

# Global depth distribution of soil carbon inputs inferred from belowground net primary production and root biomass profiles

Liujun Xiao<sup>1</sup>, Guocheng Wang<sup>2</sup>, Jinfeng Chang<sup>1</sup>, Yaoyao Chen<sup>1</sup>, Xiali Mao<sup>1</sup>, Xiaowei Guo<sup>1</sup>, Zhou Shi<sup>1</sup>, Mingming Wang<sup>1</sup>, Shuai Zhang<sup>1</sup>, Yiqi Luo<sup>3</sup>, Lei Cheng<sup>4</sup>, Kailiang Yu<sup>5</sup>, Fei Mo<sup>6</sup>, Shengyao Jia<sup>7</sup>, and Zhongkui Luo<sup>1</sup>

<sup>1</sup>Zhejiang University - Zijingang Campus

<sup>2</sup>Chinese Academy of Sciences

<sup>3</sup>Northern Arizona University

<sup>4</sup>Wuhan University

<sup>5</sup>Princeton University

<sup>6</sup>Northwest A&F University

<sup>7</sup>Zhejiang University

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## Abstract

The depth distribution of carbon inputs to soil has been unquantified globally, hindering our understanding of belowground carbon dynamics. We synthesize global observational data to infer the allocation of carbon inputs to soil depths down to 2 m, and map depth-specific carbon inputs globally at 1 km resolution. Global average carbon input to the 0–20 cm soil layer is 1.1 Mg C ha<sup>-1</sup> yr<sup>-1</sup>, accounting for >50% of total soil carbon inputs. Across the globe, the depth distribution of carbon inputs shows large variability, and there are relatively more carbon inputs to deeper layers in hotter and drier regions. Edaphic, climatic and topographic properties (in the order of importance) explain >80% of such variability in soil depths; and the direction and magnitude of the influence of individual properties are soil depth- and biome-dependent. Our results provide global benchmarks for prediction of whole-soil carbon profiles across global biomes.

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