Analysis protocol — NASA MERRA-2 point trend (prepared before reviewing values)

- Prepared: 2026-11-14T00:09:31+11:00
- Source: NASA POWER Monthly API, meteorological variables sourced from MERRA-2.
- Question: At the project dashboard's default map coordinate (requested 133.8°E, 25.3°S), did monthly mean 2 m air temperature or corrected precipitation show a linear trend over 1981–2025?
- Primary outcome: annual day-weighted mean T2M (°C).
- Secondary outcome: annual day-weighted mean PRECTOTCORR (mm/day); precipitation direction is exploratory.
- Expected direction: T2M upward; no directional hypothesis for precipitation.
- Aggregation: omit API annual summary values; aggregate the 12 monthly values into day-weighted annual values to remove the seasonal cycle before trend testing.
- Trend summaries: ordinary least-squares slope and Sen's median slope; Mann–Kendall two-sided test on annual values. Apply Bonferroni correction across the two variable tests; alpha = 0.05.
- Missingness: treat the API sentinel value -999 as missing and report the number of years retained.
- Scope: single NASA POWER grid point nearest the requested coordinate; this is not an Australia-wide average and MERRA-2 is a reanalysis/model product, not a direct satellite observation.
- Limitations: the basic Mann–Kendall p-value is not corrected for serial autocorrelation; results are exploratory and require sensitivity checks before any scientific or causal claim.