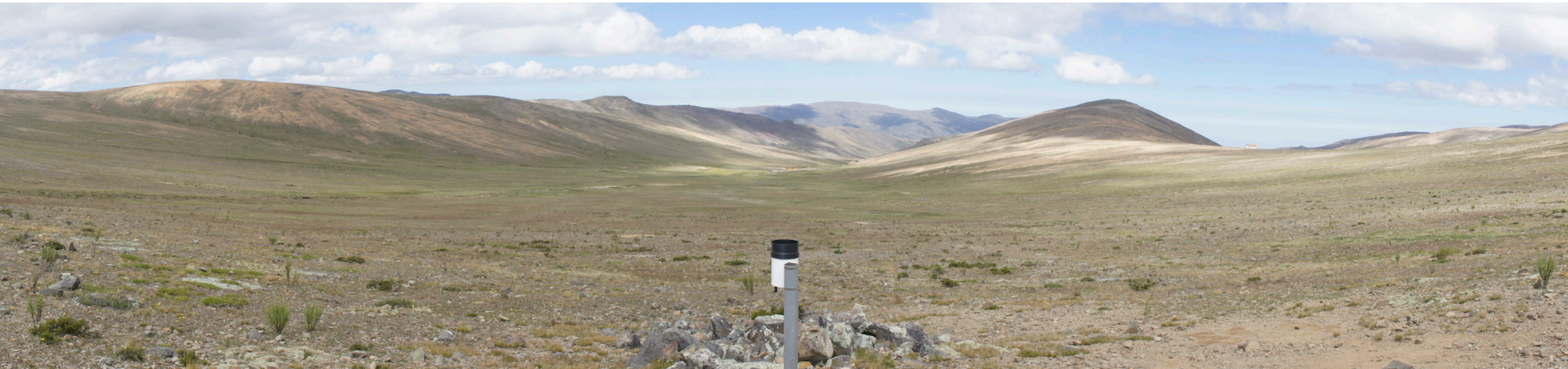


Characterising extreme rainfall over mountain regions with a network of tipping bucket rain gauges and GPM satellite data



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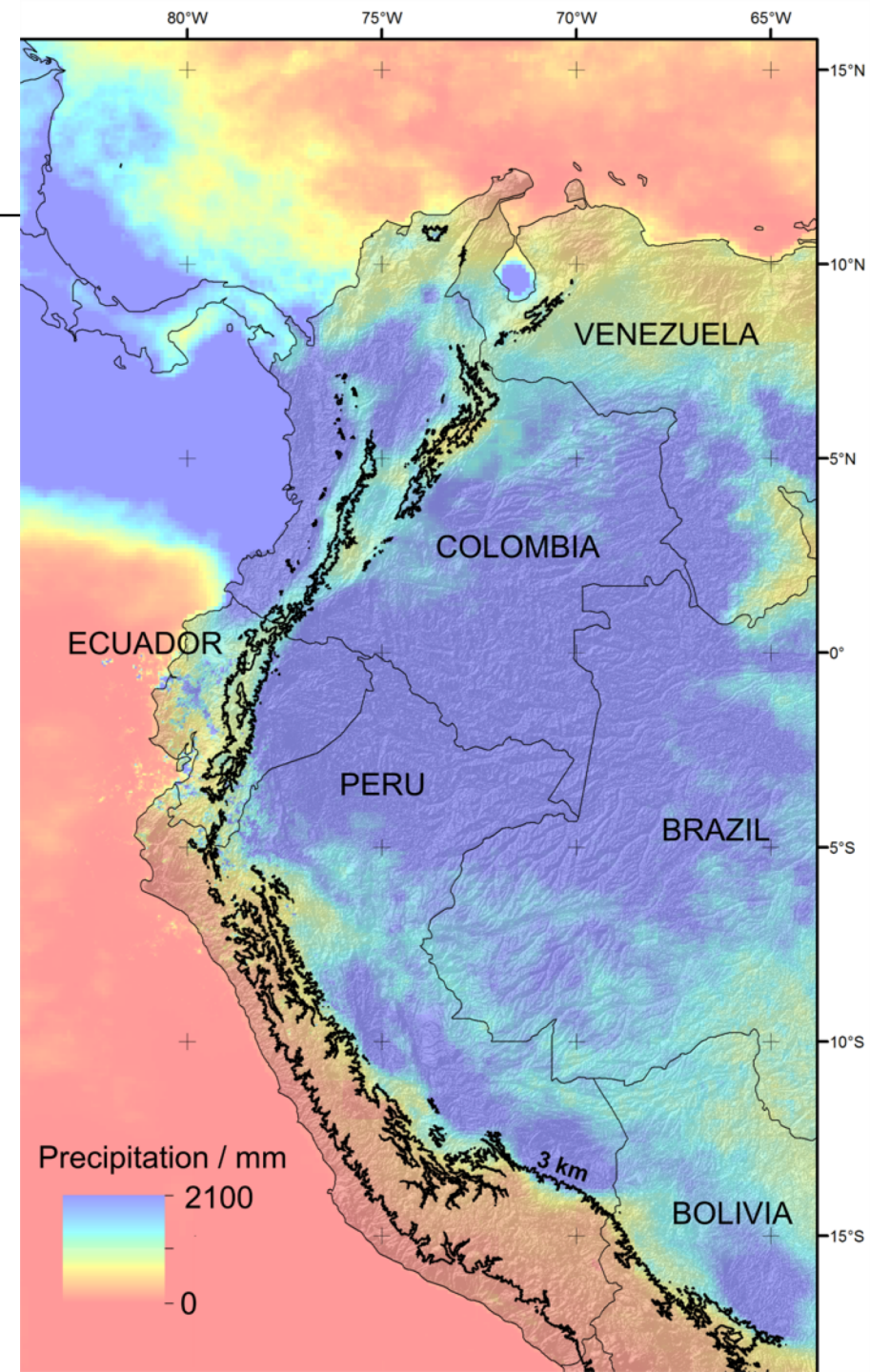
CONDESAN
Consortio para el Desarrollo Sostenible
de la Ecorregion Andina

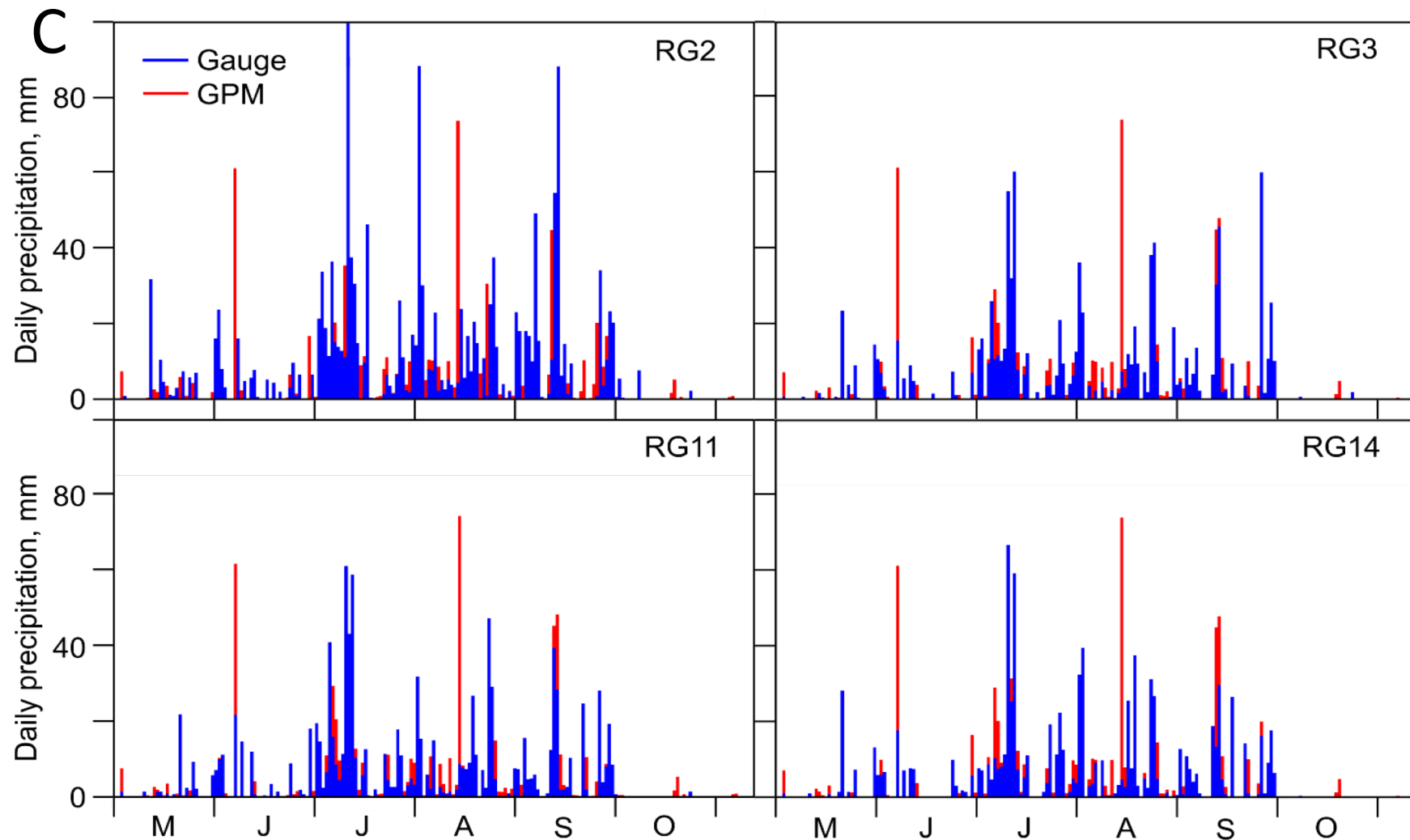
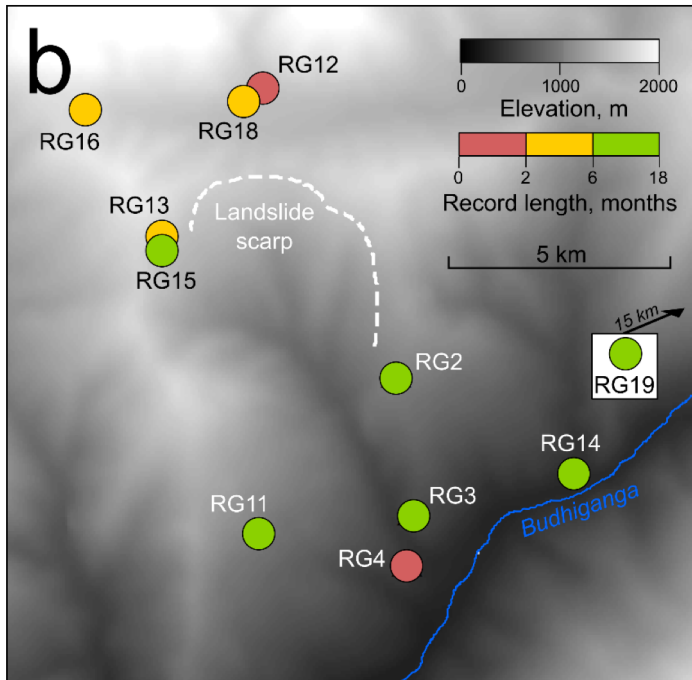
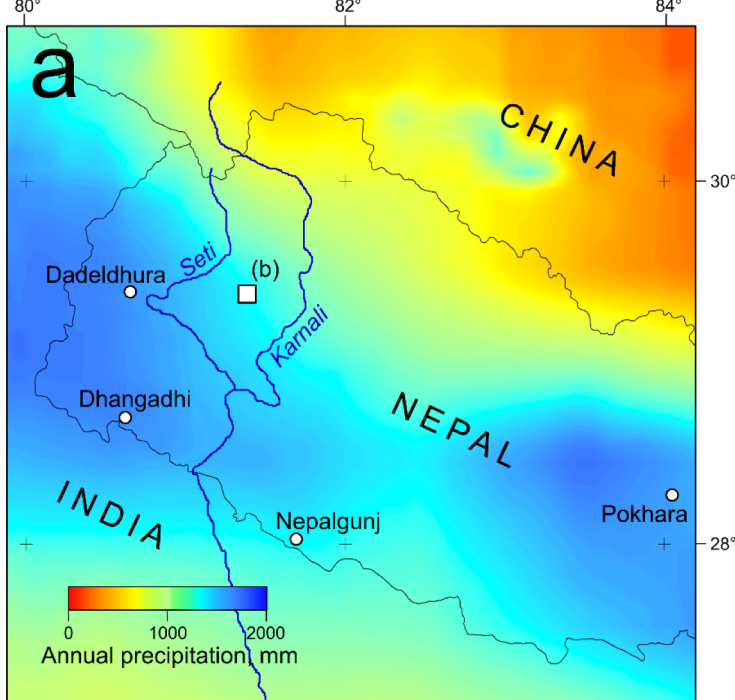


Global Precipitation Mission (GPM)

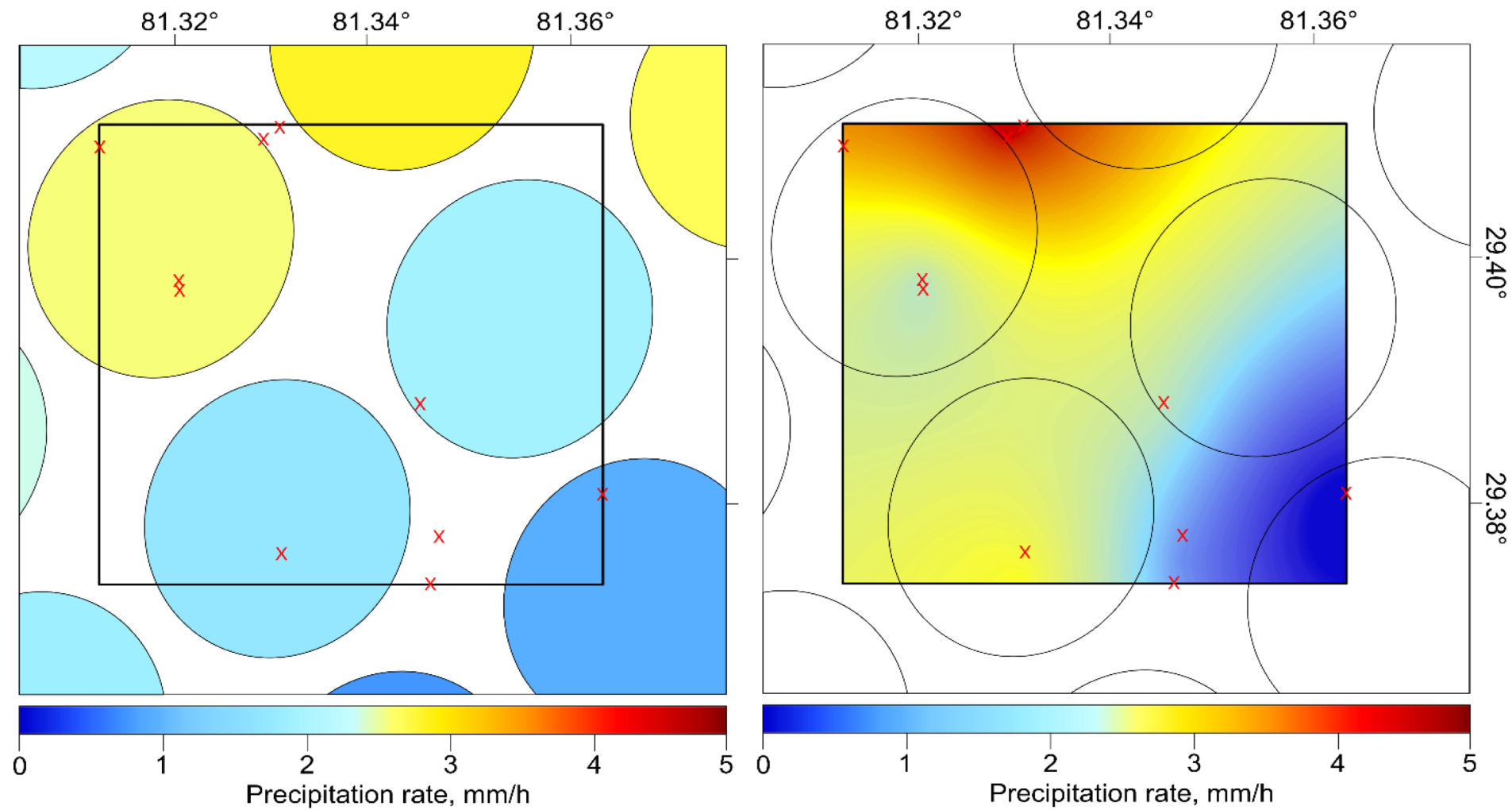
- Satellite-based active radar:
- GPM 2A-DPR data product: level 2 dual precipitation radar product (Ka and Ku bands)
- Narrow swath: high spatial resolution (~4 km)

GPM, 2018

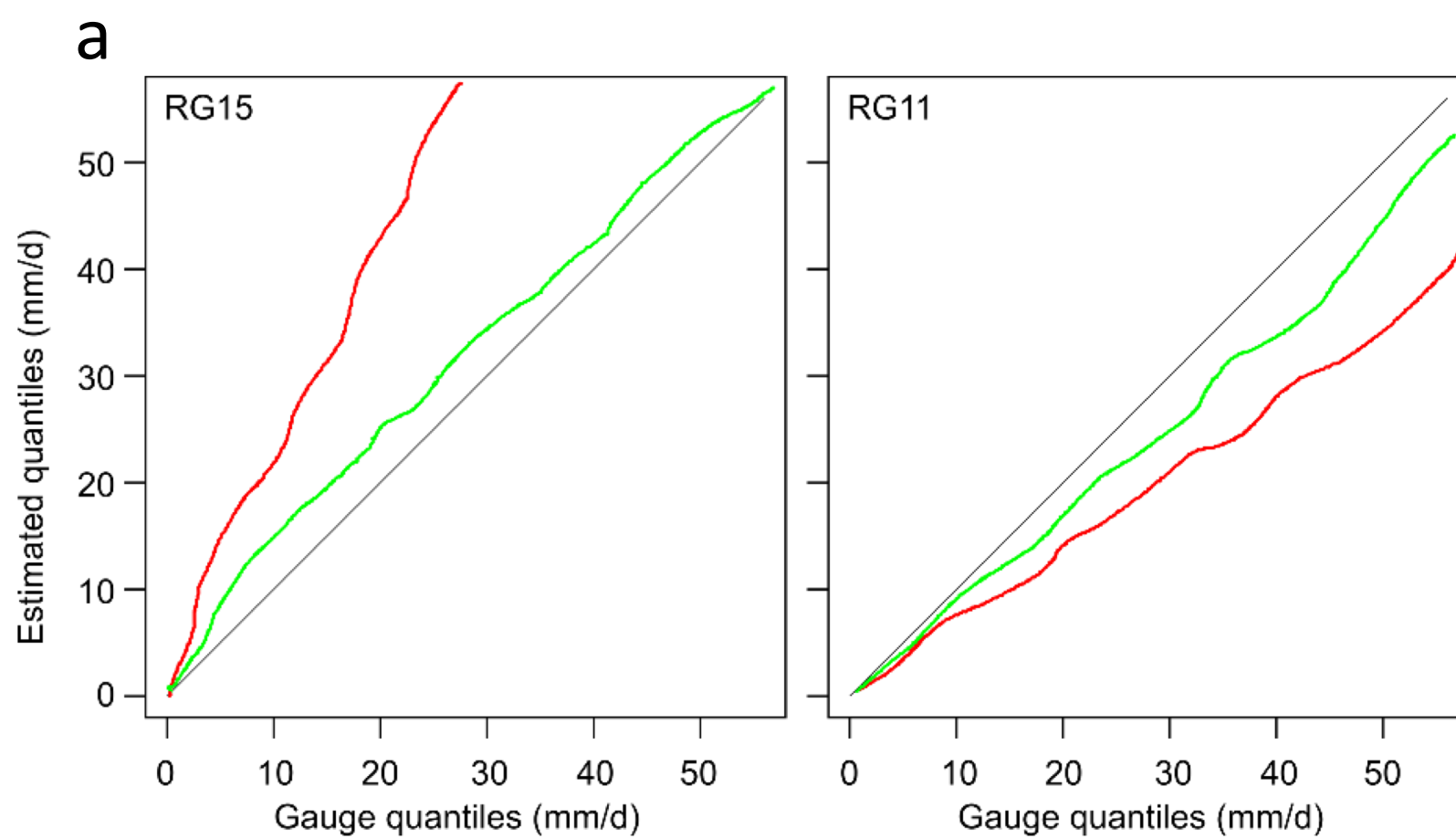




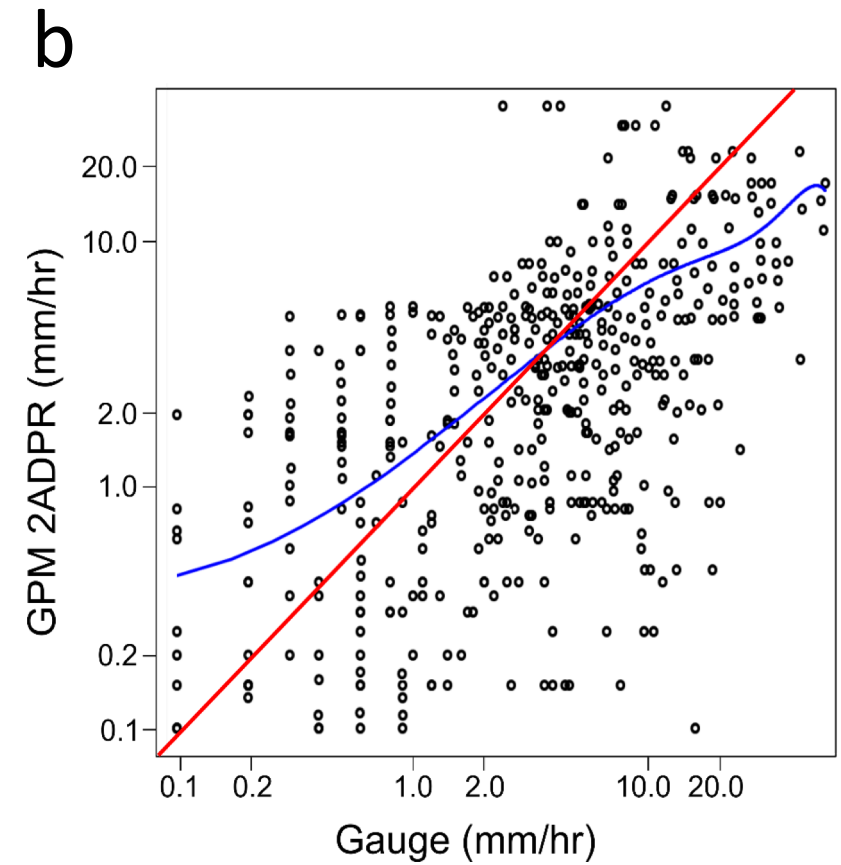
- (a) Average total annual precipitation for western Nepal region, 2015–8, interpolated using GPM 2ADPR product.
- (b) Distribution of automatic tipping-bucket rain gauges in study area, Budhiganga landslide, Bajura District.
- (c) Comparison of gauge and GPM 2ADPR precipitation data, daily totals, 2019 Monsoon season



Measurements from the GPM core satellite (DPR-MS) in and around the network of tipping-bucket rain gauges (x) compared to gauge data gridded using ordinary kriging for 11 July 2019 (cf. Lasser et al., 2019). Note that the circular satellite footprint is distorted into an ellipse due to the meridian convergence. The GPM-DPR estimates provide one rain rate per footprint; the footprints do not overlap. In contrast, the rain gauge network has 1–4 stations per footprint. Every footprint contains a large range of rainfall and much variability, which must be approximated with a single GPM-DPR value (i.e. mean areal rainfall).



(a) Quantile-quantile (q-q) plot of 2ADPR (red line), and the regional gauge average (green line) compared to the actual individual rain gauge data.



(b) Match-up plot of synchronous and co-located gauge and 2ADPR rainfall rates. The red line ($y = x$) shows perfect agreement. The blue line shows the average DPR intensity across rainfall intensity bins defined by an exponentially distributed curve.