ 0.52 mm/day)
RMSE ≈ 338.8 mm/year (≈ 0.93 mm/day),
46% of grid points **show >10% difference**.

Overall regional totals changed modestly, but many local grid cells change a lot.

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=== CHIRPS Version Comparison - Basic Statistics (2020, Africa Region) ===
    Dataset  Mean (mm/year)  Median (mm/year)  Std Dev (mm/year)  Min (mm/year)  Max (mm/year)  Valid Points  Total Points
CHIRPS v2.0          205.04              0.25             312.13            0.0        2919.69       1540000       1540000
CHIRPS v3.0          220.75              0.74             337.36            0.0        4246.32       1540000       1540000
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Region mean (annual)

- CHIRPS **v2.0 mean** (grid-averaged): **205.04 mm/year** (this is the mean of the per-grid annual values; see note below)
- CHIRPS **v3.0 mean** (grid-averaged): **220.75 mm/year**
- Difference of those datasets means: v3 − v2 = **+15.71 mm/year** (this is dataset-mean difference)

Annual totals (temporal summary, region-mean integrated across the year)

- Annual total **(v2, region mean)**: **405.1 mm**
- Annual total **(v3, region mean): 429.5 mm**
- Absolute annual difference **(v3 − v2): +24.5 mm** (≈ +6.1% relative to v2 annual total)

Error / dispersion metrics (cellwise)

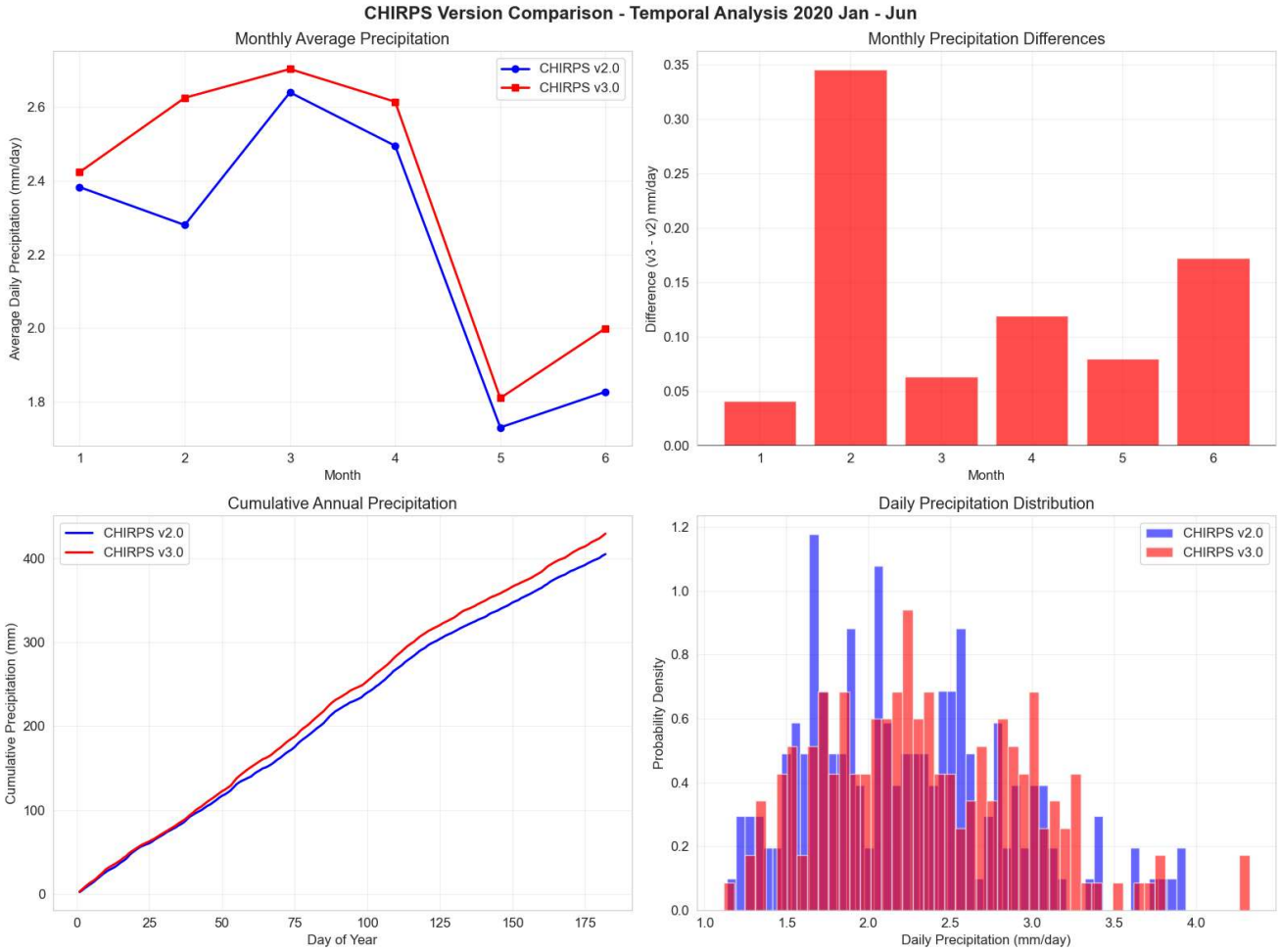
- Mean Absolute Error (MAE; cellwise): 189.54 mm/year (≈ 0.52 mm/day)
- Root Mean Square Error (RMSE; cellwise): 338.80 mm/year (≈ 0.93 mm/day)
- R-squared (v3 vs v2): −0.178 (note: negative R^2 indicates residual variance > total variance around mean; reflects large, localized differences)
- Pearson correlation (spatial): ≈ 0.459 (Pearson p-value ≈ 0)

Spatial extremes (localized)

- Maximum positive local difference (v3 − v2): about +4246 mm/year in some grid cells
- Maximum negative local difference: about −2919.7 mm/year in some grid cells
- Fraction of grid points with >10% relative difference (masked appropriately): ≈ 46.3%

Monthly differences (6 months in the run Jan–Jun):

- Maximum monthly difference: +0.345 mm/day in month 2 (February)
- Minimum monthly difference: +0.041 mm/day in month 1 (January)
- Cumulative annual totals (region-mean)
- v2 cumulative final: 405.1 mm
- v3 cumulative final: 429.5 mm
- Net increase: +24.5 mm/year



Seasonal means:

Months	v2 (mm/day)	v3 (mm/day)	Difference (mm/day)
DJF (Dec-Jan-Feb):	2.333	2.521	+0.188 mm/day (+8.05%)
MAM (Mar-Apr-May)	2.286	2.373	+0.087 mm/day (+3.82%)
JJA (Jun-Jul-Aug)	1.827	1.999	+0.172 mm/day (+9.42%)

Large positive differences (v3 > v2) in some coastal and interior bands, and large negative differences in others explains why dataset-mean changes are small while cellwise MAE/RMSE are large, local corrections or reprocessing in v3 produce big local changes but they partially cancel at the regional average scale.

Region-level totals or long-term averages (e.g., aggregated water balance or annual rainfall for planning), the differences are modest: **~+6% increase** in total annual precipitation for this Africa region (v3 > v2).

Local/grid-level numbers (e.g., hydrological modelling for sub-catchments, extreme-event mapping, station-scale comparisons), differences are substantial and may materially change results: **MAE ≈ 189.5 mm/year** and **RMSE ≈ 338.8 mm/year** (many local cells change by hundreds to thousands of mm/year).

Seasonal shifts are visible: peak relative changes (DJF & JJA) in the sample region were **~+8–9%,** meaning seasonal risk/seasonality assessments could change meaningfully between versions.

Recommendation: for high-impact local decisions (e.g., flood risk, design storms, local crop planning), run v3 through the applications and compare outcomes rather than relying on v2-based calibrations.