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The relationship between fire behavior trend and human pressure

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Fire is a key disturbance, which has a significant impact not only on the landscape and related ecosystems, but also on humans and infrastructures. Humans play in this respect a manifold role, acting indirectly as fuel shaper through the spatial pattern of land use as well as directly setting and controlling fire. In anthropogenic fire affected environment, understanding the detailed influence of human pressure on the temporal and spatial distribution patterns of wildfires is a crucial factor for fire management planning. Given the complexity of modeling the human component of wildfires, in recent years, analyses of fire risk have started to incorporate human-related variables that may directly or indirectly influence spatial patterns of fire occurrence. Among main resulting anthropogenic drivers associated or explaining spatial distribution of fire ignition we have differences in land cover, distance to roads, population density and proximity to urban areas. In particular, certain land cover classes are differently selective to fire depending on fuel load, structure, spatial continuity and human activities. In this sense, fire selectivity trends depend on the changing use of ecosystem resources with respect to their availability, through time. Aim of this study is (i) to analyze changes in fire ignition selectivity occurred in stable land cover types in Sardinia (Italy), from 2000-2015, and (ii) to assess the role of demographic dynamics over such fire frequency trends. Results, on one side, indicate that the anthropogenic land uses show an increasing trend of fire proneness, mainly linked to the population growth recorded in such land uses over the last 40 years. On the other side, the natural and seminatural land cover types are characterized by a decreasing trend of fire ignition occurrence, mainly related to the progressive land abandonment dynamics occurring in such low populated and less economically productive land use types. These evidences highlighted a rich-get-richer model where human presence represents the main ignition source, hence the higher the population grows, the larger is the available fire ignition energy. A thorough knowledge of which land-cover types fire ‘prefers’ is crucial to understand fire role in landscape processes and ultimately to support fire-prevention strategies and land management.