# Meteorological Drought Assessment Integrated TRMM and Standardized Precipitation Index in Western Desert/ Iraq

**Nadia A. Aziz**[1] **Zaidoon T. Abdulrazzaq**

*Ministry of Science and Technology/ Directorate of Space and Communication/ Baghdad-Iraq*
zaidoon.taha@live.com

**Abstract**

Nowadays, many places on Earth especially arid and semi-arid areas face the risk of desertification due to severe drought. Droughts could be classified to three types, which is, meteorological, hydrological and agricultural. When meteorological drought occurs in a region, agricultural and hydrological droughts follow. The TRMM dataset offers an alternative to water resources applications, essentially because of the fact of being a well-distributed and continuous database. Moreover, SPI transforms precipitation value into a single numerical value and is used to define different categories of drought. In this study, the Tropical Rainfall Measuring Mission (TRMM) data have been used for mapping and monitoring the spatiotemporal meteorological drought. As well as, the Standardized Precipitation Index (SPI) was applied to analyze the meteorological drought at 11 stations located around the Western Desert/ Iraq in order to define different categories of drought for the years (2000, 2005, 2010, 2015 and 2017). The standardized precipitation index (SPI) analyses were performed on 12-month datasets for the five years

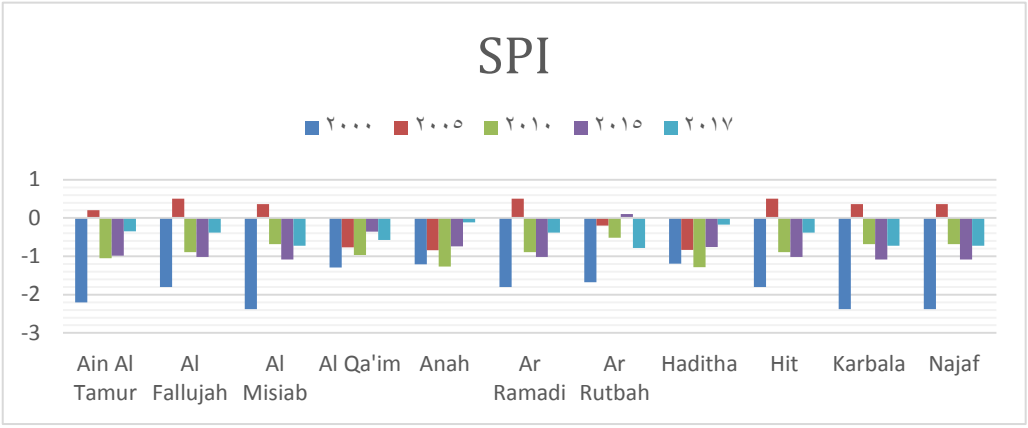


Figure 1: SPI values for the study period for 11 stations.

In conclusion, the integration between TRMM data SPI Index values proved to a powerful tool in mapping the spatial distribution and drought assessment in the study area. In addition, the results showed that the northeast region has the higher rainfall indices and the southwest region has the lowest rainfall. An analysis of the drought and rain conditions showed that the quantity of extreme drought events was higher than that expected in regions, particularly in the south and southwest areas. Thus, an alternative classification is proposed to characterize the drought, which spatially categorizes the drought type (extreme, severe, moderate, and mild).

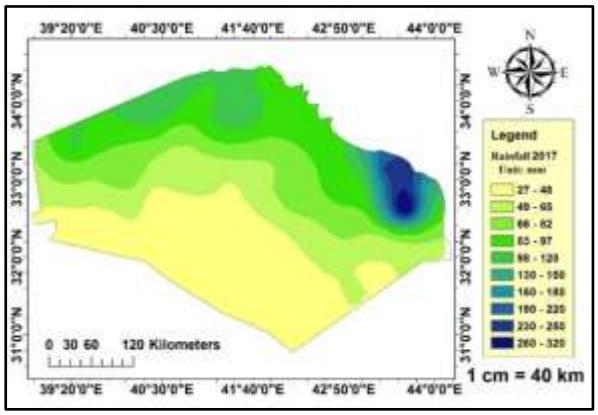


Figure 2: Rainfall Distribution for 2017.

**Keywords:** Drought; GIS; Remote sensing; TRMM; SPI and the Western Desert.

**References**


[1] Bonaccorso, B., Bordi, I., Cancelliere, A., Rossi, G. and Sutera, A. (2003) Spatial variability of drought: an analysis of the SPI in Sicily. Water Resour. Manage, Vol. 17, pp. 273–296.

[2] Sirdas, S. Sen, Z. (2003) Meteorological Drought Modeling and Application to Turkey. Journal of Istanbul Technical University, Vol. 2, No 2, pp. 95-103.

[3] Guttman, N. B. (1999) Accepting the standardized precipitation index: a calculation algorithm. J. Am. Water Resour. Assoc,Vol. 30(2), pp. 311–322.

[4] Tsakiris, G. and Vangelis, H. (2004) Towards a drought watch system based on spatial SPI. Water Resour. Manage, vol. 18, pp.1–12.

[5] Moreira, E. E., Paulo, A. A., Pereira, L. S. and Mexia, J. T. (2006) Analysis of SPI drought class transitions using loglinear models. J. Hydrol. Vol. 331, pp.349–359.