



Pollen-based land-cover change during the Holocene in temperate China for climate modelling

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Quantification of the biogeochemical and biogeophysical effects of human-induced land-cover change (land-use) on climate in the past is still a subject of debate. Progress in our understanding of the net effect of land-use change on climate greatly depends on the availability of reliable, empirical reconstructions of anthropogenic vegetation change. China is one of the key regions of the world where agricultural civilizations flourished during a large part of the Holocene. However, the role of human activity in vegetation change is not yet fully understood. As a contribution to LandCover6k, we present the first pollen-based reconstruction of land-cover change, both climate-(natural) and human-induced, over the Holocene in temperate China using the REVEALS model (Sugita, 2007). The REVEALS model requires values of pollen productivity for the major plants characteristic of the study region. We performed the first evaluation of the relative pollen productivities (RPP) available from temperate China and established a tentative standard RPP dataset for 31 plant taxa. These RPP values were used together with 95 pollen records from temperate China grouped into 35 groups for the REVEALS application. The REVEALS-based values of plant cover strongly differ from the pollen percentages. As in Europe, pollen percentages generally underestimate the cover of herbs in the vegetation, except for *Artemisia* that is overrepresented by pollen. As expected, human-induced deforestation is highest in eastern China with 3 major phases of decreasing woodland cover at ca. 5.5-5k, 3.5-3k and 2k calendar years BP. Disentangling human-induced from climate-induced land-cover change requires thorough comparison of the REVEALS reconstructions with historical and archaeological data.

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