

Spatial Distribution of Reconstructed Soil Volume Density in Loess Open-pit Mining Area Based on IDW Interpolation¹

Shu-fei Wang, Yin-gui Cao, and Zhong-ke Bai²

Abstract: We examine the southern dump of Pingshuo antaibao open-pit coal mine in China with the field sampling data, DEM and high-definition images, and aim at analyzing the variation of soil bulk density in the research area and the effect of slope and vegetation configuration mode on the variation of soil bulk density. Typical profile sampling, indoor testing, geostatistics method, IDW and overlay analysis are used in the research. Results show that: (1) soil bulk density value increases with the increase of soil depth, and it is of moderately variation of each layer. (2) The amplitude of soil bulk density of 0-20cm in both the east-west and south-north directions is small and similar. In the four layers of 20-60cm, the variation of soil bulk density in the east-west direction is far greater than that in the south-north direction. (3) Soil bulk density of 0-30cm medium slope is the largest, in the 30-60cm soil layer, the bulk density of soil in large slope topography is larger than that in small slope topography. (4) From the perspective of vegetation allocation model, the order of soil bulk density in 0-20cm and 20-60cm layers is different. As a whole, the bulk density of soil in the area with *Caragana korshinskii* is smaller, while that in the area with mixed vegetation is moderate, and that in the area without vegetation or only *Robinia pseudoacacia* is larger. The following conclusions can be drawn. Spatial differentiation of soil bulk density in 0-20cm soil layer is affected by herbaceous root system, while it is affected by vegetation allocation mode in 20-60cm soil layer. On the whole, soil bulk density decreases with increasing slope, but when the slope is between 0 to 21°, it has a special law of change. The mixed mode of "grass-irrigation-joe" or "irrigation-joe" has the best effect in regulating soil bulk density. These results can improve the basic principle of land reclamation in mining areas in theory and provide basis for further optimizing land reclamation technology in practice.

-
1. Oral paper presented at the 2019 National Meeting of the American Society of Mining and Reclamation, Big Sky, MT. Welcome Back to Montana: The Land of Reclamation Pioneers, June 3 - 7, 2019. Published by ASMR; 1305 Weathervane Dr., Champaign, IL 61821.
 2. Shu-fei Wang, Yin-gui Cao, and Zhong-ke Bai, School of Land Science and Technology, China University of Geosciences, Beijing 100083, China; Yin-gui Cao is also with the Key Lab of Land Consolidation, Ministry of Land and Resources of the PRC, Beijing 100035, China.