

Curriculum Vitae

Name: Guobao Xu (male)

Institute: Northwest Institute of Eco-environment and Resources, Chinese Academy of Sciences.

Address: Donggang West Road No. 320 Lanzhou 730000, China

Tel:(+86)15101229611 **E-mail:** xgb234@lzb.ac.cn; xgb234@126.com

Date of Birth: 5th February 1985

ORCID: <http://orcid.org/0000-0001-7267-554X>

Researchgate: https://www.researchgate.net/profile/Guobao_Xu

Education:

2004.9-2008.7, Bachelor degree, Geography Science, Northwest Normal University

2008.9-2009.7, Master, Graduate University of Chinese Academy of Sciences

2009.9-2011.7, Master degree, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences

2011.9- 2014.7, Doctor, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences

Employment:

2014.8-2016.7, Research assistant Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences.

2016.8-now, Research assistant Northwest Institute of Eco-environment and Resources, Chinese Academy of Sciences.

Doctor Supervisor: Prof. Qin Dahe & Prof. Liu Xiaohong

Brief of My Past Research:

Many scientists have suggested that climate change is an important issue. The paleoclimate is crucial to study climate change. The tree-ring is used in the research with the advantage of accurate dating, high resolution and widely spreading. The past climate could be reconstructed by the tree rings and future of climate will be forecasted. We have used the tree-ring stable isotope

and tree-ring width to study the climate in the past 300 years in southern Tibetan Plateau, China. We established the width chronology and isotope chronology in the study region. A network of the tree-ring stable oxygen chronologies were constructed for detecting the climate change in the study region in this research. The related journal articles have been published in the international journal.

I assessed the long-term intrinsic water-use-efficiency (iWUE) changes of forest in the Tibetan Plateau based on the tree-ring stable carbon isotope. The iWUE can reflect the balance of carbon assimilation and water loss during the plant growing process. The iWUE was increasing during the past 150 years, but it showed different pattern during the different periods. The reasons for the iWUE increase were CO₂ concentration increase and global warming. We also found the iWUE was increasing in the Xinglong Mountain, in northwestern China during the past 200 years. However, the iWUE was kept constant after 1998, and the basal area increment showed a persistent decrease. During the drought period, the iWUE was increasing, while BAI decreasing, which indicated that the iWUE improvement was insufficient to compensate for the negative effects of severe water limitations on tree radial growth.

During my Ph.D. I have conducted the related works in the arid area in the Tianshan Mountains in northwestern China. The aims of these studies were to detect the influence of the atmospheric circulation to the climate change and trees physiological response to the climate change. We used the stable carbon ($\delta^{13}\text{C}$) and oxygen ($\delta^{18}\text{O}$) isotopes in tree-ring to evaluate the drought stress. We found the tree-ring $\delta^{18}\text{O}$ was a valuable proxy to explore the response of trees to drought stress and the climate change. The plant physical response was changed during the climate change.

Research Interests:

My research is the stable isotopes in the tree and tree rings. I am interested in water use efficiency change in the forest, climate change, drought stress on trees and forest as well as plant physical. The methods could be used tree-ring width, stable isotopes, plots data, lab experiments, and process model.

Awards:

2011: Outstanding Prize of President Scholarship for Postgraduate Students, Chinese Academy of Sciences

2012: Zhuliyuehua Outstanding Doctor Prize

2013: National Scholarship for Doctor

2014: Special Prize of President Scholarship for Postgraduate Students, Chinese Academy of Sciences

2014: The Lu Jiayi Outstanding Postgraduate Scholarship

2014: Outstanding Postgraduate Scholarship, Chinese Academy of Sciences.

2015: Outstanding Doctor Thesis Prize, Chinese Academy of Sciences.

Experience:

12th-14th August 2010, attendance at the International Conference on Cryospheric Change and Its Influences – Cryospheric issues in regional sustainable development, Lijiang, China. I had a presentation “The Moisture Variability for the northeastern Qaidam Basin, China Since 1800 AD and Possible Linkages with the East Asian Summer Monsoon Reflected by Tree-ring $\delta^{18}\text{O}$ ”.

20th-23rd August 2011, attendance at the International Asian Dendrochronology Conference, Xi'an, China. I present a poster “Climate warming and increasing CO_2 both contribute the intrinsic water-use efficiency improvement on the northeastern Tibetan Plateau since AD 1850”

13rd-17th May 2013, attendance at the Second American Dendrochronology Conference, Tucson, Arizona, USA. I had an oral presentation “Drought history inferred from tree-ring $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ in the Middle of the Tianshan Mountains of China, and linkage with the North Atlantic Oscillation”.

14th -24th October 2013 visiting in the Department of Physical Geography and Quaternary Geology, Stockholm University, Sweden.

Publications:

1. **Xu G.**, Liu X., Trouet V., Treydte K., Wu G., Chen T., Sun W., An W., Wang W., Zeng X. & Qin D. (2018) Regional drought shifts (1710-2010) in East Central Asia and linkages with atmospheric circulation recorded in tree-ring $\delta^{18}\text{O}$. **Climate Dynamics**, Accepted.
2. **Xu Guobao**, Liu Xiaohong, Wu Guoju, Chen Tuo, Wang Wenzhi, Zhang Qiong, Zhang Youfu, Zeng Xiaomin, Qin Dahe, Sun Weizhen, Zhang Xuanwen. 2015. Tree ring $\delta^{18}\text{O}$'s indication of a shift to a wetter climate since the 1880s in the western Tianshan mountains of

- northwestern China. **Journal of Geophysical Research** 120, 6409–6425. DOI: 10.1002/2014JD023027. (SCI)
3. **Xu Guobao**, Liu Xiaohong, Qin Dahe, Chen Tuo, Wang Wenzhi, Wu Guoju, Sun Weizhen, An Wenling, Zeng Xiaomin. 2014. Tree-ring $\delta^{18}\text{O}$ evidence for the drought history of eastern Tianshan Mountains, northwest China since 1700 AD. **International Journal Climatology** 34, 3336–3347. DOI: 10.1002/joc.3911. (SCI)
 4. **Xu Guobao**, Liu Xiaohong, Qin Dahe, Chen Tuo, Sun Weizhen, An Wenling, Wang Wenzhi, Wu Guoju, Zeng Xiaomin, Ren Jiawen. 2014. Drought history inferred from tree ring $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ in the central Tianshan Mountains of China and linkage with the North Atlantic Oscillation, **Theoretical and Applied Climatology** 116, 385-401. DOI: 10.1007/s00704-013-0958-1. (SCI)
 5. **Xu Guobao**, Liu Xiaohong, Qin Dahe, Chen Tuo, Wang Wenzhi, Wu Guoju, Sun Weizhen, An Wenling, Zeng Xiaomin. 2014. Relative humidity reconstruction for northwestern China's Altay Mountains using tree-ring $\delta^{18}\text{O}$, **Chinese Science Bulletin** 59, 190-200. DOI: 10.1007/s11434-013-0055-y. (SCI)
 6. **Xu Guobao**, Liu Xiaohong, Qin Dahe, Chen Tuo, An Wenling, Wang Wenzhi, Wu Guoju, Zeng Xiaomin, Ren Jiawen. 2013. Climate warming and increasing atmospheric CO_2 contribute to increased intrinsic water-use efficiency on the northeastern Tibetan Plateau since 1850. **Trees-Structure and Function** 27,465-475. (SCI)
 7. Wu Guoju, **Xu Guobao (Co-first author)**, Chen Tuo, Liu Xiaohong, Zhang Youfu, An Wenling, Wang Wenzhi, Fang Ziang, Yu Shulong. 2013. Age-dependent tree-ring growth responses of Schrenk spruce (*Picea schrenkiana*) to climate—A case study in the Tianshan Mountain, China. **Dendrochronologia** 31, 318-326.(SCI)
 8. **Xu Guobao**, Chen Tuo, Liu Xiaohong, Jin Liya, An Wenling, Wang Wenzhi. 2011. Summer temperature variations recorded in tree-ring $\delta^{13}\text{C}$ values in the north-eastern Tibetan Plateau. **Theoretical and Applied Climatology** 105, 51-63. (SCI)
 9. **Xu Guobao**, Liu Xiaohong, Chen Tuo, Wang Wenzhi, An Wenling, Yun Hanbo, Sun Weizhen. 2011. Potential linkages between the moisture variability in the northeastern Qaidam Basin, China, since 1800 and the East Asian Summer Monsoon, as reflected by tree-ring $\delta^{18}\text{O}$. **Journal of Geophysical Research** 116, D09111. (SCI)

10. **Xu Guobao**, Liu Xiaohong, Chen Tuo, An wenling, Hou Shugui, Li Zhongqin 2009. Temperature Variations Recorded in Tree-ring Width at Timberline Forest in Hami Badashi, Xinjiang (in Chinese), **Journal of Mountain Science** (04), 402-410.
11. Liu Xiaohong, **Xu Guobao**, Griebinger J, An Wenling, Wang Wenzhi, Zeng Xiaomin, Wu Guoju, Qin Dahe. 2014. A shift in cloud cover over the southeastern Tibetan Plateau since 1600: evidence from regional tree-ring $\delta^{18}\text{O}$ and its linkages to tropical oceans. **Quaternary Science Reviews** 88: 55-68. (SCI)
12. Zhang X., Liu X., Zhang Q., Zeng X., **Xu G.**, Wu G. & Wang W. (2018) Species-specific tree growth and intrinsic water-use efficiency of Dahurian larch (*Larix gmelinii*) and Mongolian pine (*Pinus sylvestris var. mongolica*) growing in a boreal permafrost region of the Greater Hinggan Mountains, Northeastern China. **Agricultural and Forest Meteorology**, **248**, 145-155.
13. Wang B., Chen T., **Xu G.**, Wu M., Zhang G., Li C. & Wu G. (2018) Anthropogenic-management could mitigate declines in growth and survival of Qinghai spruce (*Picea crassifolia*) in the east Qilian Mountains, northeast Tibetan Plateau. **Agricultural and Forest Meteorology**, 250-251, 118-126.
14. Zeng X., Liu X., Treydte K., Evans M.N., Wang W., An W., Sun W., **Xu G.**, Wu G. & Zhang X. (2017) Climate signals in tree-ring $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ from southeastern Tibet: insights from observations and forward modelling of intra- to interdecadal variability. **New Phytologist**, **216**, 1104-1118.
15. Wu G., Liu X., Kang S., Chen T., **Xu G.**, Zeng X., Wang W., Wang B., Zhang X. & Kang H. (2018) Age-dependent impacts of climate change and intrinsic water-use efficiency on the growth of Schrenk spruce (*Picea schrenkiana*) in the western Tianshan Mountains, China. **Forest Ecology and Management**, 414, 1-14.
16. Liu Xiaohong, An Wenling, Treydte K, Wang Wenzhi, **Xu Guobao**, Zeng Xiaomin, Wu Guoju, Wang Bo, Zhang Xuanwen. 2015. Pooled versus separate tree-ring δD measurements, and implications for reconstruction of the Arctic Oscillation in northwestern China. **Science of The Total Environment** **511**: 584-594. DOI: 10.1016/j.scitotenv.2015.01.002.
17. Wu Guoju, Liu Xiaohong, Chen Tuo, **Xu Guobao**, Wang Wenzhi, Zeng Xiaomin, Zhang Xuanwen. 2015. Elevation-dependent variations of tree growth and intrinsic water-use

- efficiency in Schrenk spruce (*Picea schrenkiana*) in the western Tianshan Mountains, China. *Frontiers in Plant Science* **6** DOI: 10.3389/fpls.2015.00309. (SCI)
18. Wu Guoju, Liu Xiaohong, Chen Tuo, **Xu Guobao**, Wang Wenzhi, Zeng Xiaomin, Wang Bo, Zhang Xuanwen. 2015. Long-term variation of tree growth and intrinsic water-use efficiency in Schrenk spruce with increasing CO₂ concentration and climate warming in the western Tianshan Mountains, China. *Acta Physiology Plant* **37** DOI: 10.1007/s11738-015-1903-y. (SCI)
 19. Wang Wenzhi, Liu Xiaohong, Shao Xuemei, Qin Dahe, **Xu Guobao**, Wang Bo, Zeng Xiaomin, Wu Guoju, Zhang Xuanwen. 2015. Differential response of Qilian juniper radial growth to climate variations in the middle of Qilian Mountains and the northeastern Qaidam Basin. *Climatic Change* DOI: 10.1007/s10584-015-1467-2. (SCI)
 20. Liu Xiaohong, Wang Wenzhi, **Xu Guobao**, Zeng Xiaomin, Wu Guoju, Zhang Xuanwen, Qin Dahe. 2014. Tree growth and intrinsic water-use efficiency of inland riparian forests in northwestern China: evaluation via $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ analysis of tree rings. *Tree Physiology* **34**: 966-980. DOI: 10.1093/treephys/tpu067.
 21. Zeng Xiaomin, Liu Xiaohong, Wang Wenzhi, **Xu Guobao**, An Wenling, Wu Guoju. 2014. No altitude-dependent effects of climatic signals are recorded in Smith fir tree-ring $\delta^{18}\text{O}$ on the southeastern Tibetan Plateau, despite a shift in tree growth. *Boreas*. **43**: 588-599. DOI: 10.1111/bor.12053
 22. Zeng Xiaomin, Liu Xiaohong, **Xu Guobao**, Wang Wenzhi, An Wenling (2014) Tree-ring growth recovers, but $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ do not change, after the removal of point-source air pollution: a case study for poplar (*Populus cathayana*) in northwestern China. *Environmental Earth Sciences*, **72**: 2173–2182, doi:10.1007/s12665-014-3127-7. (SCI)
 23. Liu Xiaohong, An Wenling, Leavitt SW, Wang Wenzhi, **Xu Guobao**, Zeng Xiaomin, Qin Dahe. 2014. Recent strengthening of correlations between tree-ring $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ in mesic western China: Implications to climatic reconstruction and physiological responses. *Global and Planetary Change* **113**:23-33.
 24. An Wenling, Liu Xiaohong, Leavitt SW, **Xu Guobao**, Zeng Xiaomin, Wang Wenzhi, Qin Dahe, Ren Jiawen. 2013. Relative humidity history on the Bating–Litang Plateau of western China since 1755 reconstructed from tree-ring $\delta^{18}\text{O}$ and δD . *Climate Dynamics*: **42**: 2639-2654.

DOI: 10.1007/s00382-013-1937-z.

25. Liu Xiaohong, Zeng Xiaomin, Leavitt SW, Wang Wenzhi, An Wenling, **Xu Guobao**, Sun Weizhen, Wang Yu, Qin Dahe, Ren Jiawen. 2013. A 400-year tree-ring $\delta^{18}\text{O}$ chronology for the southeastern Tibetan Plateau: implications for inferring variations of the regional hydroclimate. **Global and Planetary Change** 104: 23-33. DOI: 10.1016/j.gloplacha.2013.02.005.
26. Wang Wenzhi, Liu Xiaohong, **Xu Guobao**, Shao Xuemei, Qin Dahe, Sun Weizhen, An Wenling, Zeng Xiaomin. 2013. Moisture variations over the past millennium characterized by Qaidam Basin tree-ring $\delta^{18}\text{O}$. **Chinese Science Bulletin** 58: 3956-3961. DOI: 10.1007/s11434-013-5913-0.
27. An Wenling, Liu Xiaohong, Leavitt SW, Ren Jiawen, Sun Weizhen, Wang Wenzhi, Wang Yu, **Xu Guobao**, Chen Tuo, Qin Dahe. 2012. Specific climatic signals recorded in earlywood and latewood $\delta^{18}\text{O}$ of tree rings in southwestern China. **Tellus B**. 64: 18703. DOI: <http://dx.doi.org/10.3402/tellusb.v64i0.18703>.
28. Wang Wenzhi, Liu Xiaohong, An Wenling, **Xu Guobao**, Zeng Xiaomin. 2012. Increased intrinsic water-use efficiency during a period with persistent decreased tree radial growth in northwestern China: Causes and implications. **Forest Ecology and Management** 275: 14-22.
29. Wang Wenzhi, Liu Xiaohong, Shao Xuemei, Leavitt S, **Xu Guobao**, An Wenling, Qin Dahe. 2011. A 200-yr temperature record from tree-ring $\delta^{13}\text{C}$ at the Qaidam Basin of the Tibetan Plateau after identifying the optimum method to correct for changing atmospheric CO_2 and $\delta^{13}\text{C}$. **Journal of Geophysical Research** 116: G04022. DOI: 10.1029/2011JG001665.
30. Liu Xiaohong, Shao Xuemei, Liang Eryuan, ChenTuo, Qin Dahe, An Wenling, **Xu Guobao**, Sun Weizhen, Wang Yu. 2009. Climatic significance of tree-ring $\delta^{18}\text{O}$ in the Qilian Mountains, northwestern China and its relationship to atmospheric circulation patterns. **Chemical Geology** 268(1-2):147-154.