



## Comparison of instantaneous satellite rainfall data and observations from rain gauges network in the Bouregreg-Chaouia region in Morocco

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Over the last twenty years, remote monitoring of rainfall has become a fact. Thus, techniques to measure rainfall by analyzing satellite data is increasingly integrated in hydrology fields helping to tackle some of scientists' biggest challenges such as the lack of rain gauges or the difficulty to access their data.

This work is a study of the reliability and performance of precipitation observation products like PERSIANN-CCS (Precipitation Estimation from Remotely Sensed Information using Artificial Neural Networks-Cloud Classification System) with a temporal resolution of one hour (<https://chrsdata.eng.uci.edu/>) and like IMERG-GPMv6 (Integrated Multi-satellitE Retrievals for GPM version6) with a temporal resolution of 30 minutes (<https://search.earthdata.nasa.gov/search>) by using the programming language Python. These satellite-derived data are then compared to precipitation observed from rain gauges in the watershed Bouregreg-Chaouia in Morocco.

The first procedure was to create a database of hourly rainfall collected from PERSIANN-CCS and IMERG-GPMv6 and based on measured rainfall events received from three rain gauges located in the study area. Afterwards, the comparison between the two data sources was executed through calculation of several statistical parameters such as the Pearson's R correlation coefficient in addition to an analysis of the dimensionless values of rain (instantaneously observed precipitations from PERSIANN-CCS and IMERG-GPM).

Obtained results show a good correlation between values deduced from satellite imagery and those observed in rain gauges. Quantitatively, the "R" correlation coefficients varied from 0.69 to 0.98 in the case of PERSIANN-CCS and from 0.86 to 0.99 in the case of IMERG-GPMv6. Furthermore, analysis of the dimensionless rainfall curves showed that they represent very comparable patterns, especially for the case of IMERG-GPMv6, it was also remarked that the latter dataset overestimated precipitation levels while the first underestimated them in comparison with ground station values.

We concluded that, it's possible to use instant rainfall data from satellites in contexts like hydrology for purposes like flood risk assessment. But, a correction of these products is necessary to improve

the results and the quality of this data.