AN INDICATOR OF FOREST FIRE INTENSITY APPLIED TO EUROPEAN FOREST ECOSYSTEMS

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Abstract

European woodland and forest ecosystems cover more than 40 % of the territory and support human well-being providing regulating, provisioning, supporting, and recreational services. Theses ecosystems are continuously changing due to internal ecosystem processes and dynamics as well as external disturbance factors.

Forest fires are an integral part of forest dynamics as they insure forest renewal. During the last decades, fire frequency, which is the number of fires for a particular location and period of time; have shown increasing trends becoming an important disturbance in specific regions of Europe. In specific regions, including some areas in the Mediterranean, forest fires showed cycles faster than the natural regeneration capacity of the underlying forest canopy.

This research develops a European fire regime indicator (FRI) for European forests (Abdul-Malak et al., 2014). The data for this analysis are extracted from the European Fire Database of the European Forest Fire Information System (EFFIS) accounting for single fire records provided by European countries of the EFFIS network.

The FRI is a composite indicator describing the frequency with which forests are burned by wildfire. It is composed of two indexes; the fire recurrence (FR) being the number of fires/ year/ 10 km2 as well as forest fire extent (FE) being the percentage of total forest areas burnt per year, this sub-index is interpreted as a measure of fire intensity. FRI identifies the frequency, with which forests are burned, its values are distributed in five classes of pressures ranging from very low o very high.

For the 32 years period studied (between 1980 and 2012), the FRI and its sub-indicators (FR and FE) showed a particular distribution in the Scandinavian Peninsula, mainly in the southern part, where values of the composite index –FIR– was moderate due to high values of FR (the number of fires per year), being comparable to the number of fires occurring in the Mediterranean, counteracted by low values of fire intensity (FE) sub indicator. This means there many fires, similar to the Mediterranean region, with small but small burned areas.

The results of the FRI indicator for this period show that the most frequent and intense fires in Europe occur in the Mediterranean (70% of European areas with very high class of FRI) and Continental biogeographical regions. These results prove that there are some regions outside the Mediterranean that might be pressured by frequent forest fire and might require specific management actions including Poland (Ubysz and Szczygiel, 2006; Schelhass et al., 2010).

High fire intensities can affect the regeneration capacity of specific forest species, namely seeders that have reduced mitigation capacities to face frequent fires (Abdul Malak, et al., 2015) subjecting some areas to considerable soil erosion by wind and water.

This research's results indicate that FRI is an adequate indicator to be used to assess fire intensity around Europe. Whenever historical data are available, the FRI can then be used to assess historical trends.

Key words: Fire intensity, spatial indicator, Pressure assessment, Forest and woodland, Europe.

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