Yang Li

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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.
[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	Parallelly download MODIS data, automatically select tiles and dates, clip images, projection, and format transformation.

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

Languages
English (Proficient)
Mandarin (Native)