

Microbial biomass C acts as a source of CO₂ released from soils in karst areas, southwest China

PIAO HECHUN and HONG YETANG State Key Laboratory of Environmental Geochemistry, Institute of Geochemistry, Chinese Academy of Sciences, Guiyang 550002, P.R.China.

The release of CO₂ from the soil, which results from the oxidation of soil organic matter by heterotrophic microorganisms and by the respiration of plant roots, is a major flux in the global carbon cycle. In this paper, we investigated the relationship between soil surface CO₂ flux and microbial biomass carbon.

Twelve terrace fields on the slopes at different altitudes above sea level were chosen as the sample localities. Those sample localities are located in the slope terrains, a transitional zone from low land to hills in the eastern part of the Yunnan-Guizhou plateau, southwest China.

In each of the sample localities, the microbial biomass C is high in winter, and low in summer. Differences in microbial biomass C between winter and summer are related with soil organic C contents, showing a reciprocal relationship, and increased with increasing mean annual air temperature(a positive correlation) and decreasing sea-level elevation(a negative correlation). These results showed that the amounts of conversion of soil organic C at warmer site were higher than those at cooler sites; and that the amounts of changes in microbial biomass C at warmer sites were also higher than those at cooler sites. It is followed that changes in microbial biomass C may be the major pathway of decreasing of soil organic matter. A simple mass-balance calculation indicated that the carbon in microbial biomass may act as a source of CO₂ released from soils.