CURRICULUM VITAE OF YUAN QIU

520-528-4909 | qiuyuan@arizona.edu | 1133 James E Rogers Way, Tucson, AZ, USA 85719

Education

- Ph.D., September 2012 – June 2018; Cartography and Geography Information System; Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences.
- B.S., September 2008 – June 2012; Cartography and Geography Information System, North China University of Water Resources and Electric Power.

Employment

- July 2024 – present: Associate Research Professional; School of Sustainability, Arizona State University; Tempe, AZ, USA.
- August 2023 – July 2024: Postdoctoral Research Associate; Department of Hydrology and Atmospheric Sciences, University of Arizona; Tucson, AZ, USA.
- January 2019 – July 2023: Postdoctoral Research Associate; Institute of Atmospheric Physics, Chinese Academy of Sciences; Beijing, China.
- July 2018 – December 2018: Data Engineer; GAGO Inc.; Beijing, China.

Main Achievements

- Estimation of the water budget in Arizona based on the Noah-MP model

At the request of the Arizona Department of Water Resources, the Arizona Tri-University Research and Water Reliability Project was launched with the intention of studying locations and methods for enhancing groundwater recharge across the state. My colleagues and I used the Noah-Multiparameterization (Noah-MP) model to estimate the water budget in Arizona. We thoroughly evaluated the model in simulating the historical evapotranspiration, runoff, recharge, and snow water equivalent. Then we analyzed their spatial and temporal characteristics and explored what factors modulate recharge rate. Currently, we are developing high-resolution climate scenario data for projecting groundwater recharge in Arizona in the future.

- A method to evaluate land surface models in preserving soil memory

A GEWEX/GASS initiative called “Impact of initialized land temperature and snowpack on sub-seasonal to seasonal prediction (LS4P)” intended to simulate the effect of spring soil temperature (ST) anomalies over the Tibetan Plateau on late spring and summer precipitation in East Asia with multiple earth system models. Each

model group conducted a control and sensitive experiment. The sensitive experiment imposed ST initial anomalies over the Tibetan Plateau. However, it was found that the LS4P models were generally unable to preserve the imposed ST anomalies and thus had difficulty in generating the observed 2-meter air temperature anomalies over the Tibetan Plateau. I suspected that this was related to the land surface modules used in the models. Therefore, I developed a method to evaluate the ability of three widely used land surface models to preserve the imposed ST anomalies and proved my suspicion was right. This study is helpful to the land surface model development.

- Evaluation of the WRF model in Central Asia

I pioneered the evaluation of the Weather Research and Forecasting (WRF) model in simulating the climate in Central Asia (CA). After many one-year sensitivity experiments, I found the optimal combination of the physical schemes for the model in CA, which has been adopted by numerous studies.

- Regional climate projection in Central Asia

Due to the complex terrain and heterogeneous land surface features in CA, the skills of the global climate models (GCMs) in simulating the local climate are limited, and the projected results based on the GCMs may have large uncertainties. In addition, the spatial resolutions of the GCMs are relatively low, and they are not suitable for driving ecological and hydrological models. High-resolution climate datasets are urgently needed for ecological and hydrological research in CA. To this end, I used the WRF model to downscale multiple bias-corrected GCMs to a resolution of 9KM. I systematically assessed the future climate changes in CA and the potential impact of future climate changes on local agriculture.

- Mapping the spatial distribution of the spring ephemeral plants in northern Xinjiang, China

To adapt to arid conditions, spring ephemeral plants (SEP) have evolved to germinate in early spring and wither in late spring or early summer, with their life cycles as short as about two months. In China, they are mainly distributed in northern Xinjiang. They play an important role in due stability and are food for livestock and wild animals in the spring. However, their spatial distribution in northern Xinjiang was unclear. To fill this gap, I used the Moderate-Resolution Imaging Spectrodiometer (MODIS) Enhanced Vegetation Index (EVI) to map the spatial distribution of SEP based on their unique phenological characteristics. I also investigated the spatial-temporal evolution of SEP and the impact of climate change and human activities on the evolution.

- Development of an agricultural information management system

I worked as a data engineer for a year in a tech company. I participated in the development of an agricultural information management system for Jilin Province, China. I produced and maintained about two-thirds of this system's data and wrote over 10,000 lines of code.

Main Publications

- **Qiu Y.**, Yan Z., Feng J., Hua L., Fan L., Li Z., Wang J., and Qian C.: Robust historical and future drying trends in Central Asia evidenced by the latest observation and modeling datasets, *Atmospheric Research*, https://doi.org/10.1016/j.atmosres.2023.107033, 2023.
- **Qiu Y.**, Feng J., Yan Z., and Wang J.: Assessing the Land-Use Harmonization (LUH) 2 dataset in Central Asia for regional climate model projection, *Environmental Research Letters*, 10.1088/1748-9326/accfb2, 2023.
- **Qiu Y.**, Feng J., Yan Z., and Wang J.: HCPD-CA: high-resolution climate projection dataset in central Asia, *Earth System Science Data*, 14, 2195-2208, 10.5194/essd-14-2195-2022, 2022.
- **Qiu Y.,** Feng J., Yan Z., and Wang J.: High-resolution Projection Dataset of Agroclimatic Indicators over Central Asia, *Advances in Atmospheric Sciences*, 10.1007/s00376-022-2008-3, 2022.
- **Qiu Y.**, Feng J., Yan Z., Wang J., and Li Z.: High-resolution dynamical downscaling for regional climate projection in Central Asia based on bias-corrected multiple GCMs, *Climate Dynamics*, 58, 777-791, 10.1007/s00382-021-05934-2, 2021.
- **Qiu Y.**, Feng J., Wang J., Xue Y., and Xu Z.: Memory of land surface and subsurface temperature (LST/SUBT) initial anomalies over Tibetan Plateau in different land models, *Climate Dynamics*, 10.1007/s00382-021-05937-z, 2021.
- **Qiu Y.**, Liu T., Zhang C., Liu B., Pan B., Wu S., and Chen X.: Mapping Spring Ephemeral Plants in Northern Xinjiang, China, *Sustainability*, 10, 10.3390/su10030804, 2018.
- **Qiu Y.**, Hu Q., and Zhang C.: WRF simulation and downscaling of local climate in Central Asia, *International Journal of Climatology*, 37, 513-528, 10.1002/joc.5018, 2017.

Main Presentations

- **Qiu Y.**: Regional Climate Model, *Yunnan University,* 2023. [lecture]
- **Qiu Y.**, Feng J., and Wang J.: The Response on Temperature Variation over Tibetan Plateau in Different Cumulus/PBL/LSM Schemes, *AGU Fall Meeting*, 2019. [oral]
- **Qiu Y.,** Hu Q., and Zhang C.: WRF Simulation and Downscaling of Local Climate in Central Asia, *The 2nd International Workshop of Meteorological Science and Technology in Central Asia*, 2016. [poster]

Main Grants

- *The Arizona Tri-University Recharge and Water Reliability Project* funded by the Arizona Board of

Regents through the Technology Research Initiative Fund, 2023 – 2025. [Co-I]

- The Strategic Priority Research Program of Chinese Academy of Sciences (grant no. XDA20020201), *Climate change impacts and countermeasures of extreme weather in the great-lake region of Central Asia*, 2018 – 2023. [Co-I]
- Global Energy and Water Exchanges (GEWEX) program, *Phase I of the "Impact of Initialized Land Temperature and Snowpack on Sub-seasonal to Seasonal Prediction (LS4P)"*, 2018-2022. [Co-I]
- The Chinese National Basic Research Program (grant no. 2014CB954204), *Dynamic simulation and protection strategy of Eurasian inland desert ecosystem evolution under climate change*, 2014 – 2018. [Co-I]