Geophysical Research Abstracts
Vol. 20, EGU2018-6834, 2018
EGU General Assembly 2018

Inter-comparison and Accuracy Assessment of Satellite and Model Precipitation Products

Muhammad Amjad (1), M. Tugrul Yilmaz (1), Ismail Yucel (1), and Koray K. Yilmaz (2)

(1) Department of Civil Engineering, Middle East Technical University, Ankara, Turkey, (2) Department of Geological Engineering, Middle East Technical University, Ankara, Turkey

It is important to quantify the reliability of satellite and model precipitation products before utilizing them in water resources assessment. This study inter-compares TRMM-era and GPM-era satellite-based precipitation products, deterministic forecasts from European Centre of Medium – range Weather Forecasts (ECMWF) and available ground station-based gauge observations (a total of 707) over the entire Turkey characterized by complex topography. The analyses are performed in two parts: the first part focuses on the validation of TRMM (TMPA 3B42v7) and ECMWF (1 daily deterministic forecast) over time period of January 2007 to April 2017, and the second part focuses on the evaluation of GPM (3IMERGDFv04), TRMM and ECMWF over time period of April 2014 to February 2017. All analyses are performed over daily and monthly (accumulated) temporal scales and include statistical measures, categorical performance indices, intensity-frequency distributions and error variations. Results show that variability of the climatology component of the errors is higher than the anomaly component. Overall, the products tend to overestimate the precipitation (wet bias) compared to gauge stations data; GPM shows the least monthly wet bias of 1.55 mm/month as compared to 7.69 mm/month and 9.72 mm/month for TRMM and ECMWF, respectively. The highest average monthly correlation coefficient (CC) exist between GPM-TRMM which is 0.86 followed by CC value of 0.83 between TRMM-ECMWF. ECMWF is more correlated with TRMM (monthly CC of 0.83) as compared to its correlation with GPM (monthly CC of 0.74). CC of GPM, TRMM and ECMWF with gauges data are 0.76, 0.80 and 0.80, respectively. Average monthly RMSE values for GPM, TRMM and ECMWF are 30.59, 31.34 and 31.00 mm/month, respectively. All the three products are relatively more consistent with gauges in capturing the precipitation over Western Turkey where there is a relatively denser network of ground-based precipitation gauge stations and over Central Anatolian Region which has dry to moderately dry climate (based on the amount of precipitation) and relatively less complex topography. GPM performs the best in case of variation in monthly absolute bias with the varying elevation of the stations. Seasonally, the products are more consistent in capturing the observed precipitation during summer; the errors are higher in capturing the precipitation during other three seasons. Comparatively, the frequencies of precipitation events with different intensities (mm/day) for ECMWF are less consistent with those of observed precipitation.