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Fire-induced variability in vegetation covers by using SPOT-VGT NDVI time series

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Fires are considered one of the most important causes of land degradation since they induce significant alterations in short as well as long-term vegetation dynamics. The estimations of fire induced variability can be effectively approached by using satellite data.

In this study, SPOT VEGETATION temporal series (1998 to 2005) of NDVI [obtained using the NDVI= (NIR- Red)/(NIR+ Red)], were analyzed to perform a dynamical characterization of burned and unburned vegetation covers. To this aim, VGT-NDVI data acquired for both fire-affected and fire-unaffected vegetational covers were analysed using the Detrended Fluctuation Analysis (DFA).

The DFA is a well-known methodology, which allows the detectin of long-range power-law correlations in signals possibly characterized by nonstationarity, which features most of the observational and experimental signals.

Results from our analysis point out that the persistence of vegetation dynamics is significantly increased by the occurrence of fires. In particular, a scaling behavior of two classes of vegetation (burned and unburned) has been revealed. The estimated scaling exponents of both classes suggest a persistent character of the vegetation dynamics. But, the burned sites show much larger exponents than those calculated for the unburned sites. This result points out to the role played by fires in driving a more unstable vegetation patterns for burned areas, which indicates an efficient fire-induced vegetation recovery processes The methodology approached in the present study could be fruitfully applied to investigate other types of vegetation stresses.