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

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Information on spatial and temporal distribution of precipitation is important for drought monitoring, water resource management in agriculture, power generation and etc. In this respect, high-resolution gridded rainfall datasets are useful for regional studies on the hydrological cycle, climate variability, evaluation of regional models as well as satellite rainfall data. Iran receives rainfall from three major air masses throughout the year and the precipitation regime is complicated due to existence of two main mountain chains of the Zagros and the Alborz. High-resolution gridded precipitation can reproduce the precipitation distribution along the complicated topography and they could improve our understanding of precipitation regime as well a weather systems.

Here, firstly we will present precipitation analysis over Iran (20°-45° N, 40°-65° E) based on high-resolution gridded rainfall datasets (0.25° × 0.25° lat./long.) from 1998 to 2006 utilizing synoptic observation data network of Islamic Republic of Iran Meteorological Organization (IRIMO). The number of synoptic stations used in this study are 256 and these data have passed quality control operations such as checking location (latitude, longitude and elevation), consistency to other meteorological parameters, test for homogeneity of data, filling data gaps and etc. by IRIMO. The algorithm of interpolation method of gridded precipitation data is based on the Shepard (1968). Secondly, the comparison of the above mentioned interpolated gridded precipitation data and daily rainfall estimates of TRMM(3B42_V6) which is TRMM Merged High Quality (HQ)/Infrared Precipitation without using raingauge data with spatial resolution 0.25 ° × 0.25° will be presented.

From the above analysis results we have shown that spatial distribution of average of precipitation over Iran has two main precipitation pattern with maxima about 4 mm/day along Caspian sea and Zagros mountain chains. Moreover, comparison of spatial distribution of gridded precipitation data and TRMM (3B42) has shown good accordance in precipitation pattern and amount. The scatter plot between average daily precipitation estimated by TRMM_3B42 and average daily gridded precipitation using synoptic network data during time period (1998-2006) has been derived for 3 following regions including total country, land area along Caspian sea, and Zagros mountain region. The statistics of linear fit of scatter plots has shown the spatial correlation coefficients for the above mentioned regions were 0.76, 0.58, 0.75 and TRMM(3B42) has underestimated precipitation amount about -0.17, -0.38, -0.14 (mm/day) respectively. Moreover, the time period of synoptic observation is exactly the same as TRMM-3B42. It should be also mentioned that the above correlation coefficients are in accordance with result of Xie et al. (2007) who have derived the correlation coefficients between the Chaina gauge-based daily precipitation and satellite estimates based on TRMM 3B42 about 0.7.