

Submitted Abstract

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Abstract

Managing forests after wildfire involves modifying, and often removing, large amounts of biological legacies in the form of burnt wood. This may, in turn, affect different ecosystem processes and functions and ultimately determine the speed of regeneration of biodiversity and ecosystem services. The effect of postfire management on the hydrological cycle -particularly on those processes related to snow cover- has been little studied so far. In this study, we assessed the effect of salvage logging, partial logging and no intervention after a wildfire on the duration and abundance of the snow cover in the Sierra Nevada protected area (Spain). We used 20 years of Landsat images of the Normalized Difference Snow Index (NDSI) to characterize the temporal dynamics (seasonal and interannual) of snow cover in several experimental plots before and after a wildfire event in 2005. Within each treatment and plot, Landsat pixels (~30 m) were first categorized into homogeneous classes that could be analyzed independently, through visual interpretation of historical orthophotos, based on the percentage of burned area and tree cover. Pixels from each treatment and plot were further selected to exclude the effect of standing living trees, the presence of gullies and bare rock, and to account for mixed-treatment pixels. Images were corrected for cloud cover and an NDSI threshold was established to map snow cover by comparing it with a MODIS snow product. Preliminary results showed that active wood management after wildfire seems to have a negative effect on snow duration and quantity compared with no intervention, at least during the first years. Longer duration of the snow cover can have positive feedback on forest regeneration in high mountains by protecting the seedbank from extreme cold temperatures, by increasing soil humidity, and by extending the period of snow melt and consequent water availability into the spring.