



## **Effects of asynchronous growth of agricultural vegetation and natural vegetation in spring**

Guosong Zhao and Jinwei Dong

Institute of Geographic Sciences and Natural Resources Research, CAS, Beijing, China (zhaogs86@126.com)

Agricultural vegetation, as managed ecosystem, showed different structural and physiological characteristics from natural vegetation (forest/grassland), i. e. albedo, leaf area index, surface roughness, canopy resistance. Besides, agricultural vegetation showed distinct phenology with natural vegetation. These differences will alter the biogeophysical and the biogeochemical cycles, causing feedbacks to climate. However, spring phenology change along with cropland expansion by occupying forest or grassland are not well documented, and also its subsequent effects. Here, we firstly quantify spring phenology difference between agricultural vegetation and forest/grassland in spatial details of  $0.5^{\circ} \times 0.5^{\circ}$  of China by adopting both in-situ and satellite-observed method. Agricultural vegetation showed significant later spring phenology (SOS, start of growing season) compared with adjacent natural forest/grassland, with more than 30 days in Northeast China Plain and Xinjiang Oasis region. Such a distinct asynchronous growth will lead to considerable differences on carbon uptake (carbon cycle) and ET (water cycle), and with subsequent impacts on local/regional climate. This study calls for notice of the important role of land cover change induced phenology change and its subsequent biogeophysical and biogeochemical effects. Moreover, more accurate spring phenology of agricultural vegetation in Earth System Models instead of grassland is quite needed to reveal the effects of historical and future cropland expansion.