Evaluation of PERSIANN CCS-CDR product for drought assessment in a semi-arid basin in Morocco

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Mots-clés : PERSIANN, CCS-CDR, Drought assessment, Precipitation, Morocco.

Precipitation estimation products are becoming more vital for climatological and hydrological studies. Satellite-based precipitation products, with simultaneously, high spatial and temporal resolutions are mostly needed to assess climate change repercussions in regions suffering from data-scarcity. Past researches focused on datasets either with a poor spatial or a poor temporal resolution, therefore, showing weak performances. Precipitation estimations from Remotely Sensed Information using Artificial Neural Networks-Cloud Classification System-Climate Data Record (P-CCS-CDR) are one of the projects aiming to remedy these limitations. The P-CCS-CDR dataset provides precipitation estimates at 0.04° spatial resolution, the product is covering the period 1983 to present over the global domain of 60°S to 60°N. The main goal of this study is to evaluate the accuracy of the P-CCS-CDR product compared to observed precipitation at monthly scale and its suitability for drought assessment in a semi-arid watershed in Morocco. Several statistical indices are computed, and drought SPI (Standardized Precipitation Index) is calculated with P-CCS-CDR to estimate its suitability to simulate drought during the period from 1983 to 2020. The preliminary comparison and evaluation results of both datasets are promising, showing good correlation coefficient (CC) of 0.77 on a basin scale for monthly precipitation, poorly overestimating the observed precipitation with a 3.9% PBias and a Nash-Sutcliff efficiency coefficient (NSE) criteria of 0.40. At the basin scale the SPI for 3 and 9 months (SPI3 and SPI9) were calculated using both observed and P-CCS-CDR datasets, the precipitation PBias were not corrected during this study, the results showed that comparing to the observed SPI, the P-CCS-CDR SPI overestimated the drought risk with 225.9% and 101.4% PBias respectively for SPI9 and SPI3, the NSE were very low compared to the previous precipitation evaluation, scoring 0.1 and 0.27 for SPI3 and SPI9. However, the correlation and determination coefficients have average scores with a 0.67 CC and a 0.44 R2, demonstrating that we need to correct

the PBias before using the P-CCS-CDR data for SPI calculation. This study provides a framework for future use of the P-CCS-CDR to assess climate change impacts over semi-arid watersheds, providing an important alternative to observed precipitation datasets.