

Oral presentations:

## **Reconstructing historical cropland in United States from 1850 to 2015**

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### **Abstract**

**Research objectives** Land use and land cover changes (LULCC) are the major driving forces for global climate change, biogeochemical cycles, and food supply. This study aims to reconstruct historical cropland in United States from 1850 to 2015, which will served as a basis for regional biogeochemical modeling.

**Methodology** A model was developed to reconstruct annual cropland percentage map at 1km×1km resolution from 1850 to 2015. The cropland density maps, which specified to represent the cropped land each year (excluding summer idle/fallow, cropland pasture), were reconstructed by incorporating various sources of inventory data and high resolution satellite images.

**Results** We compared these maps with other products and showed the advantages of our results in reconciling accuracy, temporal coverage, and spatial resolutions. The reconstructed maps were further used to examine the cropland expansion and abandonment in U.S. during the study period. Abandonment were found most dramatically occurred in the Central and Southeast U.S. (e.g. Texas, Mississippi, Oklahoma, and Alabama) mainly due to low soil fertility, inaccessible terrain for modern machinery, land conservation, water limitation, and intensive nonagricultural competition for land. Cropland expansion was generally associated with stimulations of government policy (e.g. Homestead Acts, development of drainage system, irrigation facilities) and development of farming techniques (e.g. machinery). The year of maximum cropland density identified in this study clearly showed a pattern of cultivated lands shifting from east to west. We also examined the conversion of land cover between cropland and other vegetation types. Results showed that national cropland expansion attained to its peak at 1920s and slightly decrease until now. Forest and shrub were the dominated land cover types be cultivated during 1850 to 1880, which may attributed to agriculture development in Ohio. Cropland begun to expand into grassland since 1870 and the encroached area increased sharply mainly due to cultivation development in Great Plain and Mid-west area.