Attempt at quantifying human-induced land-cover change during the Holocene in central eastern China

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Abstract

China is one of the key regions of the world where agricultural civilizations already flourished several millennia ago. However, the role of human activity in vegetation change is not yet fully understood. As a contribution to the PAGES LandCover6k initiative, this study aims to achieve a first attempt at Holocene land-cover reconstructions in the temperate zone of China using the REVEALS model (Sugita, 2007). Pollen productivity estimates (PPEs) are key parameters required for the model and were lacking so far for major taxa characteristic of ancient cultural landscapes in that part of the world. Remains of traditional agricultural structures and practices are still found in the low mountain ranges of the Shandong province located in central-eastern China. The area was chosen for a study of pollen-vegetation relationships and calculation of pollen productivity estimates. Pollen counts and vegetation data from 37 random sites within an area of 200 x 100 km are used for calculation. The vegetation inventory within 100 meters from the pollen sampling site follows the standard methods of Bunting et al. (2013). Vegetation data beyond 100 meters up to 1.5 km from the pollen sampling site is extracted from satellite images. The PPEs are calculated using the three sub-models of the Extended R-value model and compared with existing PPEs from northern China's biomes and temperate Europe. The PPEs' relevance for reconstruction of past human-induced land-cover change in temperate China are evaluated.

Key words
China, traditional agricultural landscape, ERV model, pollen productivity estimates

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