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Effects of fire and time in soil properties and geomorphological processes from peridotites relieves (South of Spain)

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Abstract (100-400 words)

The province of Málaga is characterised by a great variety in geological and geomorphological processes affecting the Cordillera Bética relieves. One of the most impressive element is that of the peridotite relieves from which the most important one is Sierra Bermeja, though other peridotite rock outcrops can be found in other areas of the province. All together, the peridotite relieves constitute one of the largest ultramafic rock outcrop worldwide (>300 Km^2). The peridotite is an igneous, hard and very dense rock composed by olivine and pyroxene. During the weathering the olivine is easily altered converting the peridotite into a clear blueish rock called serpentine accompanied by clay, and Fe and Mg oxide and hydroxide giving the typical red colour on surface. The soil developed over these relieves is called serpentine soil and characterised by exceptional limitations in nutrients (N, P, K, Ca, Mg) and high proportion of heavy metals (Cr, Ni, Co, Cu) influencing dramatically the type of vegetation covering the peridotite relieves.

Historically, the peridotite relieves have been extremely deforested for grazing and wooded industry. Nowadays, all of them are covered by natural vegetation but in very different evolution stages: from very dense coniferous forest to shrubland covering soils scarcely. Apart from the deforestation, this is consequence of wildfires: in fact, the most extensive wildfires in the province of Málaga have mainly occurred over peridotite relieves. Because of this, their eco-geomorphological features in vegetation, soils and geomorphic processes, can be different from one site to another.

The aim of this study is a preliminary characterization of the eco-geomorphological conditions from peridotites relieves affected by fire and, namely, evaluating the impact of fire and time in some soil properties and geomorphic features. To do this, several sites from peridotites relieves affected by fire since 1991 until 2017 were selected. In all of them, a field survey was conducted and consisted in the inventory of geomorphic processes associated to water erosion as well as the soil sampling at 0.5 cm of depth. In laboratory, the following soil properties were analysed: gravels, texture, organic matter content, pH, electrical conductivity, cationic exchangeable capacity, hydrophobicity, and aggregate stability. The results show the impact of fire and the eco-geomorphological evolution of the peridotites sites affected by wildfires in time. Nevertheless, more research are needed in order to achieve a better comprehension of the eco-geomorphology in this type of relieves impacted by wildfires considering the fire severity.