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Quantitative estimation of orographic precipitation over the Himalayas by using TRMM/PR and a dense network of rain gauges

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Precipitation Radar (PR) data acquired by the Tropical Rainfall Measuring Mission (TRMM) over 10 years of observation were used to show the monthly rainfall patterns over the Himalayas. To validate and adjust these patterns, we used a dense network of rain gauges to measure daily precipitation over Nepal, Bangladesh, Bhutan, Pakistan, India, Myanmar, and China. We then compared TRMM/PR and rain gauge data in 0.05-degree grid cells (an approximately 5.5-km mesh). Compared with the rain gauge observations, the PR systematically underestimated precipitation by 28–38% in summer (July–September).Significant correlation between TRMM/PR and RG data was found for all months, but the correlation is relatively low in winter. The relationship is investigated for different elevation zones, and the PR was found to underestimate RG data in most zones, except for certain zones in February (250–1000m), March (0–1000m), and April (0–1500m). Monthly PR climatology was adjusted on the basis of monthly regressions between the two sets of data and depicted.