Figure S1 The monthly mean temperature and monthly precipitation in the experimental site across the two years after the biochar application (from October 2019 to October 2021).
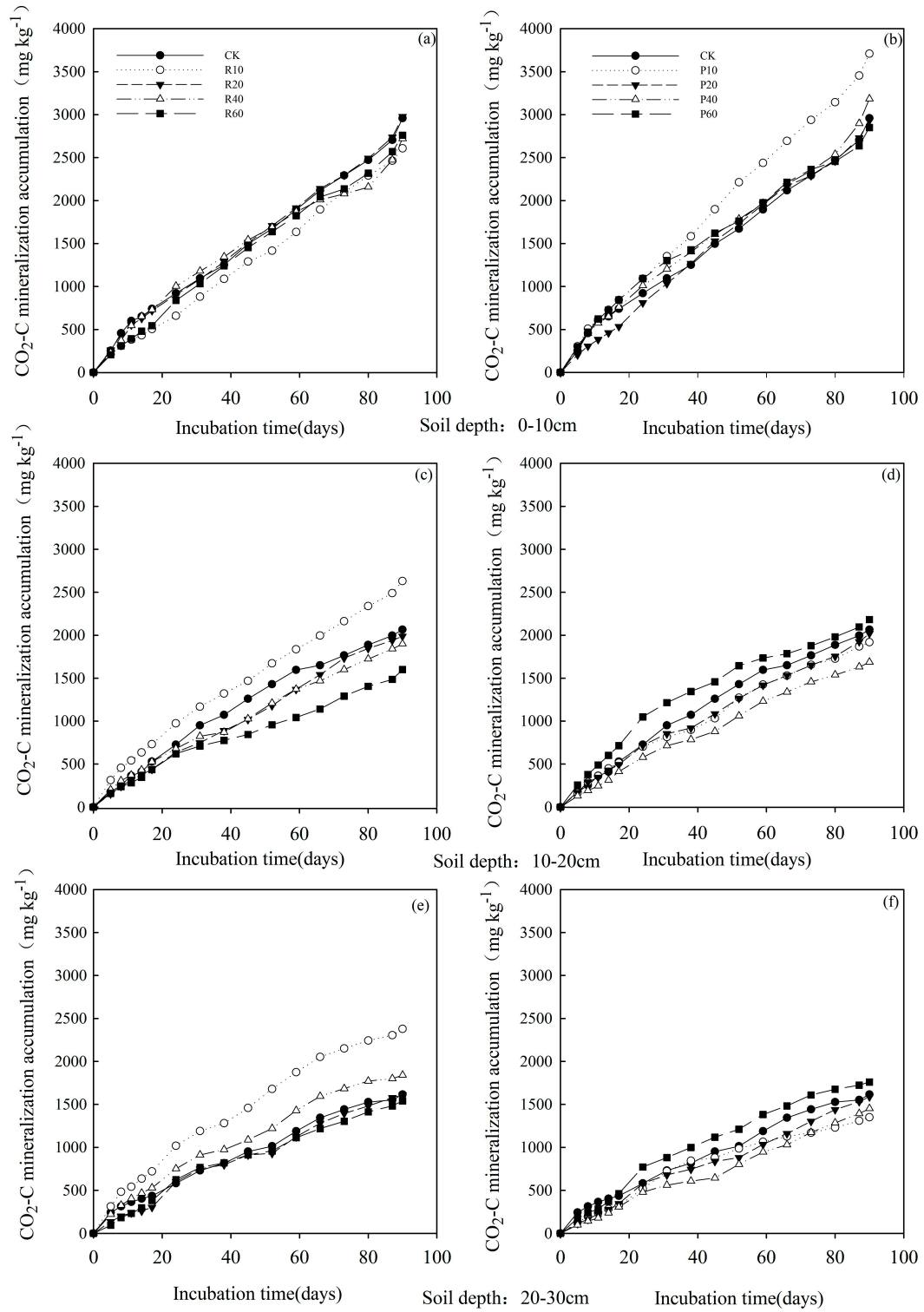
Figure S2 The dynamics of cumulative CO_2-C mineralization in dry red soil under different biochar applications. R10, R20, R40 and R60 indicate that the biomass applied to rice hull is 10 t ha^{-1}, 20 t ha^{-1}, 40 t ha^{-1} and 60 t ha^{-1}, respectively; P10, P20, P40 and P60 indicate that the biomass of peanut shell is 10 t ha^{-1}, 20 t ha^{-1}, 40 t ha^{-1} and 60 t ha^{-1}, respectively; CK: no biochar.

Table S1 Contribution rate of soil physicochemical indicators and enzyme activity to active carbon fractions and carbon stability.

Index	Contribution（%）	Significance
Suc	50.7	**
AK	27.6	**
MC	7.7	**
A pho	7	**
Cat	2.1	*
TN	1.5	NS
BD	1.4	NS
TP	0.8	NS
AP	0.8	NS
Ure	0.7	NS
pH	0.6	NS

*Significantly represented；** Significantly represented; NS represents insignificant. MC, soil moisture content; BD, soil bulk density; SOC, soil organic carbon; TN, total nitrogen; TP, total phosphorus; AP, available phosphorus; AK, available potassium. Suc, sucrase activity; Ure, urease activity; A Pho, acid phosphatase activity; Cat, catalase activity;