

LANCANG-MEKONG NEWSLETTER

September 2019, No. 3

Project Title:

Climate Change and Water Resources in Great Rivers Region in Southeast and South Asia

Principal Investigator:

Deliang CHEN, University of Gothenburg, Sweden
Junguo LIU, Southern University of Science and Technology, China

Participating Institutions:

Southern University of Science and Technology
Institute of Tibetan Plateau Research, CAS
Institute of Atmospheric Physics, CAS
Institute of Geographic Sciences and Natural Resources Research, CAS
Beijing Normal University
University of Gothenburg

Project Period:

March 2018 – February 2023



**“Climate Change and Water Resources
in Great Rivers Region in Southeast and South Asia”**

Project Office

11-12 July

Asian Water Tower International Symposium

The Asian Water Tower International Symposium was held by Pan-TPE office on July 11-12, 2019. Our project member Prof. Deliang Chen, Prof. Junguo Liu, Prof. Qihong Tang together with other 47 internationally renowned scientists are invited by Prof. Tandong Yao, the chief scientist Pan-TPE, to attend the Symposium. The scientists discussed the countermeasures for the change of Asian Water Towers based on the studies from three aspects: observation, simulation and influence. In the end, an international cooperation programme are established.



28 July

Prof. Junguo Liu attended the 16th Annual meeting of Asia Oceania Geosciences Society (AOGS) which was held in Singapore on 28 July to 2 August 2019. AOGS was established in 2003 with a mission to promote geosciences and recognise the applications of science for the benefit of humanity. In this meeting Prof. Liu presented his recent research entitled “Evaluations and Improvements of GLDAS2.0 and GLDAS2.1 Forcing Data for Applying in Tibetan Plateau Regions”



AOGS 16th Annual Meeting
Asia Oceania Geosciences Society
28 Jul- 02 Aug 2019 **Singapore**

Organized By:                

Supported By:              

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The results were published in the JCR Atmospheres. Full article link:
<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2018JD029116>

1-5 September

International Workshop on Water and Climate Change in a Coupled Human-Natural System

The joint Sino-German Symposium held at the Southern University of Science and Technology, Shenzhen to bring together leading scientists from Chinese and German universities and research institutes as well as the community-driven ISIMIP (Inter-Sectoral Impact Model Intercomparison Project) initiative to discuss major outcomes obtained in recent global change impact studies focussing on the hydrological cycle.

International Workshop on Water and Climate Change in a Coupled Human-Natural System



1-5 September

The goals of this symposium were to (i) introduce major results obtained in research studies carried-out by the participants, (ii) communicate and exchange gained knowledge and experiences, (iii) identify knowledge gaps and uncertainties, (iv) discuss ideas for further improving impact model assessments and (v) advance the development of models and tools to evaluate solutions on how to adapt to and mitigate the various impacts of global changes.



1-5 September

During the workshop German scientists, including Dr. Martina Flörke (Ruhr-University Bochum), Dr. Sonjac Jähnig (Leibnitz-Institute of Freshwater Ecology and Inland Fisheries (IGB)), Dr. Hannes Müller Schmied (Goethe University Frankfurt), Dr. Luis Samaniego (Helmholtz Centre for Environmental Research - UFZ), Dr. Jacob Schewe (Potsdam Institute for Climate Impact Research), Dr. Camelia-Eliza Telteu (Goethe University Frankfurt), Dr. Tobias Conradt (Potsdam Institute for Climate Impact Research) and Dr. Yoshihide Wada (International Institute for Applied Systems Analysis (IIASA)) from Austria presented their recent researches and achievements.

Moreover, Prof. Junguo Liu (Southern University of Science and Technology), Dr. Yihui Ding (National Climate Center), Prof. Chunmiao Zheng (Southern University of Science and Technology), Dr. Qihong Tang (Institute of Geographic Sciences and Natural Resources Research Chinese Academy of Sciences), Dr. Qingyun Dan (Beijing Normal University), Dr. Tong Jiang (Nanjing University of Information Science & Technology), Dr. Buda Su (National Climate Center), Dr. Zongxue Xu (Beijing Normal University), Dr. Xin Li (Chinese Academy of Sciences), Dr. Tian Zhan (Southern University of Science and Technology), Dr. Chuanfu Zang (South China Normal University), Dr. Masoud Irannezhad (Southern University of Science and Technology), Dr. Ganquan Mao (Southern University of Science and Technology) on behalf of Chinese universities and research institutes shared their ideas and ongoing researches.



1-5 September

After two days presentations of different topics and two days in-depth group discussions on specific topics that were identified as important, key outcomes of the symposium were identified by the participants and it was agreed to prepare a position paper or commentary entitled “*Grand challenges for global hydrological models*”. The position paper will address how to build the bridge between global water modelling and demand for locally relevant data as needed for modelling of e.g. freshwater biodiversity and to provide information to develop local solutions to cope with global change impacts. Furthermore, participants discussed about future collaboration, the exchange of PhD and Master students.



28 September

The project progress seminar of “Climate and Water Resources in Great Rivers Region in Southeast and South Asia”

On September 28, 2019, the project progress seminar of “Climate and Water Resources in Great Rivers Region in Southeast and South Asia” was successfully held at the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences.



28 September

More than 50 researchers attended the meeting, including academician Deliang Chen from the University of Gothenburg, Prof. Junguo Liu from the Southern University of Science and Technology, Prof. Qihong Tang from the Institute of Geography of the Chinese Academy of Sciences, and some other professors. The meeting was presided over by Academician Prof. Deliang Chen and Prof. Junguo Liu.

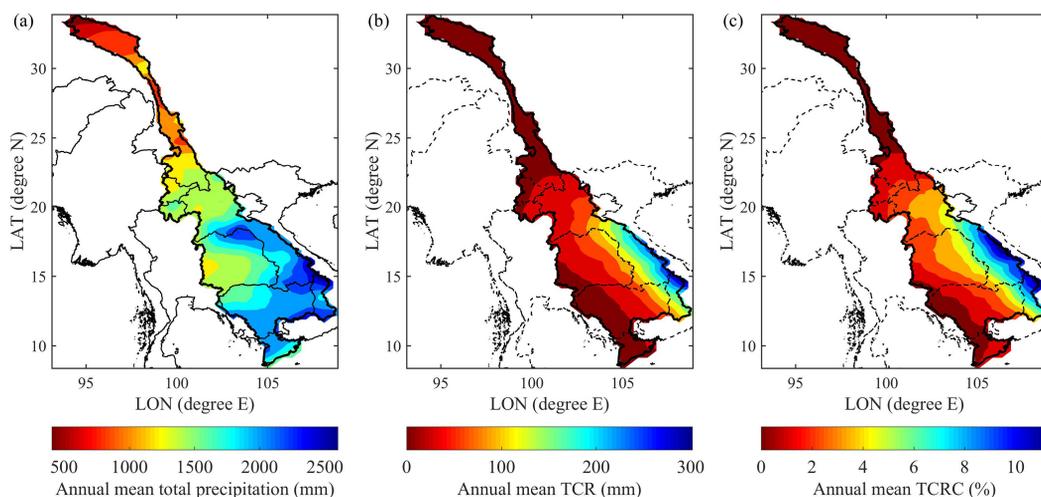
During the seminar different project members gave a talk regarding the progress of the project. Experts commented on the progress of each unit, sorted out the problems existing in the ongoing project, and discussed the next work of the project. Participants, also, enjoyed fruitful group discussions, exchanged the hot issues and projected the next work of the project. In summary, the seminar was of great significance to the smooth development of the project.



12 April

Tropical cyclone rainfall in the Mekong River Basin for 1983–2016

As home to about 70 million people, the Mekong River Basin (MRB), located in Mainland Southeast Asia, is often influenced by tropical cyclones (TCs) landfalling. The TCs not only cause flood and storm hazards, but also play important roles in providing freshwater resource and welcomed sediment transports. Led by Prof. Deliang Chen and Aifang Chen, the Department of Earth Sciences at the University of Gothenburg, Sweden, conducted a study focusing on the climatology of TCs and associated rainfall (TCR) in the MRB for 1983–2016. Results show that the TC plays a minor role in terms of the annual mean precipitation (2.5% to the total precipitation) however, it could seriously affect the local area along the TCs tracks by carrying extreme rainfall at short time period due to its highly concentrated spatiotemporal features. Besides, a declining trend of the TC frequency in the MRB has been observed for 1983 – 2016. The present findings lay a foundation for further in-depth research of the potential influence of the dynamic TCs and the associated rainfall in the MRB.



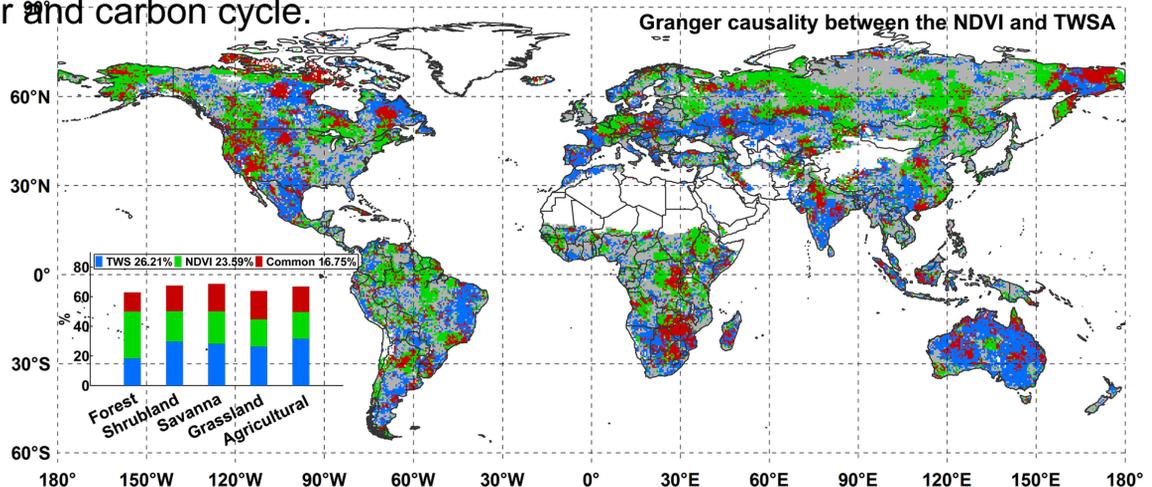
The results were published in the Atmospheric Research. Full article link:

<https://www.sciencedirect.com/science/article/pii/S0169809518312535?via%3Dihub>

7 June

Detecting hotspots of interactions between vegetation greenness and terrestrial water storage using satellite observations

Changes in water availability strongly affect vegetation growth, and vegetation can also modify land water storage by changing the land surface water balance. Prof. Bin He's team from the College of Global Change and Earth System Science at Beijing Normal University investigate the interplay between land water and vegetation greenness at a global scale, based on the terrestrial water storage data retrieved from the Gravity Recovery and Climate Experiment (GRACE) satellites mission and the normalized difference vegetation index (NDVI) from Jan. 2003 to Dec. 2015. The results reveal a significant response of the NDVI to the terrestrial water storage anomaly (TWSA) was found over 43.17% of global vegetated areas. The comparison study suggests that the response of the NDVI to TWSA is more rapid than that to precipitation. In addition, interactions between the NDVI and TWSA were detected over 16.75% of global vegetated areas. The interaction established herein between the TWSA and vegetation can help to improve the understanding of the global terrestrial water and carbon cycle.

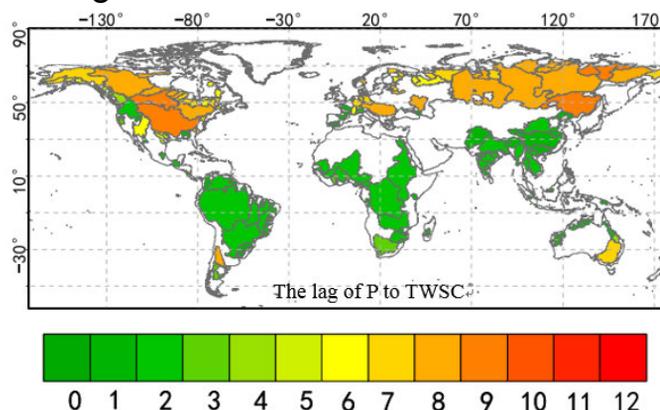


The results were published in the Remote Sensing of Environment. Full article link: <https://doi.org/10.1016/j.rse.2019.111259>

17 July

Differences in Response of Terrestrial Water Storage Components to Precipitation over 168 Global River Basins

Terrestrial water storage (TWS) is a vital component of the global hydrological cycle and can be divided into surface water storage (SWS), soil moisture storage (SMS), canopy water storage (CWS), snow water equivalent (SWE), and groundwater storage (GWS). Precipitation (P) is a major input to terrestrial water flux. Previous studies referred to that when P is converted to TWS through water distribution, there is a theoretically delayed response of TWS to P. Led by Prof. Bin He and Yafeng Zhang, the College of Global Change and Earth System Science at the Beijing Normal University, conducted a study focusing on the response of TWS components to P and its attribution. Results shown that TWSA and its individual components are positively related to P over basins. However, the lags of TWSA and its individual components to P, except for SWEA and CWSA, are shorter in the low- and mid-latitude basins (1–2 months) than those in the high-latitude basins (6–9 months). Regression analysis results show that the lags between TWSA and P are related to the mean latitude, longitude, elevation, and slope, temperature, precipitation. Determining the specific lag between TWS and P and the spatial variation of this lag are crucial to understanding interactions in the climate factors and the hydrological cycle.

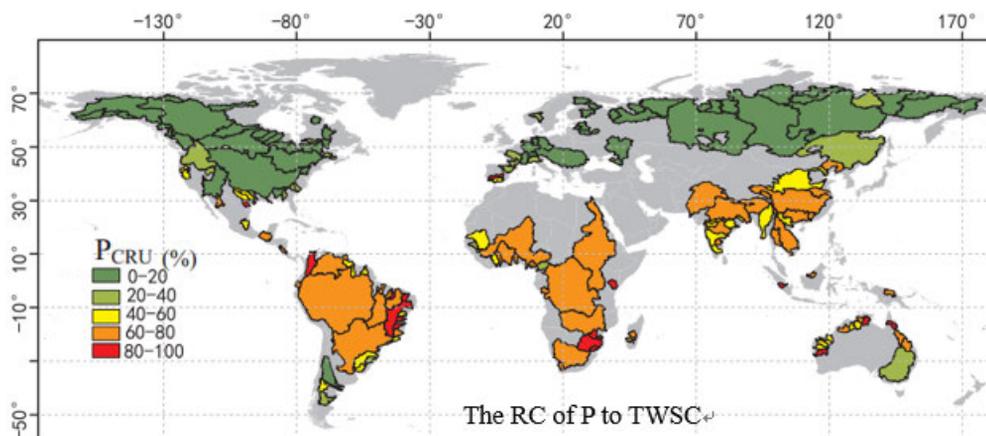


The results were published in the Journal of hydrometeorology . Full article link: <https://journals.ametsoc.org/doi/full/10.1175/JHM-D-18-0253.1>

27 September

The relative contributions of precipitation, evapotranspiration, and runoff to terrestrial water storage changes across 168 river basins

Terrestrial water storage (TWS) reflects all types of water stored on continents. Variations in TWS have large impacts on terrestrial ecosystems, human beings, and even the sea level. Climate change and human activities have changed both the magnitude and spatial distribution of TWS. Precipitation (P), as the main input flux of terrestrial water, together with evapotranspiration (ET) and runoff (R), as two main output fluxes, play key roles in the global water cycles. Led by Prof. Bin He and Yafeng Zhang, the College of Global Change and Earth System Science at the Beijing Normal University, conducted a study focusing on the relative contribution of P, ET and R. Results show that three independent variables explained an average of 61.4% of TWSC. The corresponding relative contribution(RC) of P, ET, and R were 42.6%, 43.2% and 4.2%, respectively. In spatial terms, a larger contribution of P to TWSC was found in low-latitude basins, and larger contributions of ET and R were identified for mid-and high-latitude basins. The findings of this study were important for improving our understanding of global TWSC responses to climate change.



The results were published in the Journal of Hydrology. Full article link:

<https://www.sciencedirect.com/science/article/pii/S0022169419309291?via%3Dihub>

Achievements

刘俊国教授获得国务院政府特殊津贴奖励

Prof. Junguo Liu received special government allowance from the State Council

刘俊国教授获得中国青年科技奖

Prof. Junguo Liu won China Youth Science and Technology Award

刘俊国教授入选英国皇家地理学会会士

Prof. Junguo Liu was selected as a member of the Royal Geographical Society

刘俊国教授获得教育部青年科学奖

Prof. Junguo Liu won the Ministry of Education Youth Science Award

刘俊国教授获得中组部“万人计划”科技创新领军人才

Prof. Junguo Liu was selected as the "10,000 people plan" scientific and technological innovation leader of the Central Group Department

刘俊国教授获得科技部中青年科技创新领军人才

Prof. Junguo Liu won the award of talent from the Ministry of Science and Technology for young people in science and technology innovation

刘小莽副研究员获批基金委优秀青年基金项目（“优青”）

Associate Prof. Xiaomang Liu was approved by the National Science Foundation of China for Excellent Yong Scholar

汤秋鸿研究员获批英国皇家学会“牛顿高级学者”基金

Prof. QiuHong Tang was approved by Royal Society for Newton Senior Scholar

刘俊国教授被推荐为国际水文科学协会中国委员会副主席

Prof. Junguo Liu was selected as vice-chairman of the China Committee of the International Association of Hydrological Sciences

汤秋鸿研究员团队入选2019年度中国科学院创新交叉团队

Prof. QiuHong Tang's team was selected as the Innovation Cross Team of the Chinese Academy of Sciences in 2019

International Advisory Board of the Project

Lai-yung Ruby Leung



Jeffrey McDonnell



Chong-Yu Xu



Olli Varis



Tandong Yao



Jianguo Qi



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