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# Nonparametric Time Between Events and Amplitude Control Charts for Drought Understanding and Monitoring

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Drought is a major natural hazard which can cause severe consequences on agricultural production, the environment, the economy and social stability. Consequently, increasing attention has been paid to drought monitoring methods that can assist governments in implementing preparedness plans and mitigation measures to reduce the economic, environmental, and social impacts of drought. The relevant drought characteristics are severity, duration and frequency; therefore, a suitable monitoring methodology should consider the time interval  $T$  between two occurrences and the magnitude  $X$  of each event. Time-Between-Events-and-Amplitude (TBEA) control charts have been proposed to monitor this type of phenomenon: a decrease in  $T$  and/or an increase in  $X$  may result in a negative condition that needs to be monitored and possibly detected with control charts. Most of the TBEA control charts proposed in the literature assume known distribution functions for the variables  $T$  and  $X$ . However, in the majority of real situations, the distributions of these random variables are unknown or very difficult to identify. In this study, time between events and amplitude control charts are used to detect changes in the characteristics of drought events. We used non-parametric methodologies that do not require any assumption on the distribution of the phenomenon or on the observed statistics. The results indicate that the proposed methods can be valuable tools for the institutions responsible for planning drought management and mitigation measures.

## Type of presentation

Talk

## Classification

Mainly application

## Keywords

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