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How forest fire affects the chemical properties of Andisols

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Forest fires affect soil physical, chemical and mineralogical properties. However, the magnitude of these changes depends on both fire properties, such as the peak temperature reached and duration or depth achieved; and initial soil properties (soil type) as for example soil moisture, organic matter content or soil structure characteristics. Although many works have studied the effects of fire on the chemical properties of different soil types, its effects on Andisols properties have been omitted until now. Taking into account the high susceptibility to drying processes showed by the properties of Andisols affected by land use changes, it could be expected that the fire effects on their chemical properties may differ from those shown by other types of soil.

In this study, the main chemical properties in addition to the specific andic properties of burned pine forest Andisols were compared to their unburned control. The chemical properties of ashes found after fire at the soil surface were also studied. The results show a slightly increase in EC and pH after the fire due mainly to the higher content of cations of the soil solution. Ashes derived from the vegetation and soil organic matter consumption by fire could be the main source of these elements in the soils after a fire, as they showed a high cation content. However, the rise in EC and pH is lower than the reported by most authors for other soil types. This behaviour could be related to the higher organic matter content of this soils, even after fire, and the buffering effect of organic compounds on the soil EC and pH changes after the fire. As other authors have shown, a decrease in both the total and active organic content after the fire was also observed as a result of the fire event. The specific andic properties of Andisols were also affected. The P retention of these soils slightly declines as a consequence of fire, while the content of short-range-order products was also modified, but no statistically significant differences between burned and control soils were found.