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Using the Canadian Forest Fire Weather Index (FWI) System to assess the performance of fire management in Portugal

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The success of fire management policies can be gauged by changes on the fire regime characteristics. Climate, vegetation (fuel) and topography determine the fire regime, and exert their influences at distinct temporal and spatial scales whose relative importance is quite debated. Climate factors are expected to prevail at the regional scale, while the local control of fire behaviour is determined by fuel and terrain. Recent modifications - 2001-2005 versus 2006-2008 - in wildfire incidence in Portugal are quantified by eliminating the noise associated to fire weather conditions. The following indicators of fire management performance are used, each reflecting a distinct fire management activity: number of fires, proportion of fires larger than 1 ha, proportion of fires larger than 100 ha, and median size of wildfires larger than 100 ha. The performance indicators calculated on a daily basis were examined as a function of the Canadian Forest Fire Weather Index (FWI) System components. Analysis of covariance was used to identify differences in performance between the two study periods, and non-linear regression analysis was employed to model performance indicators from FWI components for 2001-2005. The resulting models were then applied to 2006-2008 and the deviation between observed and predicted values was determined.
Least square means (adjusted for neutral weather conditions) revealed statistically significant differences between the two periods for all indicators but the median size of wildfires > 100 ha. The remaining indicators were in 2006-2008 reduced by 21% (no. fires), 37% (proportion of fires >1 ha) and 63% (proportion of fires >100 ha) in comparison with 2001-2005. The results indicate that the combined performance of fire prevention, fire detection, first intervention and initial attack have improved after 2005. Reduction in the number of large fires is especially relevant, given their impact and weight in total burned area. However, no evidences were found of improvements in the suppression of large fires, implying that the previous catastrophic years of 2003 and 2005 can be repeated in the future.