Mid-Holocene fire and vegetation history with anthropogenic implication in the Lower reaches of Yangtze River, East China

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[BACKGROUND] Human became an ever-increasing active ecological factor in shaping vegetation and landscape patterns especially by agricultural activity throughout the Holocene. The lower reaches of Yangtze River has been regarded as the cradle of the Neolithic cultures in China and the origin centre of the early rice (*Oryza sativa*) cultivation.

[AIM] Our study focuses on reconstructing a pollen-charcoal record of vegetation dynamics, fire regime and early Neolithic agriculture with a view to understanding the human-nature interaction in Lower Yangtze during the Mid-Holocene.

[RESULT] Five samples were AMS ^{14}C dated using the macro-charcoal and a total of 60 sediment samples were collected for pollen-charcoal analysis from a 2.6m-long profile at an archaeological site named Kuahuqiao (ca.30°08′N-120°13′E) in Xiaoshan, Zhejiang Province, East China. The result shows that **1)** during 8,200-7,700 cal.aBP (Zone-1), the pollen flora was dominated by deciduous *Quercus* along with evergreen *Quercus* (*Cyclobalanopsis*) and *Liquidambar* at low level suggesting warm temperate climate. Significant rise of charcoal was recorded at the later phase (Zone-1B, since 8,000?) accompanying the stepwise onward decrease of deciduous *Quercus* indicating the possible initial human increasing disturbance on the local vegetation; **2)** From 7,700 to 7,400 cal.aBP (Zone 2), *Quercus* decreased dramatically and the local forest was transformed into Poaceae-dominant vegetation. The micro-charcoal stays peaks continuously and the rice-related Poaceae pollen (>36μm in diameter after 36%HF treatment) continues to occur at low percentage, strongly pointing to extensive anthropogenic impact (Slash-and-burn practice for rice cultivation) on surrounding vegetation in agreement with archaeological findings (Kuahuqiao Culture) at the same layers; **3)** After 7,400cal.aBP, The Kuahuqiao Culture culminated in collapse mainly due to the considerable rise of the sea level evinced by the significant amount of marine dinoflagellate. The farmland was abounded which enables *Quercus* and *Pinus* to recover rapidly in association with high level of fern spores which is similar to modern vegetation.

Our result challenges the viewpoints of Zong et al. (2007) and Innes et al. (2009) who argued that the *Alnus* was the main wood cleared by humans and the rise of *Typha* was cultivate for food.

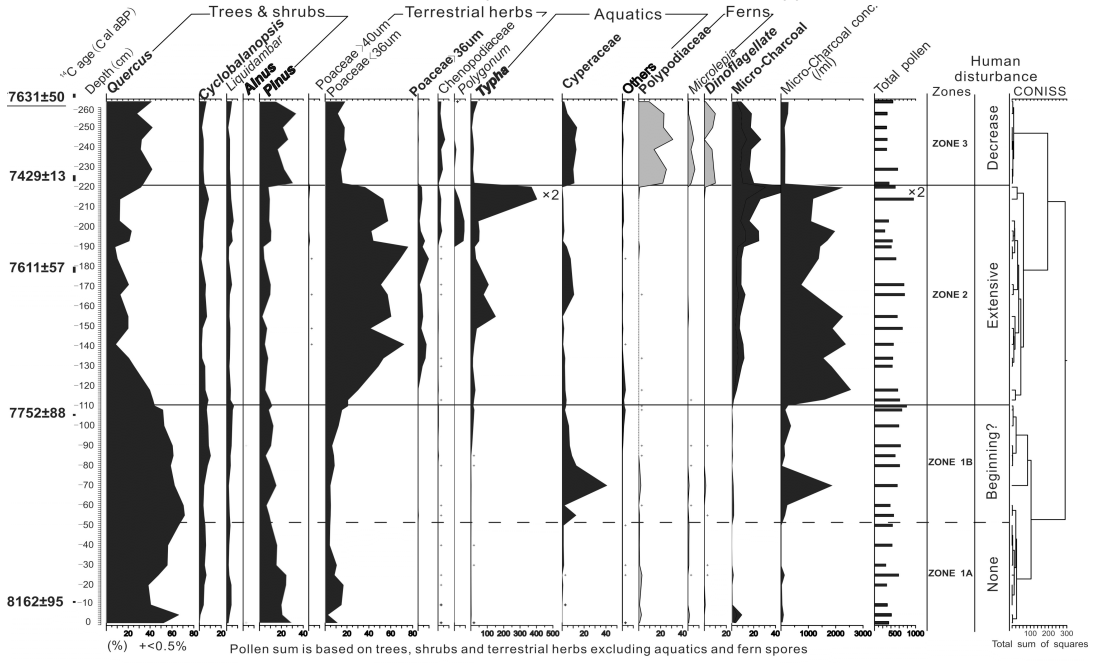

Fig.1 Pollen percentage diagram for Kuahuqiao archaeological site in Zhejing Province, East China

Keywords: Fire regime; pollen analysis; Mid-Holocene; Rice agriculture; Lower Yangtze

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