

# Yang Li

Ph.D. Candidate

*Faculty of Geographical Science, Beijing Normal University*

Email: leeyang1991@gmail.com

Website: <https://yangligeo.com>

GitHub: <https://github.com/leeyang1991>

Twitter: YangLiGeo

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## Key Words

Droughts, Global Climate Change, Ecosystem Resilience, Machine Learning, Geographic Information System (GIS), Remote Sensing, Drylands

## Education:

**Ph.D. Student: Beijing Normal University (Sep. 2017 – 2023)**

**Major:** Cartography and Geography Information System

**Thesis:** Recovery and Resilience of Ecosystem After Extreme Droughts

**Advisor:** Prof. Xiuchen Wu (xiuchen.wu@bnu.edu.cn) and Prof. Jing Li (lijing@bnu.edu.cn)

**Master of Science: China University of Geosciences (September 2015 – July 2017)**

**Major:** Surveying and mapping engineering

**Thesis:** Precipitation Thresholds for Triggering Floods in Small Medium Basins

**Advisor:** Assoc.Prof. Wei Gao (gaowei@cug.edu.cn)

**Bachelor of Science: Henan University of Urban Construction (September 2011 – July 2015)**

**Major:** Geographic Information System

**Thesis:** Research on Extraction of Urban Roads Based on Object Oriented Methods

## Publications

- [1] Li Y, Zhang W, Schwalm, C. R., Gentine, P, et al. Widespread spring phenology effects on drought recovery of Northern Hemisphere ecosystems[J]. *Nature Climate Change*, 2022. (Accepted)
- [2] Zhang W, Li Y, Wu X, et al. Divergent response of vegetation growth to soil water availability in dry and wet periods over Central Asia[J]. *Journal of Geophysical Research: Biogeosciences*, 2021, 126(6): e2020JG005912.
- [3] Xu T., Wu X., Tian Y., Li Y., et al. (2021). Soil property plays a vital role in vegetation drought recovery in karst region of southwest China[J]. *Journal of Geophysical Research: Biogeosciences*, 126(12), e2021JG006544.
- [4] Li Y., Zhang W., Chen Y., Li J.\* (2019) Self-Calibrating Palmer Drought Severity Index-based analysis on spatial and temporal characteristics of drought from 1961 to 2015 in China[J]. *Water Resources and Hydropower Engineering*, 50(01):43-51. (In Chinese)
- [5] Zhang Y., Chen Y., Li Y., Xia H., & Li J. (2019). Reconstructing One Kilometre Resolution Daily Clear-Sky LST for China's Landmass Using the BME Method[J]. *Remote Sensing*, 11(22), 2610.
- [6] Zhang W., Li J., Chen Y., & Li Y. (2019). A Surrogate-Based Optimization Design and Uncertainty Analysis for Urban Flood Mitigation[J]. *Water Resources Management*, 33(12), 4201-4214.

## Manuscripts In Progress

- [1] Li Y, Zhang W, Moore D. J., Breshears D. D., Smith K. B., Babst F. Wu X. et al. Dryland Loses its Resilience to Hot Droughts.

[2] Li Y, Zhang W, Chen Y, Li J, et al. Divergent Ecosystem Resilience in Energy- and Water-Limited Regions to Hot Droughts.

## **Research Experiences**

### **1 ) Ecosystem resilience under hot vs. normal drought across the Northern Hemisphere (2021-present).**

- Quantify drought resilience under hot drought and dry drought in different climate regions.

#### **Highlights**

- Prediction of ecosystem resilience in the future warming world.
- Using resilience as an early warning signal of forest mortality.
- This project provides a basis for the design of land-based mitigation and adaptation plans in a future warming world.

### **2 ) Drought recovery of Northern Hemisphere ecosystems (2019-2022)**

- Comprehensively quantify vegetation recovery time from extreme droughts.
- Revealed the complex interactions between vegetation phenology, drought timing, bioclimatic factors, and drought recovery.

#### **Highlights**

- Emphasize how the crucial role of phenology affects drought recovery and influences terrestrial ecosystem resilience under global warming.

### **3 ) Droughts Monitoring Using Multi-source Remote Sensing data based on machine learning (2019-2021)**

- Combining multi-source remote sensing data and in-situ data to monitor droughts across China

#### **Highlights**

- This project Improved the predictions of carbon and flux response to droughts (e.g., 2009-2010 western China drought).

### **4 ) High Resolution (30m) Fractional Vegetation Cover**

- Using Google Earth Engine (GEE) to produce a FVC dataset derived from Landsat in Inner Mongolia from 1978 to 2018.
- Analyzed the vegetation dynamics in the past 40 years in Inner Mongolia.

#### **Highlights**

- This dataset served the government in making land and rangeland management policy.

### **5 ) Vegetation dynamics and its response to climate change in the semi-arid region of Central Asia (2018-2019)**

- Investigation of the spatial-temporal patterns of vegetation responses to hydroclimate conditions in Central Asia.
- Exploring phenology and climate factors that modulate the variations of the vegetation-water relationship in dryland.

### **6 ) Large-scale droughts monitoring using in-situ meteorological stations from 1961 to 2015 in China (2018-2019)**

- Spatiotemporal patterns of droughts were identified based on sc-PDSI (Self-Calibrated Palmer Drought Severity Index) from 1961-2015 across China.
- Drought severity, intensity and affected area of different drought levels were assessed.

## Highlights

- Drought center in China has been moved into densely populated areas from 1961 to 2015

## 7 ) Floods inundation simulation system (2016-2017)

- Constructing the 2D hydro-hydraulic model to simulate the flooded area in small basins.
- In charge of the programming and development of the rainstorm flood simulation system.

## Highlights

- By observing the system's behavior, mitigation measures were designed to reduce flood damages.
- This system was deployed at the Regional Climate Center of Shenyang, China. Providing services for government decision-making.

## Work Experiences

### Teaching Assistant

Beijing Normal University	3S Technology Frontier	Mar. 2019-Jul. 2019
Beijing Normal University	3S Technology Frontier	Mar. 2018-Jul. 2018
China University of Geosciences	Principles of Remote Sensing	Mar. 2016-Jul. 2016

## Conference Presentation & Workshop

Li, Y., Vegetation recovery patterns under drought stress in China from 2000 to 2018 (Poster). AGU Fall Meeting, 9-13 December, San Francisco, USA. (2019).

## Skills

Python, R, MySQL, Google Earth Engine, ArcGIS, QGIS, ENVI, Machine Learning, HPC (High Performance Computing), Parallel Computing, Adobe Illustrator/Photoshop/Dreamweaver, Linux, OpenWRT, KVM (Kernel-based Virtual Machines), Raspberry Pi

## Self-Evaluation

- Strong Programming Skills
- Critical Thinking
- Excellent Aesthetic
- Reliable

## Open-Source packages (Pypi)

### lytools

- A toolbox for scientific data processing and analysis, including geospatial data analysis, statistical analysis, machine learning, cartography, multiprocessing, and statistical plotting.
- This package is gradually accumulated in my daily scientific research. (Frequently update)

### xymap

- An easy way to create custom bivariate images with two-dimensional colormaps. (Alpha version)

## Open-Source projects (GitHub)

GEE Download	Download a bunch of pre-processed data from Google Earth Engine to a local server by Python APIs.
MODIS Preprocessing	Parallely download MODIS data, automatically select tiles and dates, clip images, projection, and format transformation.

<b>Nature Journals Spider</b>	Automatically download articles and figures from <i>Nature</i> portfolio journals by giving search keywords and scope.
<b>Endnote Assistant</b>	Automatically search papers from Google Scholar, download citations and import them to Endnote.
<b>Online movies download</b>	Automatically download movies from live stream websites of M3U8 type.
<b>Local-Server files auto sync</b>	Local and server files seamlessly synchronize in real time.

### **Languages**

English (Proficiency)

Mandarin (Native)