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Changes in future fire regimes under climate change

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Fires are expected to change under future climate change, climatic fire is is increasing due to increase in droughts and heat waves affecting vegetation productivity and ecosystem function. Vegetation productivity influences fuel production, but can also limit fire spread. Vegetation-fire models allow investigating the interaction between wildfires and vegetation dynamics, thus non-linear effects between changes in fuel composition and production on fire as well as changes in fire regimes on fire-related plant mortality and fuel combustion.
Here we present results from simulation experiments, where the vegetation-fire models LPJmL-SPITFIRE and LPJ-GUESS are applied to future climate change scenarios from regional climate models in Europe and Northern Africa. Climate change impacts on fire regimes, vegetation dynamics and carbon fluxes are quantified and presented. New fire-prone regions are mapped and changes in fire regimes of ecosystems with a long-fire history are analyzed.
Fuel limitation is likely to increase in Mediterranean-type ecosystems, indicating non-linear connection between increasing fire risk and fuel production. Increased warming in temperate ecosystems in Eastern Europe and continued fuel production leads to increases not only in climatic fire risk, but also area burnt and biomass burnt. This has implications for fire management, where adaptive capacity to this new vulnerability might be limited.