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Using soil functional indices to assess wildfire impact

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Disturbance impact on ecosystem are often based on functional indicators, which provide integrated and yet simple and affordable measures of key ecosystem functions. In this work, we studied the amount of change (resistance) and the recovery (resilience) of soil functions after fire as a function of vegetation type for a variety of Mediterranean shrublands. We used the Landscape Functional Analysis methodology to assess soil stability, water infiltration, and nutrient cycling functions for different types of vegetation patches and for bare-soil interpatches in repeatedly burned shrubland communities two weeks before, and two and nine months after experimental fires. We assessed the impact of fire on soil functions using resistance and resilience indices. The resistance and resilience of soil surface functions to fire was mediated by vegetation traits associated to the fuel structure and the post-fire regenerative strategy of the species. Resistance was higher in vegetation patches that accumulated low contents of fine dead fuel, whereas resilience was higher in patches of resprouter species. The variation in resistance and resilience of soil functions to fire in Mediterranean shrublands depends greatly on variation in fire-related plant structural and functional traits. Although originally designed for the assessment of dryland ecosystems LFA has proved to have great potential for the assessment of the soil functional status of recently burned areas.