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Potential effects of regional climate change on rural fires over Europe

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Wildfires in Portugal are a major problem, an area equivalent to almost 3/5 of the forested surface having burned during 1980-2007. The aim of the study is to assess the potential impact of regional climate change on wildfires in Portugal using an appropriate Burnt Area Model (BAM) together with simulated data for future scenarios by a regional circulation model (RCM). Data from the ECHAM5 GCM are used as boundary conditions for the RCM. The data used in the work includes: monthly values of burnt area in Portugal as derived from the Portuguese Rural Fire Database (Pereira et al., 2011) and burnt area data from the European Forest Fire Information System (EFFIS); observed values of temperature and precipitation from the European Climate Assessment (ECA), for the period 1950-2010; and simulated values of temperature, precipitation wind and relative humidity from the COSMO-CLM model.

Based on regression analysis, the BAM reveals to be able to simulate the decimal logarithm of July/August burnt areas in Portugal using, as predictors, the Daily Severe Rating (DSR), in May and June and in July/August. The regression model is then fed with simulated data by the RCM respecting to present climate and to future IPCC emission B1 and A1B scenarios, for two 28-year periods, namely 2051-2078 and 2073-2010. It is shown that samples of observed and simulated logarithms of burnt areas follow normal distributions. The same methodology is then used applied to Mediterranean countries with high values of burnt areas (Spain, France, Italy and Greece). Obtained estimates need to be looked with due care but the developed approach consistently points towards an increasing risk of fire under future climate conditions and to an increasing likelihood of having much larger burnt areas.