Geophysical Research Abstracts
Vol. 19, EGU2017-3494, 2017
EGU General Assembly 2017

Distinguish responses of residue decomposition to long-term warming depending on tillage systems

Ruixing Hou
Institute of Geographic Sciences and Natural Resources Research, Beijing, China (hourx@igsnrr.ac.cn)

Despite the crop residue is one of most important sources of organic matter and nutrients to agriculture soils, there is little study on the effects of long-term warming and tillage systems on residues decomposition. Soil was sampled from a 4-year field warming experiment under till and no-till systems, and was incubated with ^{14}C-labeled maize residue at three temperatures (15, 21 and 27 ˚C) for 59 days. Results showed warming had a lasting effect on soil organic matter decomposition, as the warmed soil produced significantly higher CO_2 from both the till and no-till samples than non-warmed soils. However, between warmed and non-warmed soils, more residues were decomposed under no-till with higher $^{14}CO_2$effluxes, while there was little different to till. The values of microbial biomass carbon (MBC) and dissolved organic carbon (DOC) showed warming-induced higher decline under till, while slight decrease under no-till which indicated the less C availability under till than no-till after long-term warming. Furthermore, warming induced higher specific enzyme activities of three extracellular enzymes (β-glucosidase, chitinase and sulfatase) before and after the incubation under no-till only. We conclude that long-term warming leads to distinguish effects on the microbial physiology, which could result in different residue decomposition depending on tillage systems.