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In recent years, vast native forested areas have been affected by wildfires in Southern Chile with increased frequency. However, the impacts of such events on runoff production, and in particular on hydrological behavior at the catchment scale, remain unknown. In this study, we aim to characterize such effects by combining remote sensing products and a process-based hydrological model. Our study domain is the Malleco river basin, which was affected by a wildfire in 2002. We obtained time series of spatially distributed leaf area index (LAI) from the MODIS/Terra (MOD15A2H) product. Additionally, we conducted infiltration measurements – for posterior estimates of saturated hydraulic conductivity – in a suite of sites selected through the Normalized Burn Ratio (dNBR) index. We coupled such information with the Variable Infiltration Capacity (VIC) model. Our field results show a 75 % decrease in saturated hydraulic conductivity with respect to conditions before the 2002 wildfire. We also found a 44% increase in the runoff ratio signature. Further research is needed to identify the effects of forest fires in larger areas, or differences by catchment geomorphological characteristics.