Spatial analysis of wildfire patterns with a logic based fire behaviour prediction system – An analytical method using wildfire patterns and fire behaviour signatures to identify critical points of high risk potential

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Future climate change scenarios predict an increase in extreme weather events that will result in a change of future fire regimes. These scenarios require tools to predict zones where changes in fire risk potential on landscape level are likely to occur. Analyzing historical fire patterns using a logic based fire behaviour prediction system (e.g. CPS) proves to be a valuable method to categorize typical fire spread patterns that help to predict and understand fire behaviour under corresponding weather and topography conditions. For that purpose parameters that describe meteorological, topographical and vegetation conditions as well as fire spread and fire front dynamics can be determined to identify types of fire spread patterns. These patterns can be grouped into five large groups and usually are classified into fires influenced by synoptic wind, storms, hot air mass, topographical conditions and miscellaneous. With this information, a catalogue of spread patterns can be developed with the objective of catering to prevention and landscape planners, fire managers and fire services as decision support tools.This application of spatial analysis performs well to predict the spread pattern of each fire type. Thus, a shift in local wind and precipitation patterns and the resulting fire regime change can be assigned to a corresponding fire spread pattern. Resources and strategies can be pre-planned according to the expected fire type and all operations can be

predicted with technical and valuable criteria. Furthermore, it has become a tool to establish a dialogue between the intervention and the prevention organizations and also to identify and describe necessities for specific types of fire spread. This tool has been operational in Catalonia since 2003 and is shown to be effective in planning the fire season and for the design of preventive measures at the identified points of high risk potential.