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Monitoring of suspended sediment load and Sediment Sources in a Karst Plateau Catchment of Southwest China.

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The development of karst landforms in southwest China has resulted in surface and underground dual hydrogeological structure. The characteristics of the mechanism of soil erosion and its environmental effects are different from those in non-karst regions. This study aims to monitor sediment load and identify the main sediment source in a typical karst plateau agroforestry catchment, to estimate the relative contribution rates of surface and underground river sediment sources. The results show that the annual sediment transport modulus in catchment is very low (5.1 Mg km^{-2} a^{-1}) in this carbonate agroforestry catchment compare to deforestation 20 years ago (20 Mg km^{-2} a^{-1}). Sediment Fluxes in the underground river and surface river account for 19.7% and 80.3% respectively. Soil leakage is an important way but not a main way of soil erosion in typical karst watershed. There is no obvious soil erosion on the hillsides (less than 1 Mg km^{-2} a^{-1}), but the sediment sources results shows sediment sources of surface and underground river are different in 2017 and 2018, In 2017, it indicate that carbonate surface soil contributes 16.2% and 11.9% of the total suspended sediment to the surface and underground river respectively, and the clastic rock pieces are the primary source of both surface and underground river sediments, 79.5% and 60.8% respectively. Subsurface soil contributes a smaller fraction to the total sediment load, 4.3% to surface rivers and 27.3% to underground rivers. The 137Cs values for some suspended sediments in 2018 were outside the range all of the soil source samples, it attributed to re-mobilization of old sediment stored in karst underground conduits during the deforestation, and these “old sediments” could generate to the surface again when with the rainfall erosivity above 49 $J{\cdot}mm{\cdot}m^{-2}{\cdot}h^{-1}$.