



Fire occurrence and fire weather indices in the past and under future climate in Peninsular Spain

Itziar R. Urbieto, Gonzalo Zavala, and José M. Moreno

Department of Environmental Sciences. University of Castilla – La Mancha. Avda. Carlos III, s/n 45071 Toledo (Spain)
(itziar.rodriguez@uclm.es)

Understanding fire occurrence and its relationship with ignition sources and weather conditions is a major environmental challenge in regions affected by fire, particularly under ongoing and projected future climate change. The objectives of this study were: 1) To address a historical reconstruction of fire regime (fire occurrence, area burned, and fire causes) in Peninsular Spain for the last three decades. 2) Analyze the time x space relationship between fire occurrence and area burned with climatic variables and climate-derived fire danger indices. 3) Assess how climate change would affect fire danger indices for various emission scenarios based on projections of five regional climate models. The country was divided into 50x50 km cells, for which fire statistics were available. Climate data were interpolated at this grid so that daily fire danger indices were calculated for present and future conditions. Results showed an overall increase of fire occurrence and area burned over the past decades. Fire activity (number of fires and area burned) showed significant correlations with fire danger indices and climatic variables; although in some areas the relationship was weak given the uncertainty linked to the number of ignitions caused by people. There was a significant correlation between certain fire indices and Gini coefficient of fire sizes, whereby fires under more severe conditions become more variable in size. Towards the end of this century (2071-2100) increases in the fire danger indices, and a longer period of fire danger are projected. This trend is consistent among models.