

Peatland development, carbon dynamics and carbon flux histories of the Hengduan Mountains Region since the Last Glacial Maximum

Lijuan Liu (1,2,3), Huai Chen (1,3), Dan Zhu (1,3), Yixin He (1,3), Jianliang Liu (1,3), Qiuan Zhu (3,4), Xinwei Liu (1,2,3), Liangfeng Liu (1,2,3)

(1) CAS Key Laboratory of Mountain Ecological Restoration and Bioresource Utilization & Ecological Restoration and Biodiversity Conservation Key Laboratory of Sichuan Province, Chengdu Institute of Biology, Chinese Academy of Sciences, Chengdu 610041, China, (2) Zoige Peatland and Global Change Research Station, Chinese Academy of Sciences, Hongyuan 624400, China, (3) University of Chinese Academy of Sciences, Beijing 100049, China, (4) Laboratory for Ecological Forecasting and Global Change, College of Forestry, Northwest Agriculture and Forest University, Yangling 712100, China

Peatland is a large biosphere carbon reservoir. Knowledge of initiation, expansion, carbon accumulation, carbon pool and carbon flux histories will provide useful insights into predicting peat carbon fate in the future. This study presented a data synthesis of peatland basal ages, area changes and carbon accumulation rate variations in the Hengduan Mountains Region (HDMR) since the Last Glacial Maximum. The initiation patterns of the HDMR peatlands showed an expansion peak around 14.5 ka - 13 ka, 12-10 ka and 7.5-5 ka. The peat carbon accumulation rates on HDMR ranged from 4.22 to 162.74 g C m⁻² yr⁻¹, with a mean value of 36.12g C m⁻² yr⁻¹ based on 268 coring sites; the mean peat carbon accumulation of Northern, Central and Southern HDMR peatlands were 34.68 g C m⁻² yr⁻¹, 35.32 g C m⁻² yr⁻¹, 49.08 g C m⁻² yr⁻¹ since the Last Glacial Maximum, respectively. Our estimation of carbon pool was about 1.64 Pg for the HDMR peatlands. Among them, the peat carbon pool for the Northern HDMR was 1.43 Pg. Long-term decomposition rate for the HDMR peatlands was 0.00021459 per yr, which was similar to long-term decomposition rate of tropical peatlands. The net carbon carbon balance (NCB) has a mean value of 0.1 TgC/yr and the HDMR peatlands presented a slight carbon source during 6 ka - 2 ka. Our result suggested that the widespread peatland initiation and rapid accumulation were in response to regional climate and environment.