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Comparing high-resolution gridded precipitation data with satellite rainfall estimates of TRMM_3B42 over Iran

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Abstract. To evaluate satellite rainfall estimates of Tropical Rain Measurement Mission (TRMM) level 3 output (3B42) (TRMM_3B42) over Iran (20°–45° N, 40°–65° E), we compared these data with high-resolution gridded precipitation datasets (0.25°×0.25° latitude/longitude) based on rain gauges (Iran Synoptic gauges Version 0902 (IS0902)). Spatial distribution of mean annual and mean seasonal rainfall in both IS0902 and TRMM_3B42 from 1998 to 2006 shows two main rainfall patterns along the Caspian Sea and over the Zagros Mountains. Scatter plots of annual average rainfall from IS0902 versus TRMM_3B42 for each 0.25°×0.25° grid cell over the entire country (25°–40° N, 45°–60° E), along the Caspian Sea (35°–40° N, 48°–56° E), and over the Zagros Mountains (28°–37° N, 46°–55° E) were derived. For the entire country, the Caspian Sea region, and the Zagros Mountains, TRMM_3B42 underestimates mean annual precipitation by 0.17, 0.39, and 0.15 mm day⁻¹, respectively, and the mean annual rainfall spatial correlation coefficients are 0.77, 0.57, and 0.75, respectively. The mean annual precipitation temporal correlation coefficient for IS0902 and TRMM_3B42 is ~0.8 in the area along the Zagros Mountains, and ~0.6 in the Caspian Sea and desert regions.

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