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Spatial heterogeneity of soil bulk density and moisture content, organic of karst depression slope

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Abstract: The contrastive analysis of soil bulk density, moisture content, organic matter spatial heterogeneity karst hillslopes can serve as theoretical guidance for preventing soil degradation in Nandong subterranean stream basin. This study analyzes the 0-20cm, 20-40cm soil bulk density, moisture and organic matter spatial heterogeneity Zhumashao depression basing on classical statistics and geostatistics methods. Research results showed that: the soil organic matter aberrance in Zhumashao depression is the largest, up to 70.62%, the variation of bulk density and water, respectively 15.25% and 11.29%. According to the statistical analysis of different types of land use, the soil moisture content can be ordered as follows, cultivated land > grassland > shrubs, and the bulk density can be ordered as shrubs > grassland > cultivated land, and organic matter content can be ordered as cultivated land > grassland > shrubs. The bulk density of the northern slope is higher than the southern slope, and the coefficient of variation is lower than the southern slope. The soil moisture and organic matter are lower than the southern slope, and the coefficient of variation is higher than the southern slope. It also showed a significant negative correlation between soil bulk density and soil moisture, as well as a significant negative correlation between soil bulk density and organic matter, and the correlation coefficients were -0.609 and -0.581, respectively. In 0-20 cm, the soil moisture, bulk density, organic matter and the spherical model are fitter and fitting degree of R^2 were 0.911, 0.977, and 0.922, respectively. In 20-40 cm, the soil moisture, bulk density, organic matter and Gauss model match better and fitting degree of R^2 were 0.647, 0.730, and 0.881, respectively. The nugget coefficient shows that the spatial correlation of 0-20 cm factors, 20-40 cm is weak, which may be related to human activities in space. Through the analysis of normal kriging interpolation, soil bulk density in the south slope of the depression is less than those in the north slope, as well as the water and organic matter is more than those in the north slope. The soil moisture and organic matter at the bottom of the depression have the minimum value, while the bulk density has the maximum value. The water content and organic matter at the bottom and middle slope are the lowest, and the bulk density is the highest; the moisture and organic matter are higher on the downhill and uphill, and the bulk density is lower.

Key words: spatial heterogeneity; karst slope; land use, soil moisture, bulk density, organic matter