Fire history in the Yangtze River basin since 7ka: Links to climate, vegetation and human activities

WENQIANG PEI[1,3*], SHIMING WAN[2]

[1]Key Laboratory of Marine Geology and Environment, Institute of Oceanology, Chinese Academy of Sciences, Qingdao 266071(*correspondence: peiwenqiang@126.com)

[2]Key Laboratory of Marine Geology and Environment, Institute of Oceanology, Chinese Academy of Sciences, Qingdao 266071(wanshiming@ms.qdio.ac.cn)

[3]China University of Chinese Academy of Sciences, Beijing 100049, China

A high-resolution fire history in the Yangtze River basin since 7 ka cal BP is reconstructed based on the proxy of Black Carbon (BC) of core ECMZ in the continental shelf of the East China Sea in order to understand the interactions among fire, climate, vegetation and human activities. Our results show that biomass burning increased from 7 to 5ka cal BP, and gradually decreased from 3ka cal BP to present . A comparison of BC record with climatic proxy suggests that evolution in fire activity is closely related to the East Asian Summer Monsoon（EASM）variations on both millennial and centennial timescales between 7-3ka cal BP with higher fire activity during periods of strong EASM，and vice versa. The changes in climate-related biomass amount may be the most important factor of fire activity during this time interval. In contrast, fire activity showed a obvious decrease trend while the EASM intensity remained constant or slightly increased since 3ka cal BP possibly due to increasingly importance of human influence on fire activity from then on. The increase of population coupled with the technological advances in agriculture since Iron Age(2.8-2.2 ka cal BP) might result in severe deforestation, causing a reduction in fuel availability, and thus limiting fire activity on millennial timescales. Superimposed on the general decrease trend of fire activity, there were also short-time intervals characterized by high fire activity, which might be linked with the periods of increasing population resulting from state policy or human migration. This study suggests distinct response of fire to human activities on different time scales.