

## **Biochar stimulates inorganic carbon precipitation in the subsoil**

JIANYING SHANG AND YANG WANG

College of Land Science and Technology, China Agricultural University

Presenting Author: [jyshang@cau.edu.cn](mailto: jyshang@cau.edu.cn)

Biochar amendments add persistent organic carbon to soil and can stabilize rhizodeposits and existing soil organic carbon (SOC), but effects of biochar on subsoil carbon stocks have been overlooked. We quantified changes in soil inorganic carbon (SIC) and SOC to 2 m depth ten years after biochar application to calcareous soil. Biochar application at 30, 60, and 90 t ha<sup>-1</sup> rates significantly increased SIC by 10, 38, and 68 t ha<sup>-1</sup>, respectively, with accumulation mainly occurring below 1 m. To explain SIC accumulation in subsoil with biochar amendment, the interacting mechanisms are proposed: (1) biochar amendment significantly increases subsoil pH; and (2) the transported biochar in subsoil can act as nuclei to precipitate SIC. Biochar amendment enhanced SIC by up to 80%, thus the effects on carbon stocks in subsoil must be understood to inform strategies for carbon dioxide removal through biochar application. Biochar incorporated into calcareous topsoil significantly stimulates soil inorganic carbon storage in subsoil, which provides new insight into biochar's effect on soil carbon stocks. Our study provided critical knowledge on the impact of biochar application to topsoil on carbon stocks in subsoil in the long term.