



Assessing the influence of small fires on trends in fire regime features at mainland Spain

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Small fires, i.e. fires smaller than 1 Ha, represent a huge proportion of total wildfire occurrence in the Mediterranean region. In the case of Spain, around 53% of fires in the period 1988-2013 fall into this category according to the Spanish EGIF statistics. However, the proportion of small fires is not stationary over time. Small fires are usually excluded from most analysis, given the chance of introducing or falling into temporal bias, being almost mandatory in those assessments using data before the 90s. Inconsistencies and inhomogeneity problems related to the diversity of criteria and/or registration procedures among Autonomous Regions are found before that date, although it is widely agreed that small fires are consistently registered starting from 1988. Nevertheless, in terms of fire regimen characterization it is important to know to what extent small fires contribute to the overall fire behaviour.

The aim of this study is to analyse spatial-temporal trends of several fire features such as total number of fires and burned area, number and burned area of natural and human fires, and the proportion of natural/human cause in the period 1988-2013 at province level (NUTS3). The analysis is conducted at the mainland Spain at annual and seasonal time scales. We are mainly interested in exploring differences in spatial-temporal trends including or excluding small fires and dealing with them separately as well. This allows determining the extent to which small fires may affect fire regime characterization. We employed a Mann-Kendall test for trend detection and Sen's slope to evaluate the magnitude of the change. Both tests were applied for each fire feature aggregated at NUTS3 level for both autumn-winter and spring-summer seasons.

Our results show significant changes in the evolution of annual wildfire frequency; especially strong when small fires are accounted for. A similar outcome was observed in natural and human number fires during the spring-summer season. The increase in number of fires seems to be reversed during autumn-winter. At seasonal scale, the inclusion of small fires allows to detect significant trends in all of fire frequency features, except natural fires. In turn, neither burned area features do not significantly affect the trends through incorporating small fires. Therefore, the inclusion/exclusion of small fires do influence observed trends mostly in terms of fire frequency.