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Modelled global wildfire patterns induced by climate change

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Wildfire is an important and necessary natural disturbance in forest ecosystems, influencing global biome distribution and maintaining the structure and function of fire-prone communities. However as illustrated in many high-profile recent examples, it is also seen as a risk to human societies, causing death and damage to homes and businesses. Therefore, the frequency and spatial distribution of wildfires must be better understood, and in particular if this might alter under imposed climate change. Understanding how burnt area will change in the future is important, allowing diverse questions to be answered ranging from developing wildfire management strategies to assessing dangerous levels of global warming. Here we use a Dynamic Global Vegetation Model: LPJ-DGVM, now including a process-based fire module: SEVER-FIRE to explore global trends of burnt area in response to climate change. This is by forcing the DGVM with a climate impacts system, IMOGEN, here emulating 34 Earth System Models from the CMIP5 database. We find that for the recent historical period, a decreasing global burnt area trend is simulated by the model and agrees with the GFED4s observation. However, future increasing trends are predicted based on the four main RCP potential scenarios of atmospheric greenhouse gas increases. The reasons are mainly the change of the driving balance between the climate and human impacts. The results will benefit for ecologists and policy makers.