

Exploring the Time Dynamics of Fire Sequences: A Case Study in the Basilicata Region (Southern Italy)

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Extended Abstract

Forest fires, a complex natural phenomenon linked to several factors, such as climate, weather, human activities, vegetation status [1], represent one of the most critical issues in the context of natural hazards. Yearly, they affect large areas worldwide causing loss of biodiversity, decrease in forests, alteration of landscape, soil degradation, increase in greenhouse, etc. Although the cause of most of them is anthropic [2], climatic factors influence their ignition and spread. In fact, the link between climate and fire has been extensively investigated [3, and references therein].

In this paper, we focus on the investigation of the time dynamics of the sequence of fires occurred in Basilicata region (southern Italy) from 2004 to 2018 by applying several time series analysis methods. In particular, we investigated the time-clustering properties, the existence of seasonal cycles and memory phenomena of the series of the inter-fire times and burned areas.

Furthermore, we applied the Empirical Mode Decomposition (EMD) method to investigate the correlation between the time series of the monthly total burned area and monthly number of fires with the Standardized Precipitation Evapotranspiration Index (SPEI) [4]. The SPEI is a well-known drought index that allows to analyse multiple temporal scales (as it is typically computed over accumulation times from 1 month to 48 months), and to include the effects of temperature variability on drought assessment [3]. Our findings highlight the presence of components in the fire process that are correlated with the SPEI at specific time scales, indicating various types of droughts.

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