



## **Carbon flux characteristics on an abandoned karst land by critical zone observation in Puding, Southwest China**

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Extensive areas of agricultural land have been abandoned in recent years through the world and become a significant C sink to mitigate anthropogenic CO<sub>2</sub> emissions. Guizhou is the center of South China Karst and about half of its farmland is on sloping fields. Since 1990 more than one third slope farmland has been returned to ecological restoration. However, there is no direct measurement of CO<sub>2</sub> flux follow abandonment and restoration in this area. Recently, an ongoing study of carbon flux between abandoned farmland and atmosphere has been carried out at Puding Karst Ecosystem Research Station in Guizhou province. The studied farmland was abandoned to natural recovery at 2010 and the monitoring work began at March 2015. The carbon fluxes through each part of the ecosystem were monitored simultaneously with an eddy covariance flux tower to observe near surface ecosystem turbulent exchange, a LI-8150 Automated Soil Gas Flux System to observe soil respiration at 8 plots in the field, an LGR's Carbon Dioxide Isotope Analyzer with 8 gas inlets to observe cave CO<sub>2</sub> dynamic underground. Preliminary results show: First, the ecosystem was a carbon sink after 5 years' restoration with an annual average NEE about 290 g C/m<sup>2</sup>/a between April 2015 to March 2017, the carbon sequestration capacity is more than twice during the rainy season than dry season; Second, the coupled soil temperature and soil water content change is the main environmental factor to control soil respiration; Third, cave CO<sub>2</sub> mainly came from a mixture of soil respiration and vadose zone air, it changes from about 18000 ppm at autumn to about 2000 ppm at summer depending on different ventilation pattern, therefore its role as a temporary carbon pool and passage cannot be ignored for carbon cycle study in karst region. Further studies need to quantify the interactions of the carbon fluxes within the ecosystem as the succession proceeds.