Urbanization as a Driver of the Regional Thermal Environment in the Yangtze River Delta, China

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Introduction
- Urbanization is an important driver of local and regional climate changes. Urban Heat Island (UHI), one of the urban environmental issues, has been well explored worldwide. With rapid regional-scale urbanization in the Yangtze River Delta (YRD), there is a need for quantifying the regional UHI.
- Satellite remote sensing is widely used to study the surface UHI and its spatial complexity because it has the ability to cover large areas simultaneously.
- Urban Heat Island Intensity (UHII) is usually expressed as the temperature difference between urban and its surrounding rural areas. However, because in YRD the suburban rural areas have been changing quickly with time, it is difficult to find un-disturbed rural areas for determining the UHII temporal trends.
- This paper is the initial attempt at using a new method of UHII involving the MODIS Land Surface Temperature (LST) products. The goal of this study is to characterize the actual thermal environment in the YRD region.

Site and Data
- **Site**: YRD is in eastern China. It covers an area of 99600 km², and is the center of Chinese economic development. Urbanization has given rise to what may be the largest concentration of metropolitans in the world (Fig.1). As of 2010 it is home to over 105 million people, of which an estimated 80 million is in cities. YRD is one of the most densely populated areas of the world.

**Data:**
1) MODIS LST product (MOD11A2), 2003-2010
2) DMSP/OLS data, 2010
3) MODIS LULC product (MCD12Q1), 2009
4) SRTM_DEM data

Daytime UHII in YRD, China
- In order to analyze the feasibility to use Lake Taihu as the reference background for UHII, we contrasted the interannual variability of LST between Lake Taihu and the surrounding typical urban cluster.
- The temporal trends of LST were similar, indicating that Lake Taihu lake is a stable reference.

**Definition of UHII**
- UHII=LST_U-LST_W
  - UHII: Urban Heat Island Intensity
  - LST_U: Urban LST
  - LST_W: Water Body LST

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