China Meteorological Assimilation Driving Datasets for the SWAT model (CMADS)
(Annual report – 2016)

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CMADS group, Beijing, China

Preface

Due to the large areas and differences of climate conditions and the lack of meteorological data in China, there are many challenges for research on surface water in hydrologic cycle and the associated driven force. Currently, China is facing the pressures from both water resource scarcity and water pollutions. The consequences of water pollution problem have been obviously revealed in recent years. Due to the low frequencies and small number of monitoring for non-point source pollutions, it becomes the challenge to understand the continuous spatial distributions of non-point source pollution in China.

China Meteorological Assimilation Driving Datasets (CMADS) is developed based on China Land Data Assimilation System (CLDAS) and provide high resolution and quality meteorological data for researchers. Applying CMADS can significantly reduce the meteorological input uncertainty for non-point source models and improve the performance of non-point source modeling, since water resources and non-point source pollution can be more accurately localized. Besides, researchers can make use of high resolution time series data from CMADS for spatial and temporal scale analysis of meteorological data. CMADS present a basic and standard meteorological data system, and researchers can conduct the related research using the same meteorological source for better and further comparison studies in the future. We expect that CMADS can provide the reliable data for researchers with confidence and convenience.

Xianyong Meng
CMADS group
February, 12, 2017

Rejuvenating the country through science and technology, the essential data and information are essential. I am glad to see our work can be shared with different colleagues for the research purposes. CMADS datasets have been developed under a year, and have been applied to different areas. I hope all the science and technology colleagues can make use of this datasets for their research.

Chinese Academy of Engineering academician:

February, 12, 2017

CMADS has been released for over 10 months. From April 2016, we began to share this datasets on "National Earth System Science Data Sharing Infrastructure" (http://westdc.westgis.ac.cn/). We have received 732 requests nationally and 14985 page views till Feb 12, 2017. From the statistics, the requests reached the peak on May, 2016 (138 persons/month). Around August, 2016 (around summer vacation time), the requests have reached the first peak (30 persons/month), and then the number of requests is fluctuated.

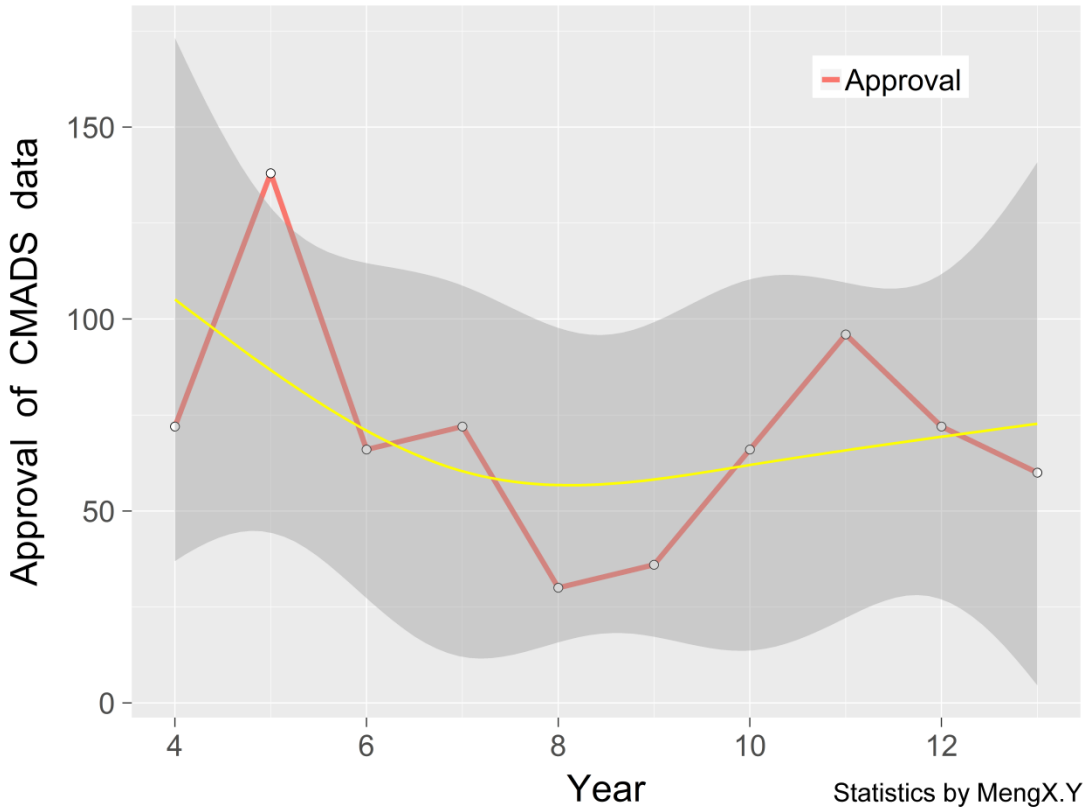

Figure 1 The number of applications in 2016

In order to understand the distribution of CMADS Chinese user, we have randomly picked 708 application forms from researchers and analyzed them. The most requests are from six provinces/cities, including Beijing (130 requests), Shaanxi (76 requests), Hubei (72 requests), Guangdong (48 requests), Gansu (47 requests) and Jiangsu (28 requests). The other requests from: Xinjiang, Hunan, Henan, Shandong, Chongqing, Jilin, Inner Mongolia, Zhejiang, Jiangxi, Sichuan, Yunnan, Shanghai, Heilongjiang, Tianjin, Hebei, Liaoning, Shanxi, Anhui, Guizhou, Fujian, Guangxi, Qinghai, Ningxia. There are no requests from following provinces: Macao, Nanhai, Taiwan, Tibet, Hongkong (Figure 3).

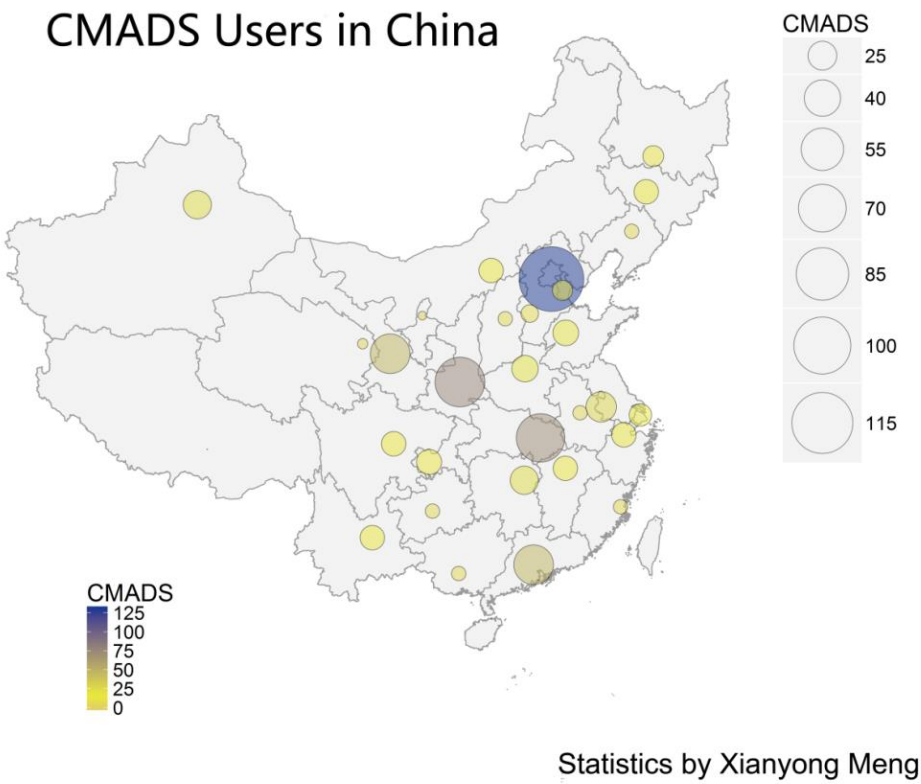

Figure 2 The distribution of CMADS Chinese users

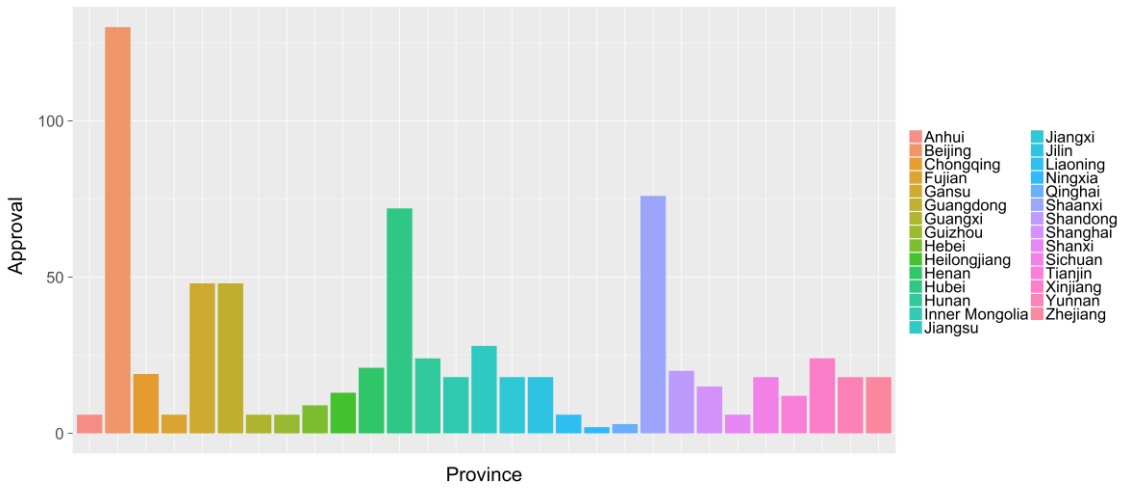

Figure 3 The distribution of CMADS Chinese users

We also summarized the interested study areas of the Chinese CMADS users, the results showed that northwestern area, southwestern area, north China, and northeastern areas are most interested areas. However, the number of traditional meteorological stations in these areas is less than that in Central China, Eastern China, and Southern China areas.

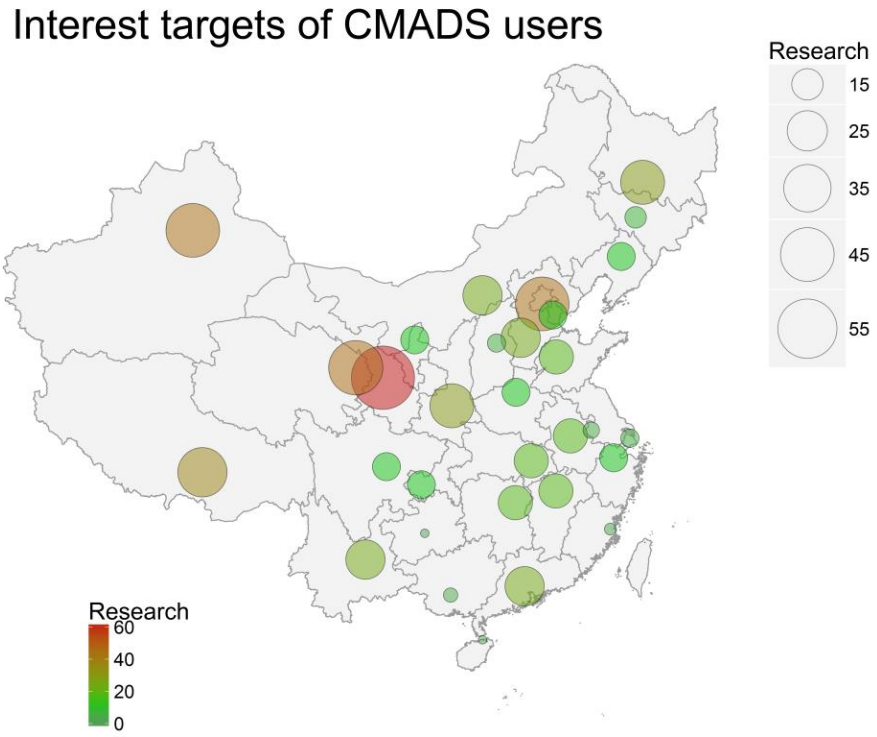

Figure 4 The interested study areas in CMADS Chinese users

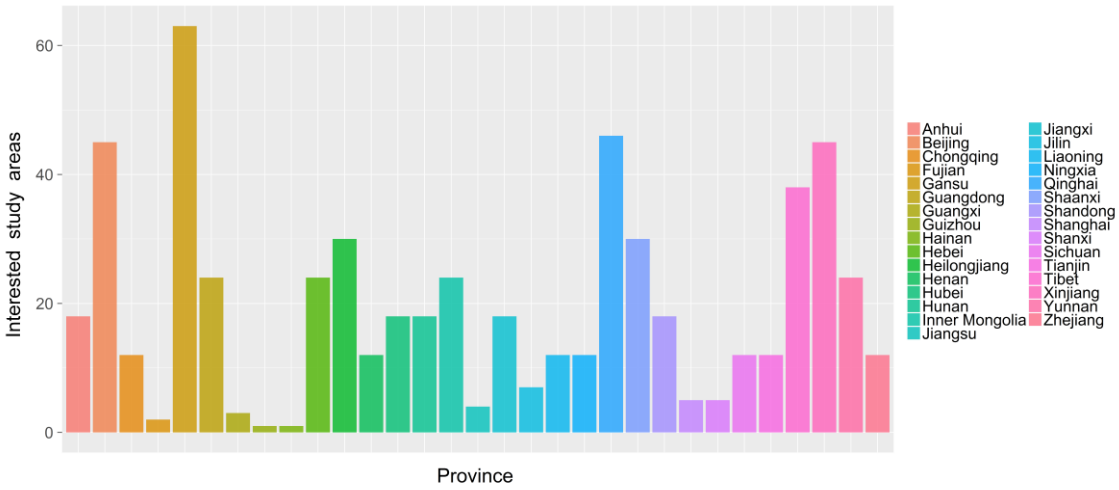

Figure 5 The distribution of CMADS Chinese users

The six most interested study areas include Gansu (63 requests), Qinghai (46 requests), Xinjiang (45 requests), Beijing (44 requests), Tibet (38 requests). Other interested provinces include, Heilongjiang, Shaanxi, Inner Mongolia, Hebei, Guangdong, Yunnan, Shandong, Anhui, Hunan, Jiangxi, Hubei, Tianjin, Chongqing, Liaoning, Henan, Ningxia, Zhejiang,

Sichuan, Jilin, Shanghai, Shanxi, Jiangsu, Guangxi. Fujian, Guizhou, Hainan. We also record different research areas where CMADS were applied (Figure 6).

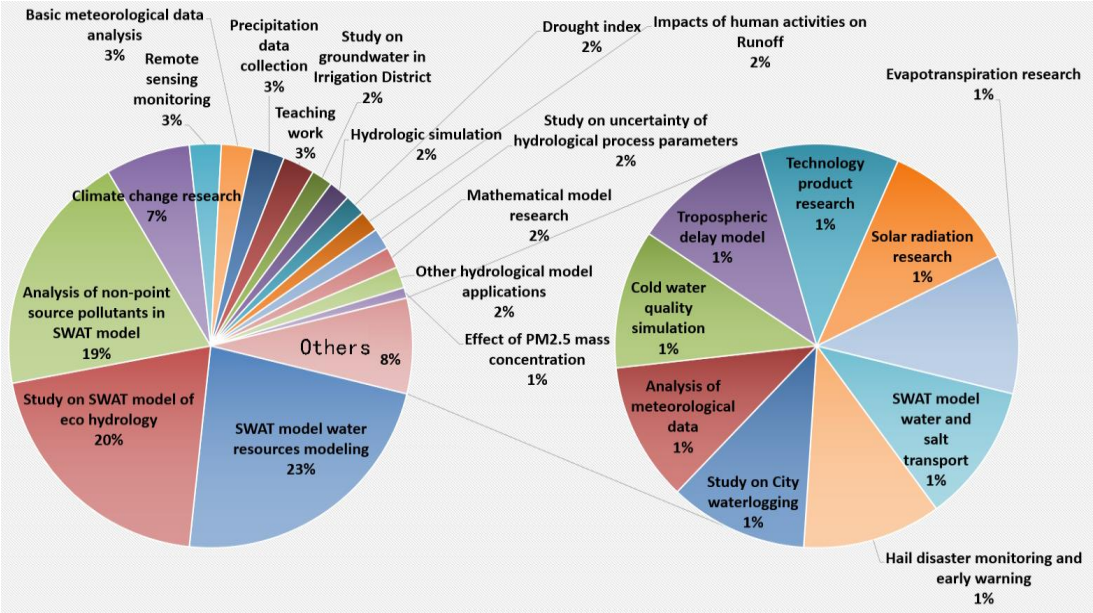

Figure 6 CMADS users research areas

The results showed that the most research areas where CMADS was applied mainly include: water resource modeling (23%), eco-hydrology study (20%), nonpoint source pollution research (19%), and climate change (7%). Other research areas include: assistance for remote sensing monitoring (3%), precipitation data collection (3%), teaching purposes (3%), groundwater research (2%), hydrological modeling in cool regions (2%), calculations for drought index (2%), Human activities impacts on surface runoff (2%), Parameters uncertainty analysis for hydrological models (2%), mathematical modeling research (2%), other hydrological studies (2%), PM 2.5 concentration research (1%), SWAT water and salt transport (1%), hailstone disaster monitoring and prediction (1%), urban inland inundation research (1%), multiple factor analysis for meteorological data (1%), water quality modeling in cold regions (1%), troposphere delay modeling (1%), technological products research (1%), solar radiation research (1%), and evapotranspiration research (1%).

In order to show the differences and features of the research, this report does not classify characteristic features of different research into major classification. For example, the hydrological modeling and water quality modeling in cold regions were not differentiated into water resource modeling and nonpoint source pollution, separately.

CMADS Users from:

Anqing Normal University

BaoJi University of Arts and Sciences

Beijing Jingshui River (Beijing) Engineering Consulting Co. Ltd.

Beijing Normal University

Beijing University of Technology

Beijing Wright Cyber Technology Services Ltd.

Central South Electric Power Design Institute

Chang'an University

Changjiang Water Resources Commission

Changsha University of Science and Technology

Chengdu University of Technology

China Academy of Forestry Sciences

China Agricultural University

China Institute of water resources and Hydropower Research

China Three Gorges University

China University of Geosciences (Wuhan)

China University of Petroleum (Hua Dong)

Chinese Research Academy of Environmental Sciences

Chongqing University

East China Normal University

Gansu Agricultural University

Gansu Meteorological Bureau Public Service Center

Guangxi University

Guangzhou Institute of Geography

Guizhou Meteorological Bureau

Harbin Institute of Technology

Hebei university of engineering

Henan Polytechnic University

Hohai University

Huazhong University of Science and Technology

Hunan University of Science and Technology

Hunan University of Technology

Inner Mongolia Agricultural University

Inner Mongolia University

Institute of Geographical Sciences and resources

Jiangxi Institute of soil and water conservation

Jiangxi Normal University

Jobon garden Limited by Share Ltd

kunming university of science and technology

Langfang urban and rural planning and Design Institute

Lanzhou University

Nanchang Institute of Technology

Nanjing Normal University

Nanjing University

nanjing university of information science and technology

Ningxia University

North China Electric Power University

North China University of Water Resources and Electric Power

Northeast Agricultural University

Northeast Forestry University

Northeast Institute of geography and agricultural ecology, Chinese Academy of Sciences

Northeast Normal University

Northwest Agriculture and Forestry University

Northwestern University

Pearl River Water Resources Commission

Peking University

PLA 65061 unit

Qiingdao University

Research and development center of State Forestry Administration

Research Center for Eco Environmental Sciences; Chinese Academy of Sciences

Research Institute of water transport, Ministry of transport

Shaanxi Normal University

Shandong University

Shang Zheng (Beijing) Information Technology Co., Ltd.

Shenzhen Institute of advanced technology, Chinese Academy of Sciences

Sichuan University

Southern China Environmental Science Research Institute

Southwestern University

Sun Yat-sen University

The Yellow River survey planning and Design Co., Ltd.

Tianjin University

Tsinghua University

University of Electronic Science and technology of China

Water Resources Protection Bureau

WuHan University

Xi'an Jiao Tong University

Xi'an University

Xi'an University of technology

Xianyang Normal University

Xinjiang Institute of ecology and geography, Chinese Academy of Sciences

Xinjiang University

Yantai Institute of coastal zone, Chinese Academy of Sciences

Yuxi normal university

Zhejiang University

Zhengzhou University

CMADS website：

http://www.cmads.org/