



Practical tool for drought characteristics calculation

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There are many ways to identify and monitor drought conditions. Scarcely are tools that calculate drought characteristics, The "SDF Calculator" works to bring monitoring tools to the public so they can assess drought conditions, this tool is used to assess and identify drought and its intensity.

Drought severity refers to the absolute sum of consecutive SDI values below a given threshold level while drought duration is the number of consecutive months that SDI is below that threshold, and drought frequency is a number of months with drought condition (means SPI < -0.5 or any given threshold that is desire, the threshold of drought index is a value that an index faces to drought condition. In every index, this value can be changed. For example, in many indices, the threshold of drought starts from zero or less zero. In other words, when the value of an index is calculating then all the values located in the drought classes, refer to the severity of the drought.

Droughts and exceptionally wet periods are regional phenomena, which are considered as major environmental extremes, especially in semiarid regions of the world. The development of severity-duration-frequency (SDF) relationships of droughts and wet periods is important in hydrological and climatic plannings in any country.

In this study, we aimed to offer a novel software model to be used for a quantitative description of droughts and wet periods to provide an overview of drought intensity and analyzing their severity, frequency, and duration. In addition, we have been able to develop a state-of-the-art bespoke software application, so the users are able to analyze drought based on the regional thresholds. While most of the analysis applications have used programming languages such as R or Python, due to the lack of software libraries in the .NET development environment, we have managed to offer our development environment based on .NET Core and C# programming language. The software application accepts inputs from various file formats or APIs, processes the data, and demonstrates the outcome in different graphs and maps depending on the geographical location of study areas. The outputs are not only can be exported as different formats to be used in big data applications but also might be exposed as web APIs to be used in live applications.

Keywords: Drought characteristics, SDF Calculator, API, Standardized Drought Indices (SDI)

