



Effect of land use history and pattern on soil carbon storage in arid region of Central Asia

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The purpose of this study is to investigate variations in soil organic carbon (SOC) in arid areas due to differences in the cultivation history, land use, and soil salinization. The study area is the lower Sangong River basin on the piedmont of the northern TianShan mountains, which experiences heavy land-use activities. In 1982 and 2005, 127 (152) and 74 (161) samples in old (new) oasis were collected from each site at the surface soil (i.e. 0-20 cm). The data reveal that the mean value of the surface soil organic carbon content of the old oasis was higher than that of the new oasis by 4.01 g/kg in 1982 and 3.79 g/kg in 2005. Additionally, the soil organic carbon content decreased more rapidly in the newly reclaimed oasis than in the old oasis from 1982 to 2005. The spatial pattern of the SOC content was correlated with the exploitation time in the new oasis, the agricultural land use history, and the SOC content. The decreasing trend is clearer in the high SOC content area than in the low SOC content area. Farmland is the largest carbon pool in both the new and old oases. The carbon density of the old oasis was higher than that of the new oasis by 4.01 and 3.79 g/kg in 1982 and 2005 respectively. The loss of SOC in the agricultural watershed of the arid region in NW China is obvious. Improvements of land management practices, such as no tillage, straw returning to soil, and balanced fertilization techniques, should be adopted to increase the SOC content.