



Topography effect on soil organic carbon pool in Mediterranean natural areas (Southern Spain)

Luis Parras-Alcántara, Beatriz Lozan-García, and Arantxa Galán-Espejo

Cordoba, Faculty of Science, Agrifood Campus of International Excellence - ceiA3, Agricultural Chemistry and Soil Science, Cordoba, Spain (qe1paall@uco.es, +34957212146)

Soils are important reservoirs of carbon, in fact, the primary terrestrial pool of organic carbon (OC) that accounts more than 75% of the Earth's terrestrial OC are the soils. In addition, soils have the ability to store carbon for a long time, playing a crucial role in the overall carbon cycle. In Spanish soils, climate, use and management are very influential in the carbon variability, mainly in the soils in Mediterranean dry climate, characterized by its low OC content, weak structure and readily degradable. Generally, the capacity to soil carbon store depends on abiotic factors such as the climate and mineralogical composition, but also depends on soil use and management. The principal factors that affect to forest soils carbon concentration and stock are: climate, landscape, landscape position, slope, latitude, chemical properties, texture and aggregation, anthropogenic factors, natural disturbance - wind, fire, drought, insects and diseases... etc.

The soil organic matter (SOM), given by the total organic carbon content (TOC) is one of the main indicators of soil quality. Several studies have been carried out to estimate differences in SOC in relation to soil properties, land uses and climate. Although the impact of topographic aspect on soil properties is widely recognized, relatively few studies have been conducted to examine the role of aspect on SOC content globally. Studies indicate some variations in soil properties related to topographic. Topographic aspect induces local variation in temperature and precipitation solar radiation and relative humidity, which along with chemical and physical composition of the substrate, are the main regulators of decomposition rates of SOM.

The spatial variation of soil properties is significantly influenced by some environmental factors such as topographic aspect that induced microclimate differences, topographic (landscape) positions, parent materials, and vegetation communities.

Many attempts have been made to quantify the relationships between topographical parameters and soil properties. Researchers suggested some promising indicators such as pH, organic matter, exchangeable cations, total exchangeable basis, ratio of primary to secondary minerals, free oxides, carbonates and physical properties such as, particle size distribution, moisture content, color, bulk density and depth to specific horizon.

If we considered SOC and TN how indicators of soil quality it is necessary to explain the relationship between the soil properties and topographic position, furthermore, is necessary establish indicator of the soil quality. In this regard, the stratification ratio (SR) is the most used.

Soil development in this region is genetically complicated by three important soil forming factors: relief, fragility of this environment and absence of good vegetation (erosion by water) and the use and management (CT). Very little literature is published on soil variability and its relationship with topographic positions within such fragile environment. There are few reports on stratification of the SOC, TN and C:N ratio as affected by topography in natural areas.

In this context, the objectives of this study were; assess the SOC in the soils, its vertical distribution in the profile and analyze the accumulation and SR of SOC along a topographic gradient and their relationship to soil depth in arid Mediterranean climate in Spain.