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Relative importance of fuel management, ignition management and weather to area burned: Comparison of five landscape-fire-succession models

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The behaviour of five landscape fire models (CAFÉ, FIRESCAPE, LAMOS(HS), LANDSUM and SEM-LAND) was compared in a standardised modelling experiment. The importance of fuel management approach, fuel management effort, ignition management (initial fire suppression and fire prevention) and weather in determining variation in area burned and number of edge pixels burned was quantified for a standardised modelling landscape. Importance was measured as the proportion of variation in area or edge pixels burned explained by each factor and all interactions among them. Weather and ignition management were consistently more important for explaining variation in area burned than fuel management approach and effort, which were found to be statistically unimportant. A similar result was found for the number of edge pixels burned. Decreased ignition management resulted in increased area burned and number of edge pixels burned in all models. When variation in total pixels burned was analysed separately for each of the different fuel management approaches, variation in fuel management effort was found to be important for the random fuel management approach in one model. By comparison, when the number of edge pixels burned was analysed separately, effort in managing landscape edges was important for three of the five models. Our findings demonstrate that year-to-year variation in weather and the success of ignition management consistently prevail over the effects of fuel management in a range of modelled ecosystems.