Hydrological properties of soils in scrublands of Montesinho Natural Park, NE Portugal: a map-based approach

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Shrubs cover about one third of Montesinho Natural Park (PNM), a 750km2 belt in NE Portugal, which is part of the Portuguese network of protected areas since 1978. The Park hosts very important natural values and striking examples of balanced land use in humanized landscapes. Scrublands are present dominantly in marginal areas on steep slopes, scrublands are indeed a stable element in PNM landscapes. Main types of scrublands found in Montesinho are "Urzais" (*Erica australis* as representative species, 68% of shrub area), "Giestais" (*Cytisus multiflorus*, 11%), and "Estevais" (*Cistus ladanifer*, 21%).

Scrublands are thought to play an important role in these mountain catchments due to their area, spatial distribution, and hydrological response to precipitation. As part of a wider study, previous work by the same authors, focused on PNM shrubs, showed the runoff generation potential of these areas, assessed on similar soil, under simulated rainfall at micro-scale. Although not significantly different, shrub types can be ranked according to hydrological response. Soil data are required for runoff generation estimates in the wide range of soil types found in PNM scrublands. The aim of this presentation is to address soils of scrublands in PNM, describing properties and discussing their relevance to hydrological response of these surfaces.

Basic data comprises soil and vegetation maps of PNM, on a GIS specifically designed for the area, together with the Soil Map of NE Portugal profile descriptions specific data base. Soils were classed according to permeability and assigned to SCS soil hydrological classification, considering data on soil properties as depth to impervious layer, texture, C content and stoniness. Commonly referenced pedotransfer functions ere also applied.

Soils in PNM scrublands are dominantly incipient shallow (Leptosols, 96% of the area), with a high C content in the surface horizon (Umbric secondary units in 66% of the area), and high rock fragment content (mean rock fragment content 20-25%). In relative terms, "Giestais" cover a larger area of developed soils (Luvisols and Alisols, 9%) and a smaller one of high C content soils (24%). "Urzais" are dominant in areas with granitic parent material. Soil characteristics and components help explaining the relative importance and spatial distribution of soil hydrologic classes in PNM. In half of the area soils are moderately permeable, in less than 1/5 permeability is high, and it is low in about 1/3 of PNM scrublands area. Sharp differences are found between shrub types, as "Urzais" have the highest areal proportion of highly permeable soils (26%) and "Giestais" the highest of soils with low permeability (74%).

Results obtained are intended to help improving hydrologic models performance or hydrological data interpretations, by providing spatially distributed soil data estimates.

Keywords: Shrubs, soil hydrological properties, mountain areas

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