Background

- Global urban population will reach 70% in 2050 from 50% in 2010;
- Urban sprawl, driven by urban population growth, is reshaping our urban environment;
- The change in urban environment has important impacts on nature systems and human activities in the urban domain;
- Satellite remote sensing observations and the planetary-scale platform provide the opportunities to monitor urban environmental change and its implications in the coupled human-nature system over large areas.

Research framework

Global urban dynamics 1992-2013 (1-km)

- Urban land (%) increased from 0.2% in 1992 to 0.5% in 2013
- The product provides spatially explicit boundaries of urban extents

Urban dynamics 1985-2015 in the US (30-meter)

- US urban area increased by about 20% over past three decades
- Urban spatial sprawl varied greatly across time and space

Phenology dynamics and response to urbanization

- A new product of vegetation phenology (30-meter) in the US was developed
- More details of vegetation phenology can be revealed in the urban domain
- A unique phenology pattern was found along urban-rural gradient
- Urbanization showed a significant impact on vegetation phenology

References


Summary

- We developed the products of annual urban extents and phenology indicators at a 30-meter spatial resolution in the conterminous US from 1985 to 2015;
- These products provide the possibility to monitor urban environmental changes in high spatial resolution;
- Our analyses indicate that the human-induced land use and land cover change (i.e., urbanization) changed the nature system and has important implications such as respiratory allergies in urban domains.

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