Study on the relationship between soil water storage and soil deep percolation in mobile sandy land

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Soil deep percolation is an important link of terrestrial hydrological cycle, and the amount of soil deep percolation is closely related to the amount of soil water storage. In this study, the real-time monitoring of soil deep percolation of typical mobile dunes in Maowusu sandy land was carried out by using the soil deep percolation recorder. Combined with the analysis of soil water storage, the following conclusions are drawn: (1) During the monitoring period, the precipitation in 2016 were 574.7 mm, and the variation ranges of water storage in the three layers of 0-50 cm, 50-100 cm and 100-200 cm were 13.78-42.47 mm, 14.46-26.43 mm and 38.52-89.46 mm, respectively, with the coefficients of variation being 0.21, 0.13 and 0.17; the precipitation in 2017 was 297.8 mm, and the variation ranges of water storage in the three layers were 17.58-39.51 mm, 14.33-22.79 mm and 40.95-51.16 mm, with the coefficients of variation being 0.17, 0.11 and 0.06, respectively, which were all smaller than 2016. The soil deep percolation at 50 cm, 100 cm and 200 cm in 2016 was 381.8 mm, 341.6 mm and 270.2 mm, which were 4.53, 5.53 and 5.22 times of the same period in 2017, respectively. (2) There was a significant correlation between the amount of water storage in the upper soil and the amount of soil deep percolation on the next day ($p < 0.01$), which reflected the lagging phenomenon of percolation. (3)The relationship between the water storage of 50-100 cm layer and the percolation at 100 cm, and between the water storage of 100-200 cm layer and the percolation at 200 cm accorded with the logistic equation of growth model, and the fitting effect was preferably. The R^2 values were 0.4677 and 0.8986, respectively. The characteristics and relationships above were of great significance for estimating the soil deep percolation of sandy soil under certain precipitation conditions.