National Tibetan Plateau Data Center

Xin Li, Xiaduo Pan, Xuejun Guo, Xiaojuan Yang, Xiaolei Niu, Ming Feng, Tao Che, Youhua Ran

Institute of Tibetan Plateau Research, CAS

May 29, 2020

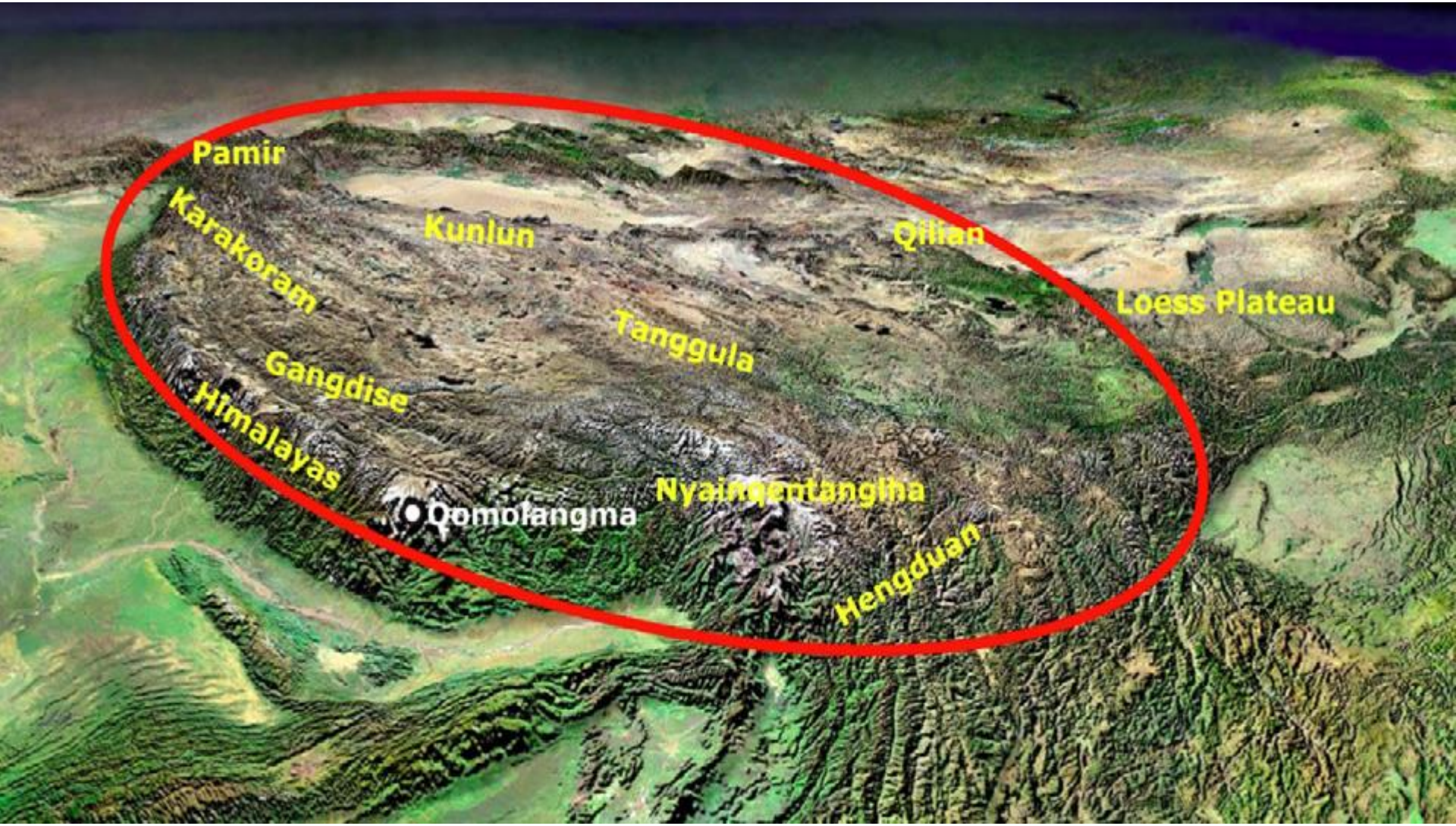
The 2020 Permafrost Data Workshop

Outline

1. The Third Pole and recent research projects
2. Data integration for the Third Pole
3. Featured datasets for the Third Pole research
4. Data Publishing & Data Repository

1. The Third Pole and recent research projects

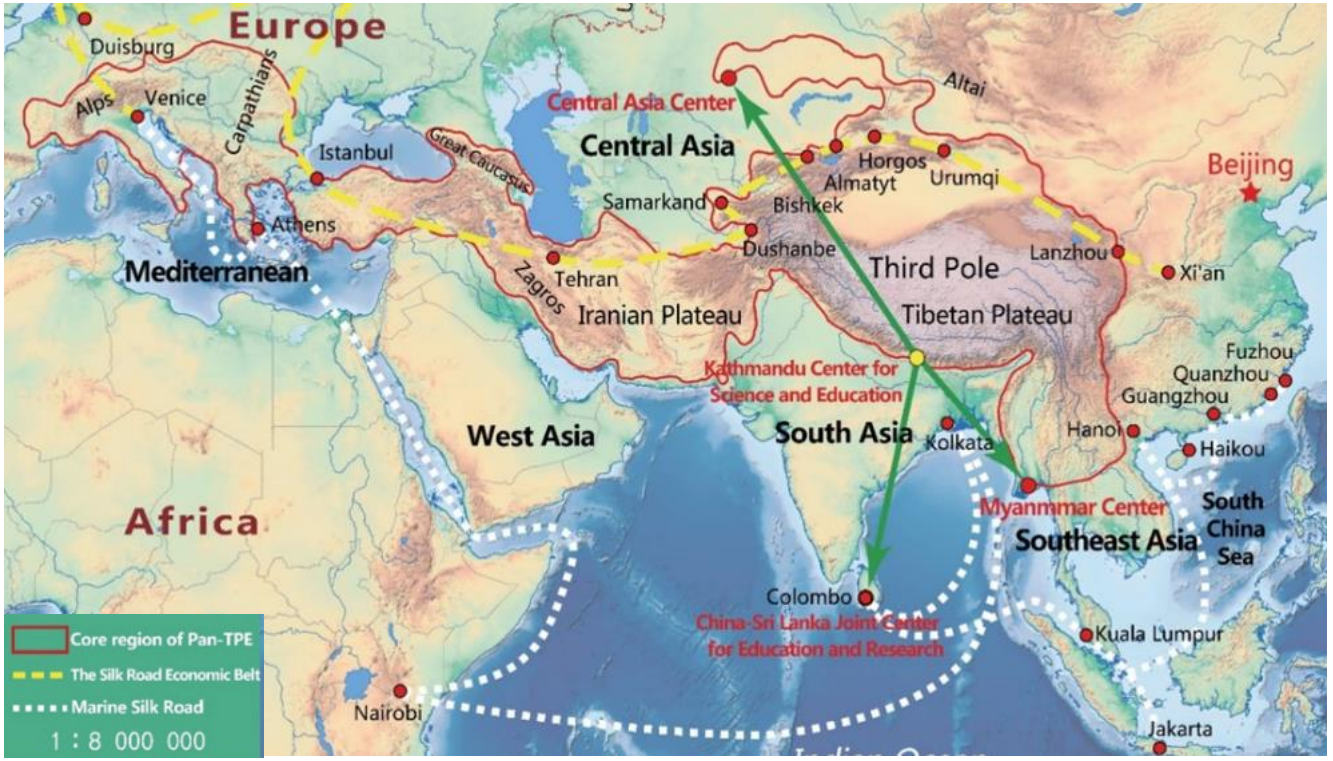
Third pole



From Prof. Tandong Yao

Strategic Priority Research Program (A) of Chinese Academy of Sciences

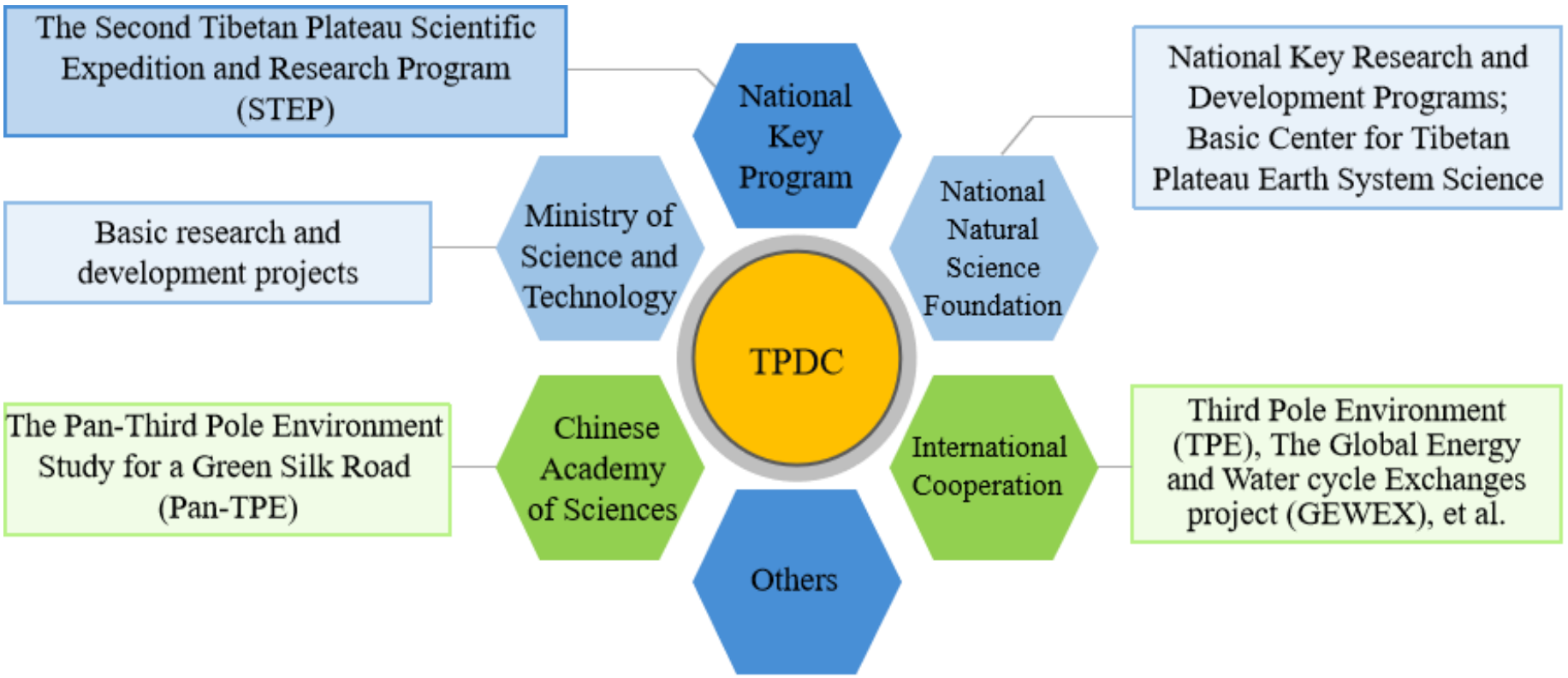
Pan-Third Pole Environment Study for a Green Silk Road (2018-2022)



From Prof. Tandong Yao

Second Tibetan Plateau Scientific Expedition Program (2017-2026)

From Prof. Tandong Yao


The Second Tibetan Plateau Scientific Expedition and Research Program (STEP)
National Key Program
National Key Research and Development Programs; Basic Center for Tibetan Plateau Earth System Science
Basic research and development projects
Ministry of Science and Technology
National Natural Science Foundation
TPDC
The Pan-Third Pole Environment Study for a Green Silk Road (Pan-TPE)
Chinese Academy of Sciences
International Cooperation
Third Pole Environment (TPE), The Global Energy and Water cycle Exchanges project (GEWEX), et al.
Others

2. Data integration for the Third Pole

Three pOle big Data and Observational center (TODO)

Objectives： 1) Establish a big data center for Three-Pole earth system science, integrate the Three-Pole data resources; 2) Develop the Internet of things (IOT) observation technology under extreme environments and build an integrated intelligent IOT Observation System for the Pan-Third Pole region; 3) Develop the prediction model for Pan-Third Pole environmental change driven by both big data and mechanism model to support the decision-making for complex issues of sustainable development in the Pan-Third Pole region.

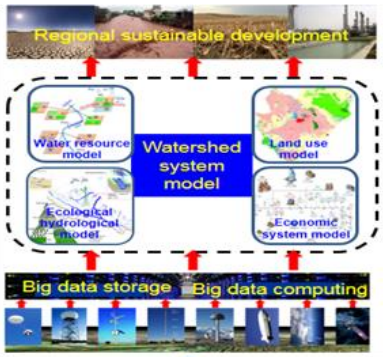
Themes：

- Three-Pole Big Data
- Remote Sensing & IOT Observation
- Environment Predication& Decision Support

People：25

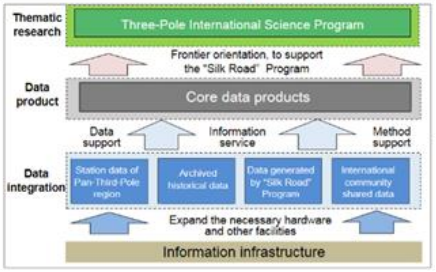
- Professor：6
- Associate Professor：5
- Postdoc/Assistant Researcher：14

3. Environment Prediction & Decision Support



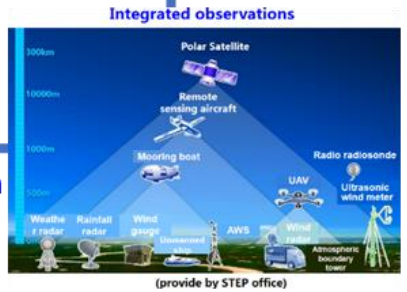
data collection & analysis

real-time data monitoring



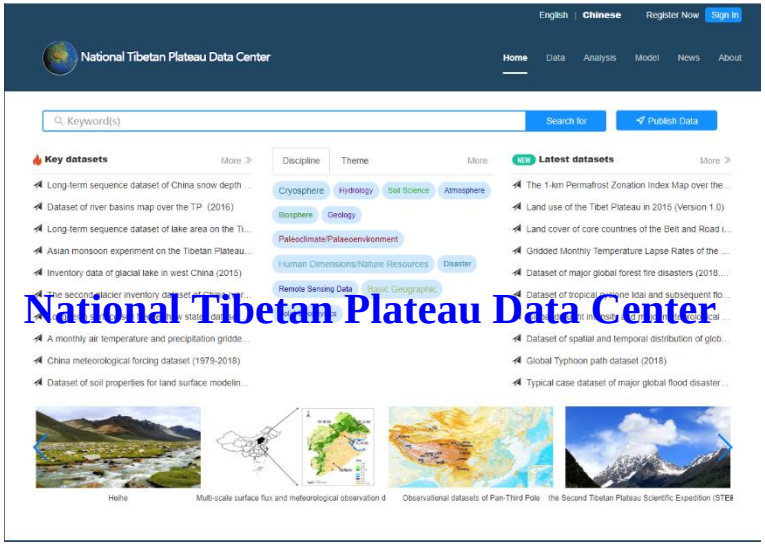
1. Three-Pole Big Data

data collection

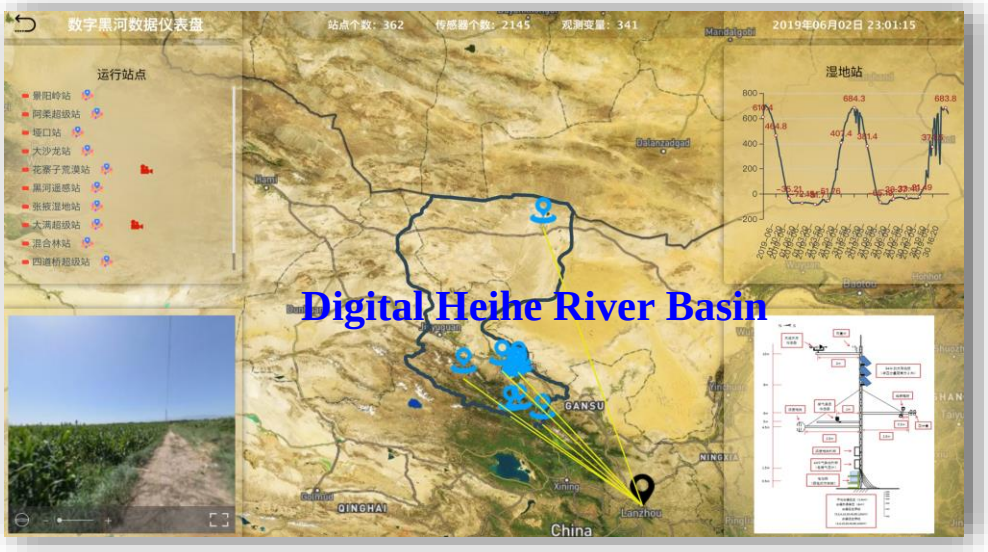


2. Remote Sensing & IOT Observation

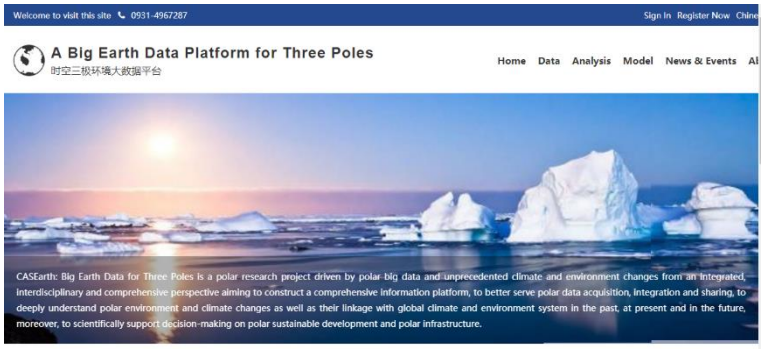
Data integration



National Tibetan Plateau Data Center

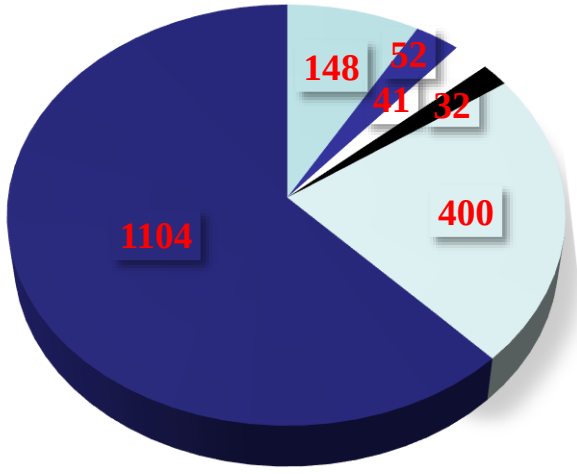


Digital Heihe River Basin

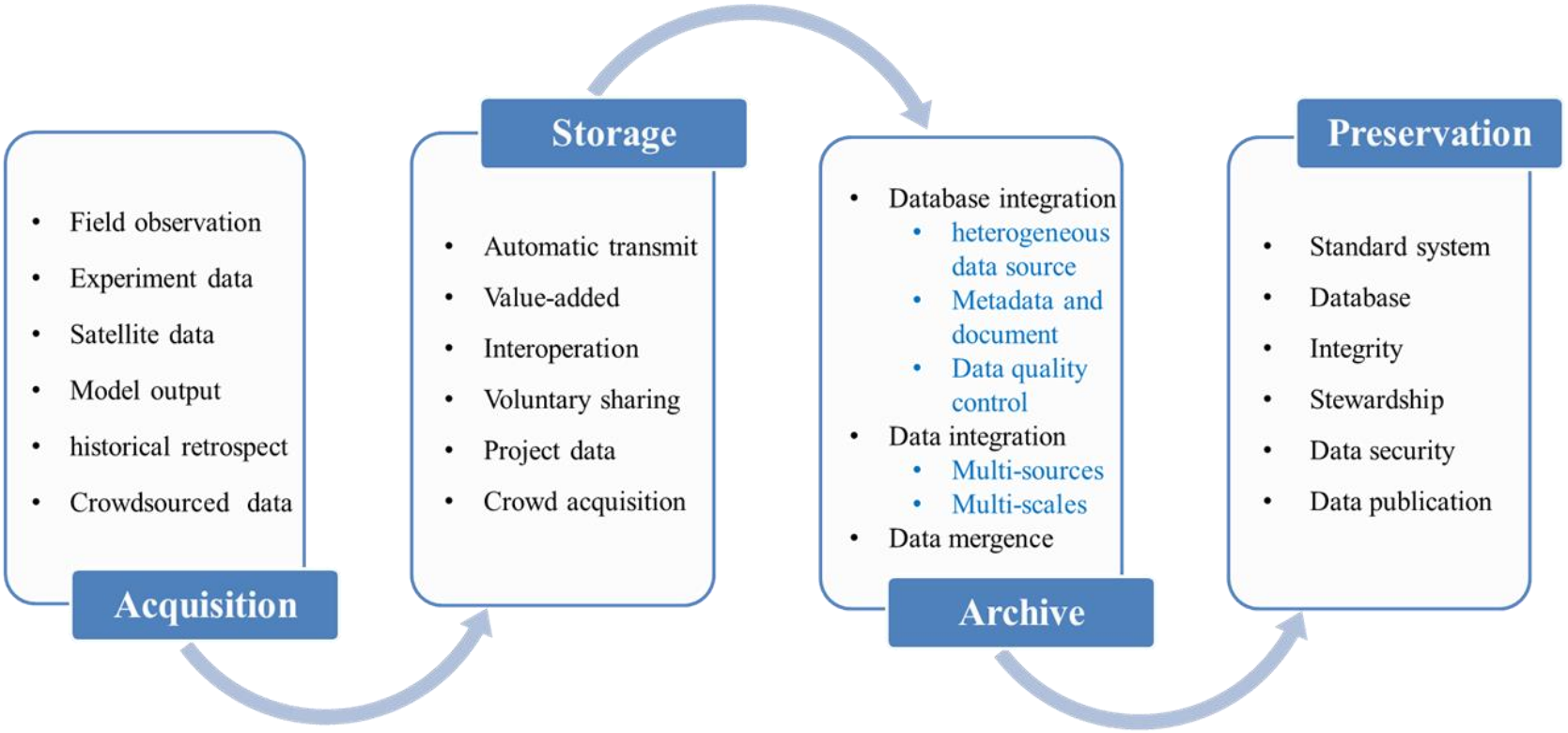


A Big Earth Data Platform for Three Poles

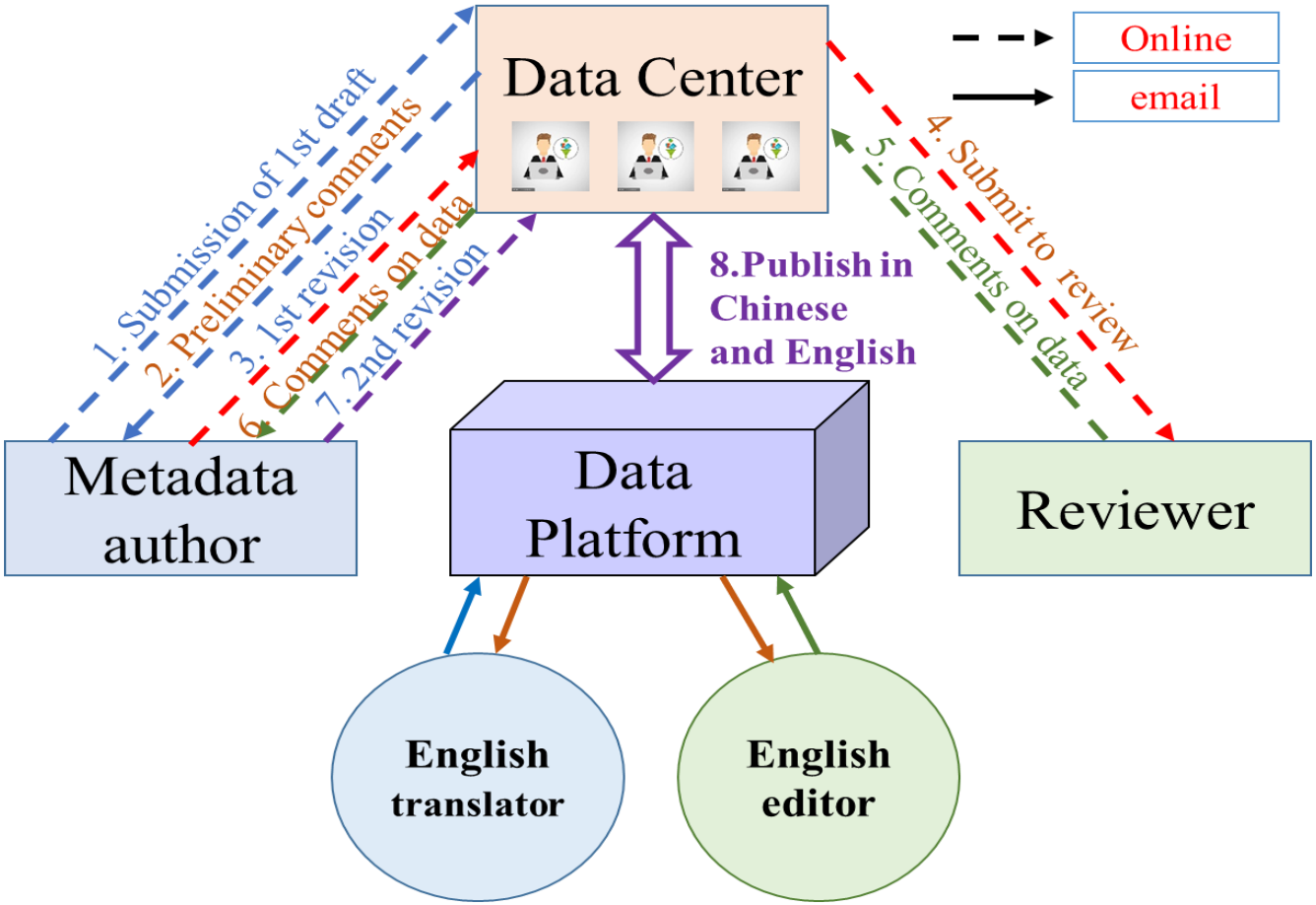
- TPE DC
- STEP
- TP National Park
- WEST DC
- Pan-TPE
- Digital HRB DC



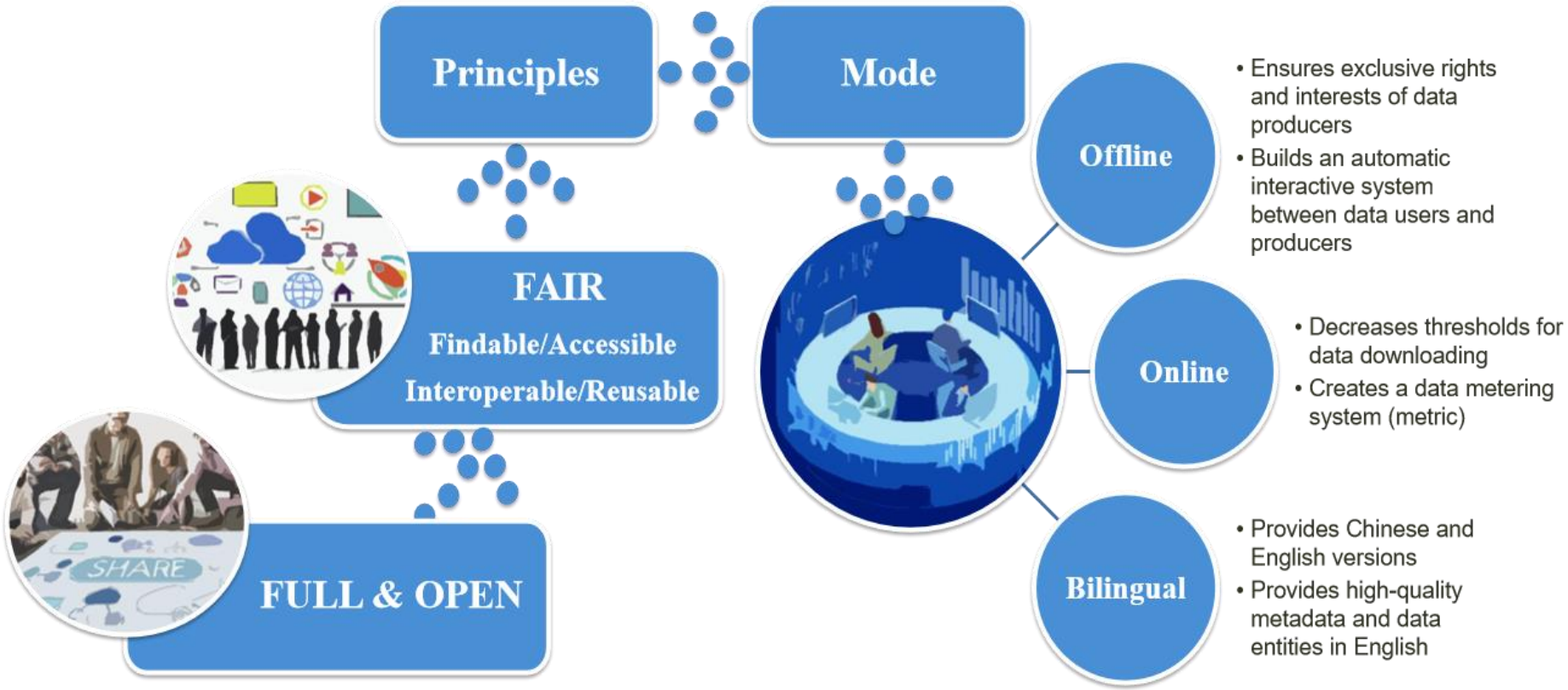
Data Integration Framework



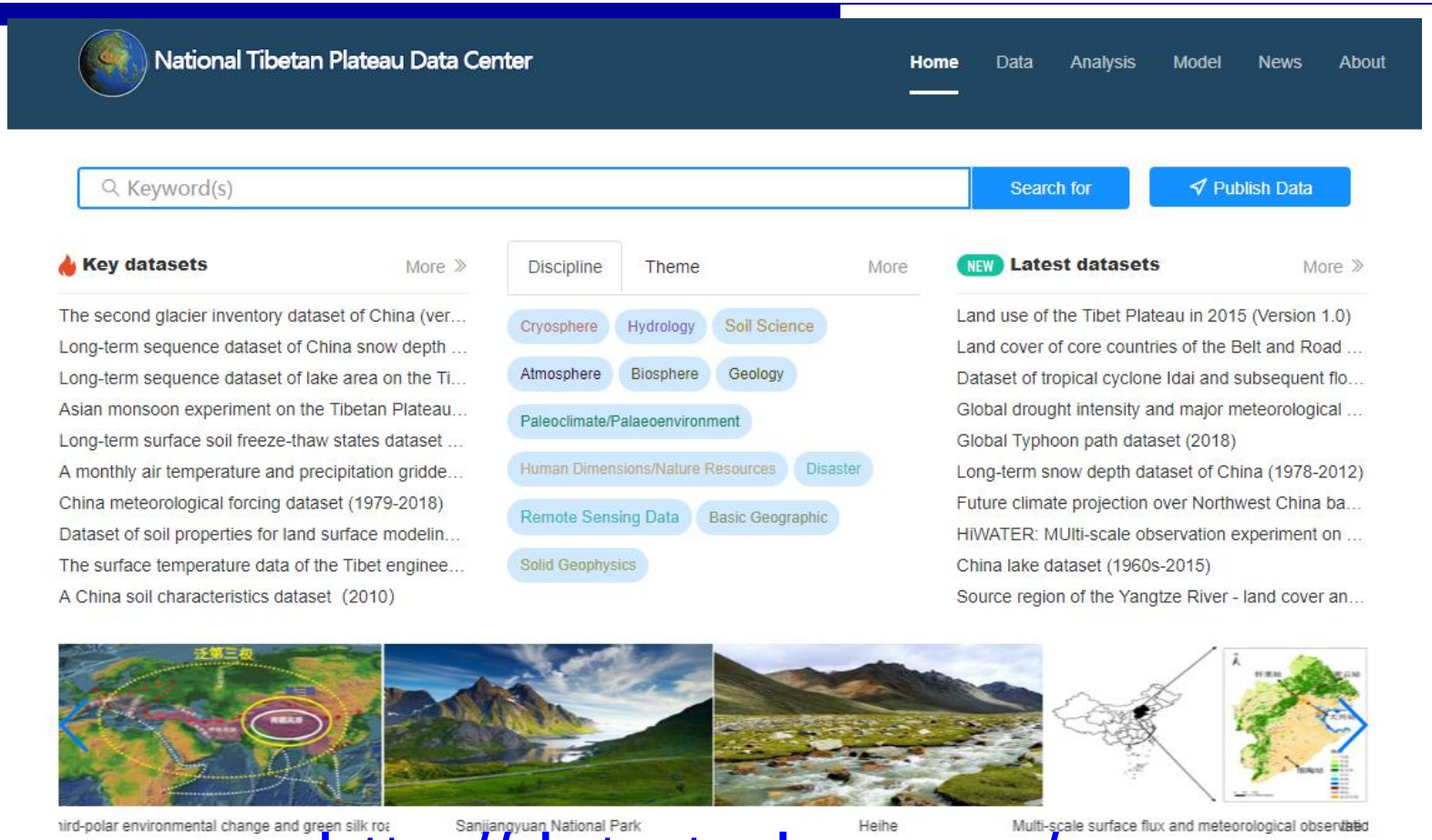
Data Review System



Data Sharing Principle and Manners



Platform of TPDC



http://data.tpdc.ac.cn/

English Chinese Submit Data Data Cart 0

Big Data System for Pan-Third Pole

Keyword(s) Search

Home Data Products Data Analysis Model Base News About

Meteorological Observation Data from the Integrated Observation and Research Station of the Alpine Environment in Southeast Tibet (2007-2016)

This data set includes daily average data of atmospheric temperature, relative humidity, precipitation, wind speed, wind direction, net radiance, and atmospheric pressure from 1 January 2007 to 31 December 2016 derived from the Integrated Observation and Research Station of the Alpine Environment in Southeast Tibet.

The data set has been used by students and researchers in the fields of meteorology, atmospheric environment and ecological research.

The units of the various meteorological elements are as follows: temperature °C; precipitation mm; relative humidity %; wind speed m/s; wind direction °; net radiance W/m2; pressure hPa; and particulate matter with aerodynamic diameter less than 2.5 μm μg/m3.

All the data are the daily averages calculated from the raw observations. Observations and data collection were carried out in strict accordance with the instrument operating specifications and the guidelines published in relevant academic journals; data with obvious errors were eliminated during processing, and null values were used to represent the missing data.

In 2015, due to issues related to the age of the observation probe at the station, only the wind speed data for the last 8 months were retained.

Keywords

Discipline: Atmosphere

Theme: Precipitation, Atmospheric Radiation, Atmospheric Temperature, Atmospheric Winds, Precipitation Amount, Humidity, Atmospheric Pressure, Atmospheric Water Vapor

Places: Southeast Tibet, Tibetan Plateau

Time: 2007-2016

Geographic Coverage

Spatial Coverage

Citation

Citations

1. Wang, Y. , Ma, Y. , Zhu, Z. , & Li, M. . (2010). Variation Characteristics of Meteorological Elements in Near Surface Layer over the Lulang Valley of Southeastern Tibetan Plateau. Plateau Meteorology, 29(1), 63-69.(View Details)

Cite the data

ZHU Liping, WANG Yongjie. Meteorological Observation Data from the Integrated Observation and Research Station of the Alpine Environment in Southeast Tibet (2007-2016). Big Data System for Pan-Third Pole, 2018. doi: 10.11888/Meteoro.tpdc.270055. (Download the reference: RIS | Bibtex)

User Limit

1. To respect the intellectual property rights, protect the rights of data authors, expand services of the data center, and evaluate the application potential of data, data users should clearly indicate the source of the data and the author of the data in the research results generated by using the data (including published papers, articles, data products, and unpublished research reports, data products and other results). For re-posting (second or multiple releases) data, the author must also indicate the source of the original data.

License: This work is licensed under a Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)

Related Resources

Related data | Service Record | Recommendations

1. HiWATER: The Multi-Scale Observation Experiment on Evapotranspiration over heterogeneous land surfaces (MUSOEXE) Dataset - flux observation matrix (an eddy covariance system of site No.7)
2. Water Level Observation Data of Selincuo Lake (2016-2017)
3. The Concentration Data Set of Persistent Organic Pollutants in the Atmosphere, Lake Water and Fish Bodies in Namco (2012-2014)
4. Meteorological Observation Data of Kunsha Glacier (2015-2017)
5. HiWATER: The Multi-Scale Observation Experiment on Evapotranspiration over heterogeneous land surfaces (MUSOEXE) Dataset - flux observation matrix (an eddy covariance system of site No.1)
6. Data on Alpine Timberlines in Southern Tibet (2005-2008)
7. The Demographic Data of Qinghai (1952-2016)
8. Basic Data on Natural Resources in the Tibetan Autonomous Region (1988-1994)
9. HiWATER: Dataset of Hydrometeorological observation network (eddy covariance system of Daman Superstation Upper)
10. Data on Workers in Primary, Secondary, and Tertiary Industries in Qinghai (1952-2016)

Detail

Resource

Format: EX

File size: 3.

View count:

Share type:

Time Range

31

Updated Tir

Conta

Data Resour

WANG Yon

Distributor:

Center for T

Contact: d

Export

Word

Comment

Please input your comment

verification code Submit

Current page automatically show English comments Show comments in all languages

Meteorological Observation Data from the Integrated Observation and Research Station of the Alpine Environment in Southeast Tibet (2007–2016)

Dataset Title

This data set includes daily average data of atmospheric temperature, relative humidity, precipitation, wind speed, wind direction, net radiance, and atmospheric pressure from 1 January 2007 to 31 December 2016 derived from the Integrated Observation and Research Station of the Alpine Environment in Southeast Tibet.

The data set has been used by students and researchers in the fields of meteorology, atmospheric environment and ecological research.

The units of the various meteorological elements are as follows: temperature °C; precipitation mm; relative humidity %; wind speed m/s; wind direction °; net radiance W/m2; pressure hPa; and particulate matter with aerodynamic diameter less than 2.5 μm μg/m3.

All the data are the daily averages calculated from the raw observations. Observations and data collection were carried out in strict accordance with the instrument operating specifications and the guidelines published in relevant academic journals; data with obvious errors were eliminated during processing, and null values were used to represent the missing data.

In 2015, due to issues related to the age of the observation probe at the station, only the wind speed data for the last 8 months were retained.

Dataset Abstract

Keywords

Discipline: Atmosphere

Theme: Precipitation, Atmospheric Radiation, Atmospheric Temperature, Atmospheric Winds, Precipitation Amount, Humidity, Atmospheric Pressure, Atmospheric Water Vapor

Places: Southeast Tibet, Tibetan Plateau

Time: 2007–2016

Citation

Related Resources

Related data | Service Record | Recommendations

1. HiWATER: The Multi–Scale Observation Experiment on Evapotranspiration over heterogeneous land surfaces (MUSOEXE) Dataset – flux observation matrix (an eddy covariance system of site No.7)
2. Water Level Observation Data of Selincuo Lake (2016–2017)
3. The Concentration Data Set of Persistent Organic Pollutants in the Atmosphere, Lake Water and Fish Bodies in Namco (2012–2014)
4. Meteorological Observation Data of Kunsha Glacier (2015–2017)
5. HiWATER: The Multi–Scale Observation Experiment on Evapotranspiration over heterogeneous land surfaces (MUSOEXE) Dataset – flux observation matrix (an eddy covariance system of site No.1)
6. Data on Alpine Timberlines in Southern Tibet (2005–2008)
7. The Demographic Data of Qinghai (1952–2016)
8. Basic Data on Natural Resources in the Tibetan Autonomous Region (1988–1994)
9. HiWATER: Dataset of Hydrometeorological observation network (eddy covariance system of Daman Superstation Upper)
10. Data on Workers in Primary, Secondary, and Tertiary Industries in Qinghai (1952–2016)

Related Resources

Detail

Resource List

Format: EXCEL

File size: 3.0 MB

View count: 103 Times

Share type: online

Time Range: 2007–01–01 To 2016–12–31

Updated Time: 2019–07–07

Immediately download

Add to Data Cart

Metrics

Contact Information

Data Resource Provider: ZHU Liping WANG Yongjie

Distributor: Observational & Big Data Center for Three Poles

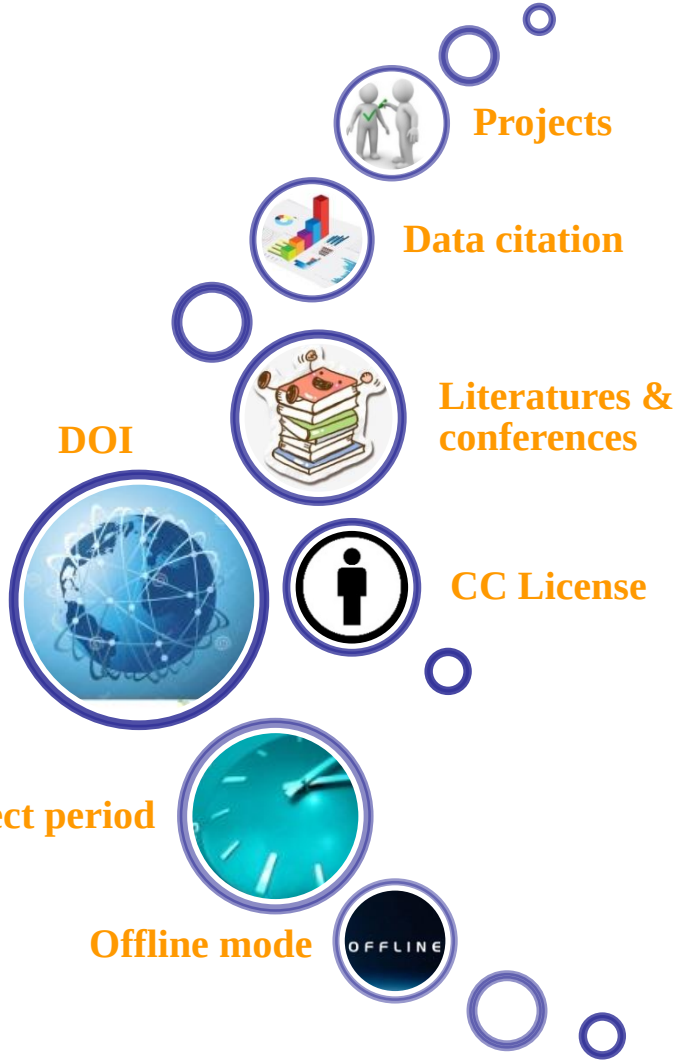
Contact: data@itpcas.ac.cn

Export metadata

Word

Data Intellectual Property Protection Measures

1. Digital object identifier
   - ✓ Assign DOI for a new dataset owned by a data provider: 10.11888/category.tpdc.metadataID
   - ✓ Continue to use the Data DOI of the original data platform
   - ✓ Do not assign DOI name for an international open dataset
2. Data redistribution license (*CC BY 4.0 License*) to be kept
3. Data Protection Period to be set for newly uploaded scientific research dataset
4. Offline sharing data to be served
5. Literatures related to data production to be cited
6. Data Reference (including Data Author, DOI, Data Platform Name, Year) to be cited



Required Data Citation

About Data Citation | View Data Cite Help

Citations

1. CHEN, Y.X., JIANG, L.M., LIANG, L.L., Zhou, Z.W., (2019). Monitoring permafrost deformation in the upper Heihe basin by use of multi-temporal Sentinel-1 InSAR images, Chinese Journal of Geophysics(in Chinese), 63(7), doi: 10.6038/cjg2019M0255(View Details)

1. Articles Reference

Cite the data

JIANG Liming. Thickness data of active layer in the Yeniugou of the Heihe River Basin over Tibetan Plateau (2014-2018). National Tibetan Plateau Data Center, 2019. doi: 10.6038/cjg2019M0255. (Download the reference: RIS | Bibtex)

2. DOI & Reference

Using this data, you must reference article references listed in the Required Data Citation and reference data

Support Program

CASEarth:Big Earth Data for Three Poles (grant No. XDA19070000)

Pan-Third Pole Environment Study for a Green Silk Road-A CAS Strategic Priority A Program

User Limit

To respect the intellectual property rights, protect the rights of data authors,expand servglacials of the data center, and evaluate the application potential of data, data users should clearly indicate the source of the data and the author of the data in the research results generated by using the data (including published papers, articles, data products, and unpublished research reports, data products and other results). For re-posting (second or multiple releases) data, the author must also indicate the source of the original data.

Example of acknowledgement statement is included below: The data set is provided by National Tibetan Plateau Data Center (http://data.tpdc.ac.cn).

License: This work is licensed under an Attribution 4.0 International (CC BY 4.0)

3. CC License

Detail

File List

Temporal resolution: 1 year < x < 10 year

Spatial resolution: m

File size: 6.0 MB

Browse count: 149 Times

Download count: 0 Times

Share mode: protected

Temporal coverage: 2014-11-19 To 2018-12-31

Updated time: 2019-06-09

This data is available for online shared at the end of the protection period

4-5. Protection Period

After the data protection period,

Most datasets are online shared,

A few are offline shared.

Contact Information

: JIANG Liming

Distributor: National Tibetan Plateau Data Center

Email: data@itpcas.ac.cn

6. Provider Identification

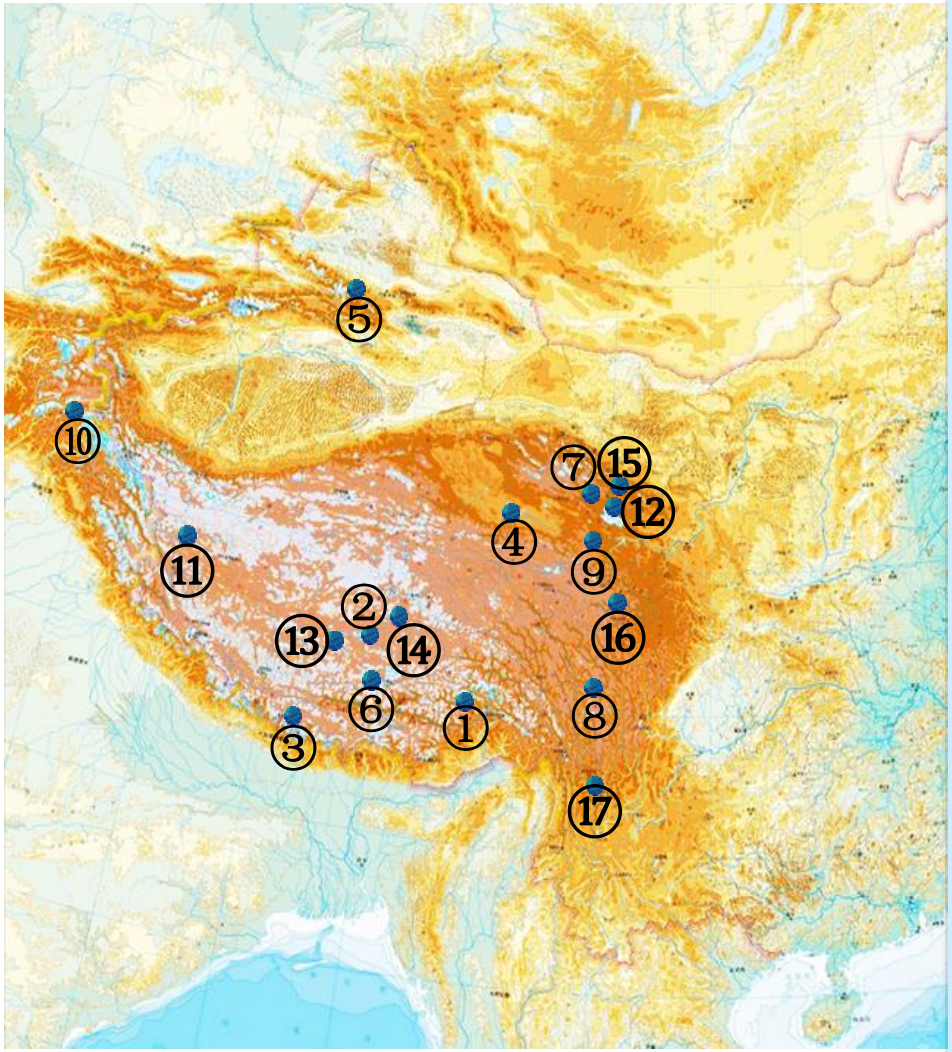
Export metadata

W XML

3. Featured datasets for the Third Pole research

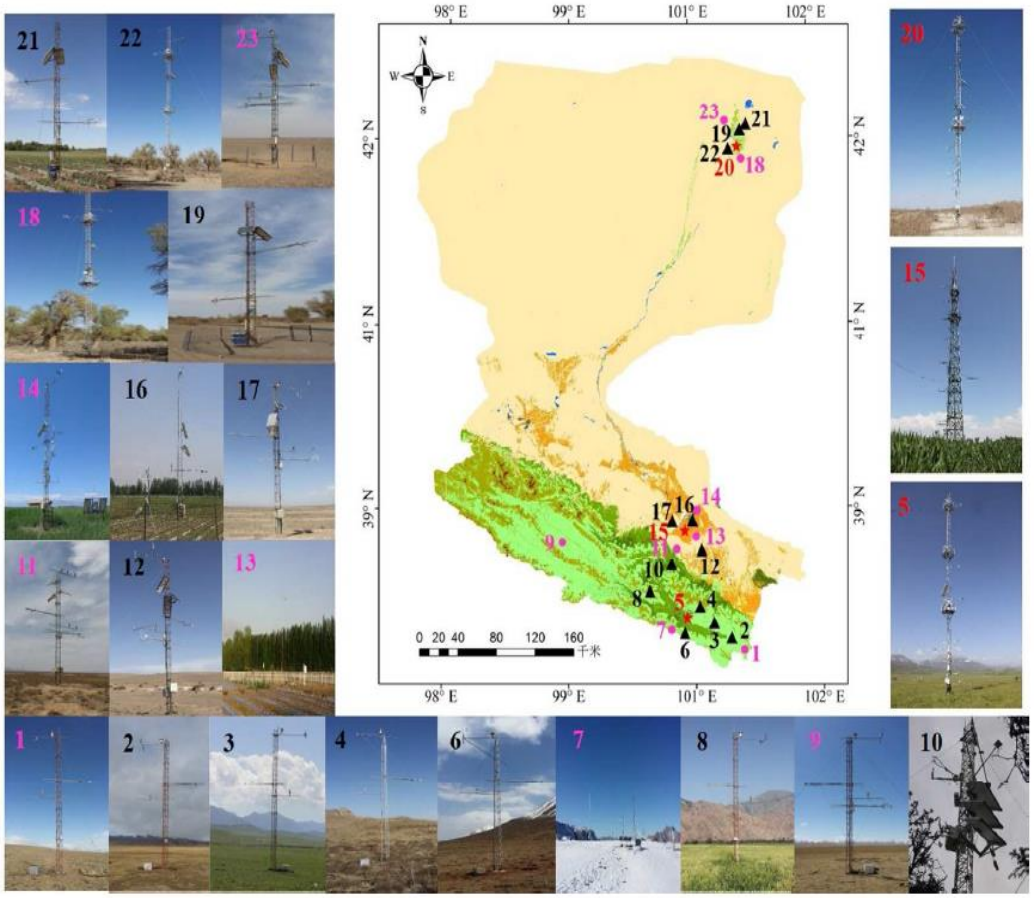
3.1 Calibration and Verification Datasets

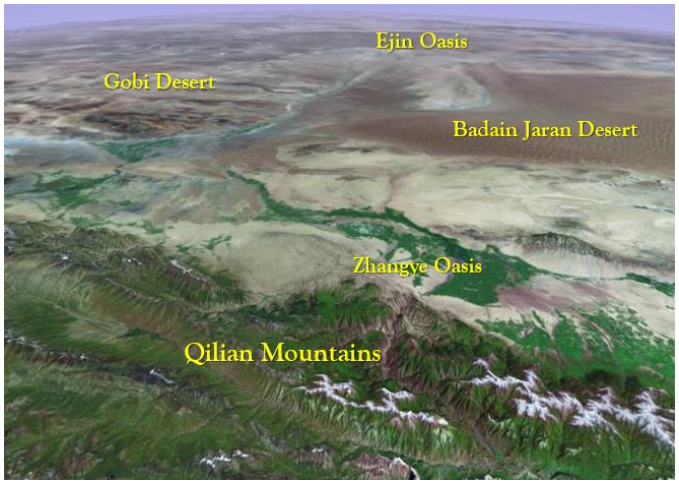
High-cold region Observation and Research Network

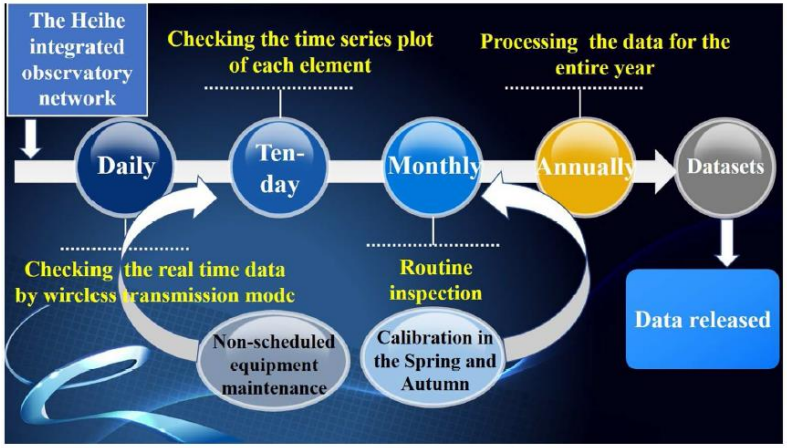


- **1. Southeastern TP station** (Southeast Tibet Observation and Research Station for the Alpine Environment)
- **2. Namco station** (Nam Co Monitoring and Research Station for Multisphere Interactions)
- **3. Qomolangma station** (Qomolangma Atmospheric and Environmental Observation and Research Station)
- **4.Golmud station** (Cryosphere Research Station on Qinghai-Xizang Plateau)
- **5. Tienshan station** (Tianshan Glaciological Station)
- **6. Lahsa station** (Lhasa Plateau Ecosystem Research Station)
- **7. Haibei station** (Haibei National Field Research Station of Alpine Grassland Ecosystem)
- **8. Gongga station** (Alpine Ecosystem Observation and Experiment Station of Mt. Gongga)
- **9. Three rivers sources station** (Three rivers sources Ecosystem Observation and Research Station)
- **10. Muztagh Ata station** (Muztagh Ata Westerly Observation and Research Station)
- **11. Ngari station** (Ngari Desert Observation and Research Station)
- **12. Qinghai lake station** (Qinghai Lake National Nature Reserve Base Station)
- **13. Shenzha station** (Shenzha Alpine Grassland and Wetland Ecosystem Station)
- **14. Nagqu station** (Nagqu Station of Plateau Climate and Environment)
- **15. Qilianshan station** (Qilian Shan Station of Glaciology and Ecologic Environment)
- **16. Norgay station** (Norgay Plateau Wetlands Ecosystem Research Station)
- **17. Mt. Yulong station** (Yulong Snow Mountain Glaciers and Environmental Observation Station)

Heihe Watershed Allied Telemetry Experimental Research (HiWATER), > 500





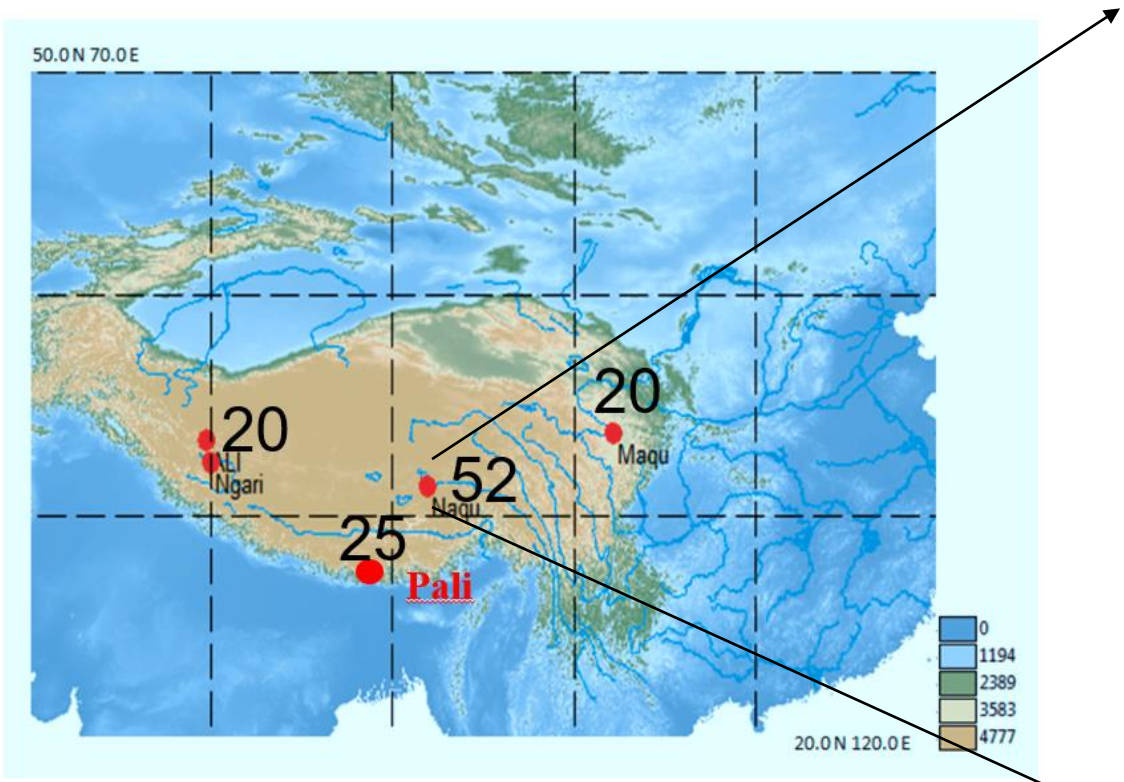


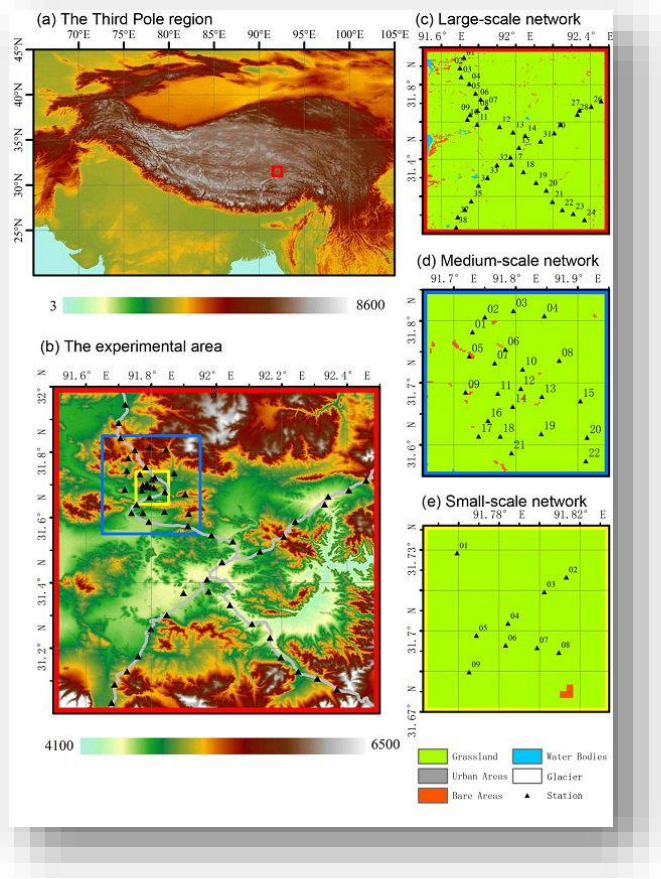
Li et al., 2013, BAMS; Liu et al., 2018, VZJ

Soil moisture and temperature networks in Tibetan Plateau

Maqu and Ngari by U-Twente; Naqu and Pali by ITPCAS

doi: 10.11888/Soil.tpdc.270110

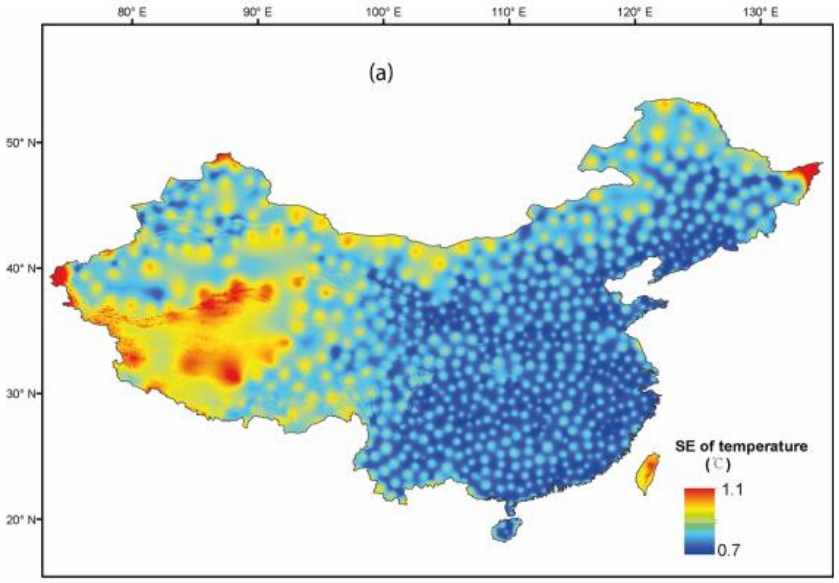


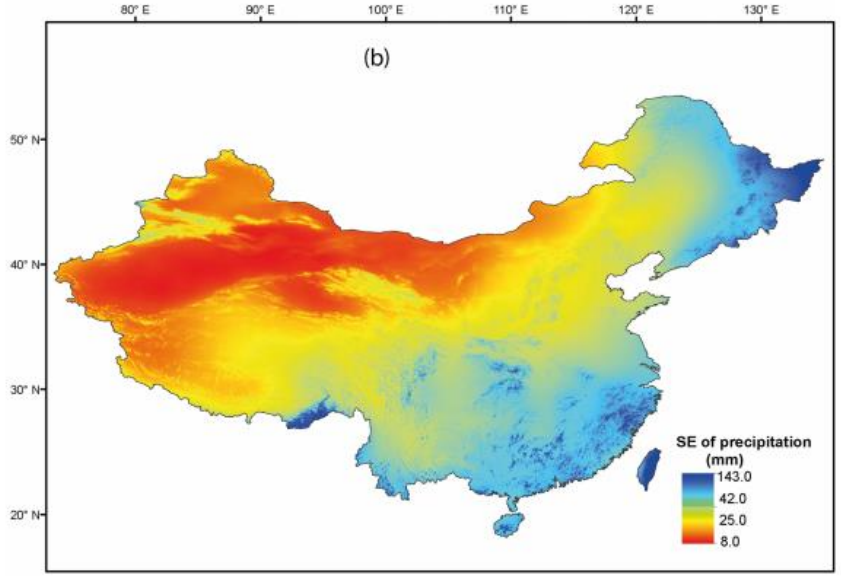


Su et al., 2011 HESS; Yang et al., 2013 BAMS; Chen et al., 2017 JGR

A monthly air temperature and precipitation gridded dataset on 0.025° spatial resolution in China during（1951-2011）

doi: https://doi.org/10.1594/PANGAEA.895742





Monthly temperature at 1153 stations and precipitation at 1202 stations in China and neighboring countries are used to construct a monthly climate dataset in China with a 0.025° resolution (~2.5 km).

Zhao et al., 2019, Theor. Appl. Climatol.

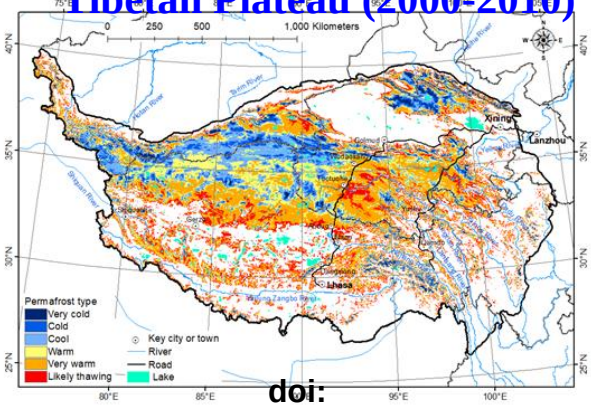
3.2 Cryospheric datasets over TP

The Second Glacier Inventory

doi:10.3972/glacier.001.2013.db

Guo et al., 2015, Journal of Glaciology.

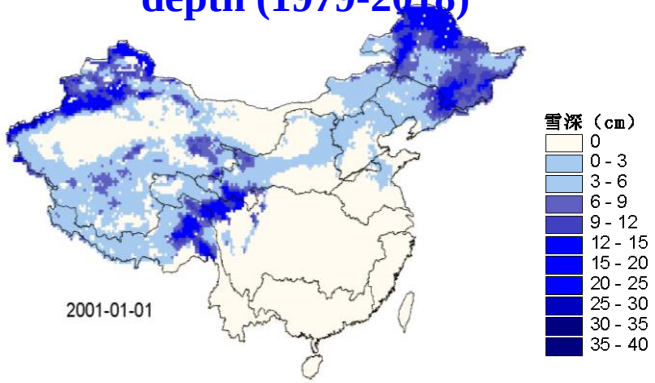
A permafrost thermal type map on the Tibetan Plateau (2000-2010)



doi:
10.11888/GlaciolGeocryol.tpe.0000017.file

Ran et al., 2018, The Cryosphere.

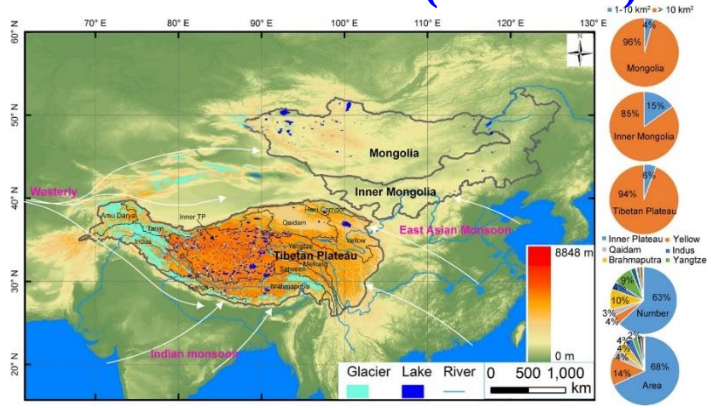
Long-term sequence dataset of snow depth (1979-2018)



doi: 10.3972/westdc.001.2015.db

Che et al., 2008, Annals of Glaciology; Dai et al., 2012, RSE; Dai et al., 2015, RS.

Long-term sequence dataset of lake area on the Tibetan Plateau (1970-2013)

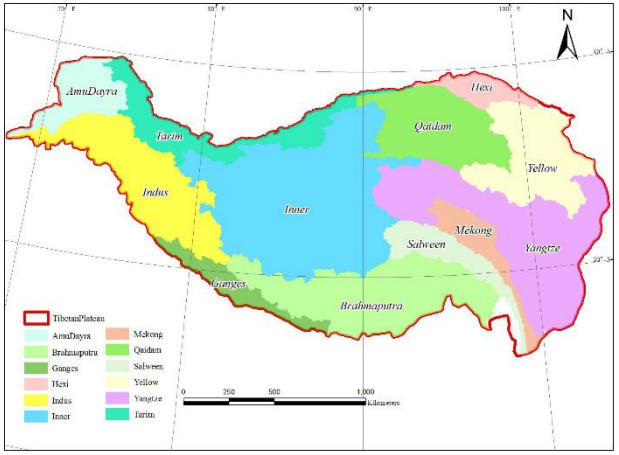


doi: 10.11888/Lake.tpe.249466.file

Zhang et al., 2016, GRL.

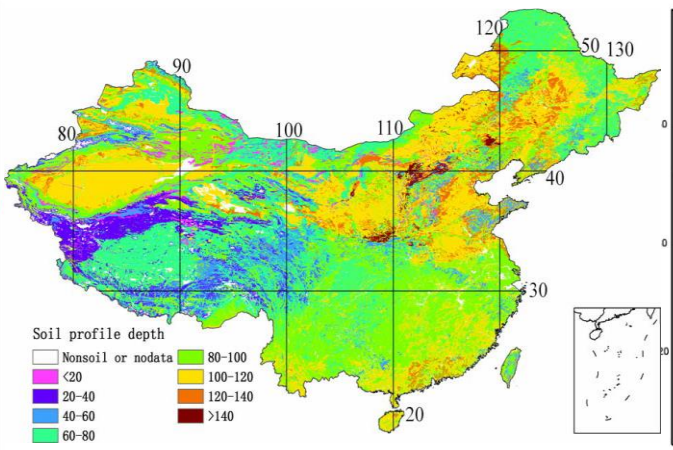
3.3 General geographic datasets over TP

River basins map over the TP（2016）



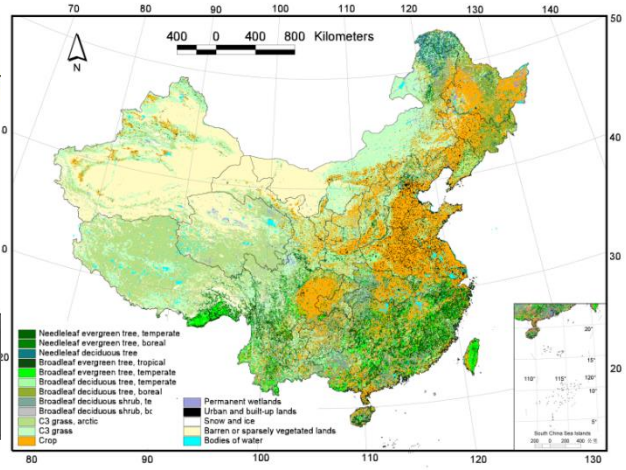
Zhang et al., 2013, GRL.
Doi:10.11888/BaseGeography.tpe.249465.file

Soil properties for land surface modeling over China (1 km)



Shangguan et al., 2013, J ADV MODEL EARTH SY
Doi:10.11888/Soil.tpdc.270281

Plant functional types map in China (1 km)



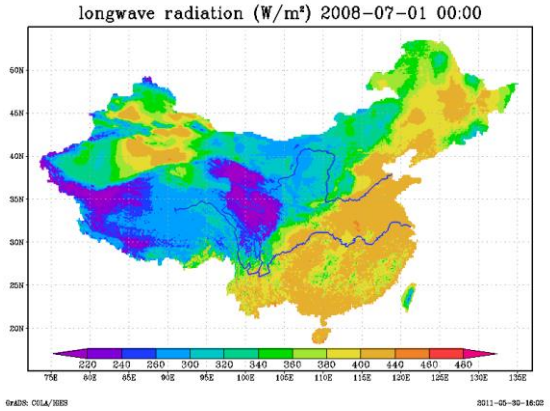
Ran et al., 2016, RSTA
Doi:10.11888/Ecolo.tpdc.270101

3.4 Near-surface atmospheric forcing datasets

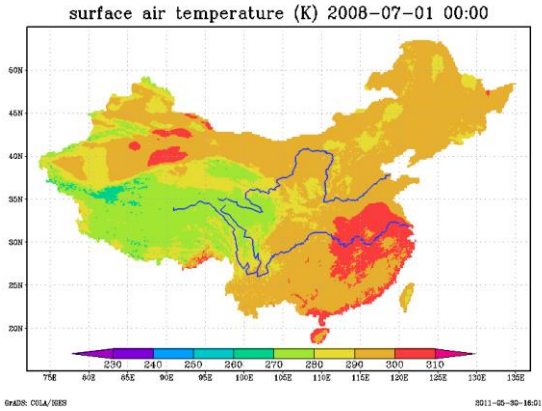
China Meteorological Forcing Dataset (1979-2018)

doi: 10.3972/westdc.002.2014.db

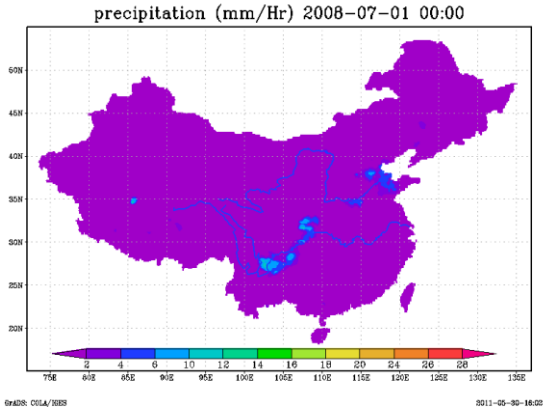
Downward shortwave



2m temperature



Precipitation



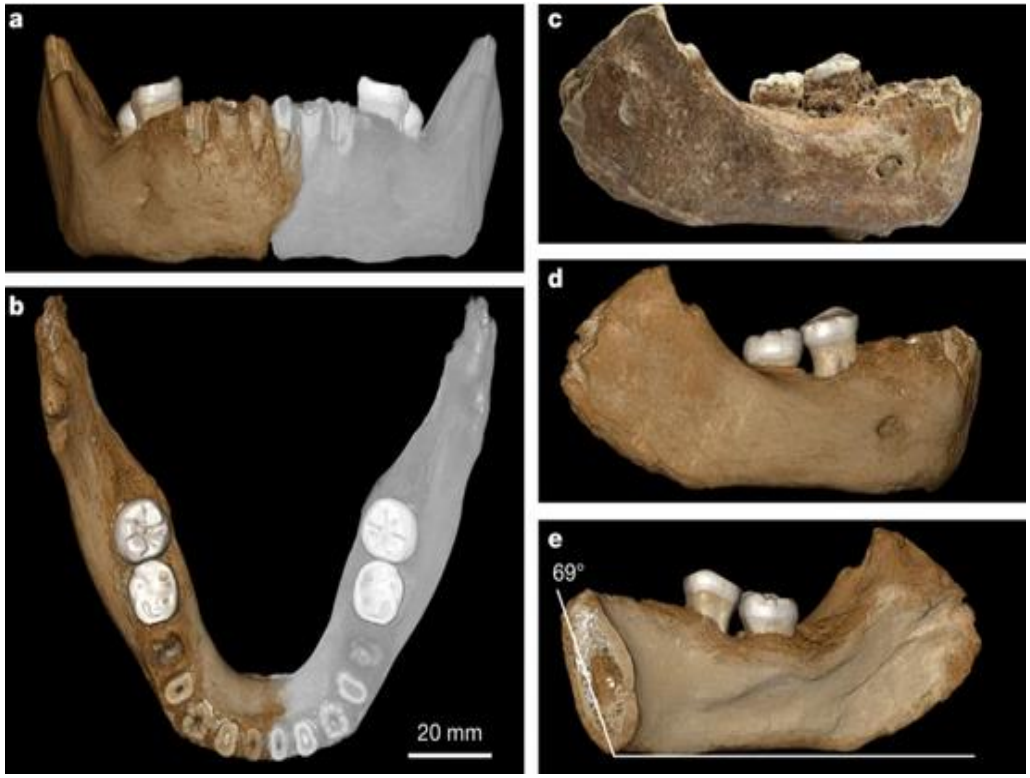
ITPCAS forcing data (0.1 degree, 3 hour) **July**

This data set is developed base on internationally available Princeton reanalysis data, GLDAS data, GEWEX-SRB radiation data, and TRMM precipitation data, and it is made by integrating the conventional meteorological observation data of the China Meteorological Administration. Chen et al., 2011, JGR.

3.5 Scientific discovery datasets over TP

A late Middle Pleistocene Denisovan mandible from the Tibetan Plateau, NATURE

doi: 10.11888/Paleoenv.tpdc.270296



Chen et al., 2019, NATURE *A late Middle Pleistocene Denisovan mandible from the Tibetan Plateau*

nature

Letter | Published: 01 May 2019

A late Middle Pleistocene Denisovan mandible from the Tibetan Plateau

Fahu Chen ✉, Frido Welker, Chuan-Chou Shen, Shara E. Bailey, Inga Bergmann, Simon Davis, Huan Xia, Hui Wang, Roman Fischer, Sarah E. Freidline, Tsai-Luen Yu, Matthew M. Skinner, Stefanie Stelzer, Guangrong Dong, Qiaomei Fu, Guanghui Dong, Jian Wang, Dongju Zhang ✉ & Jean-Jacques Hublin ✉

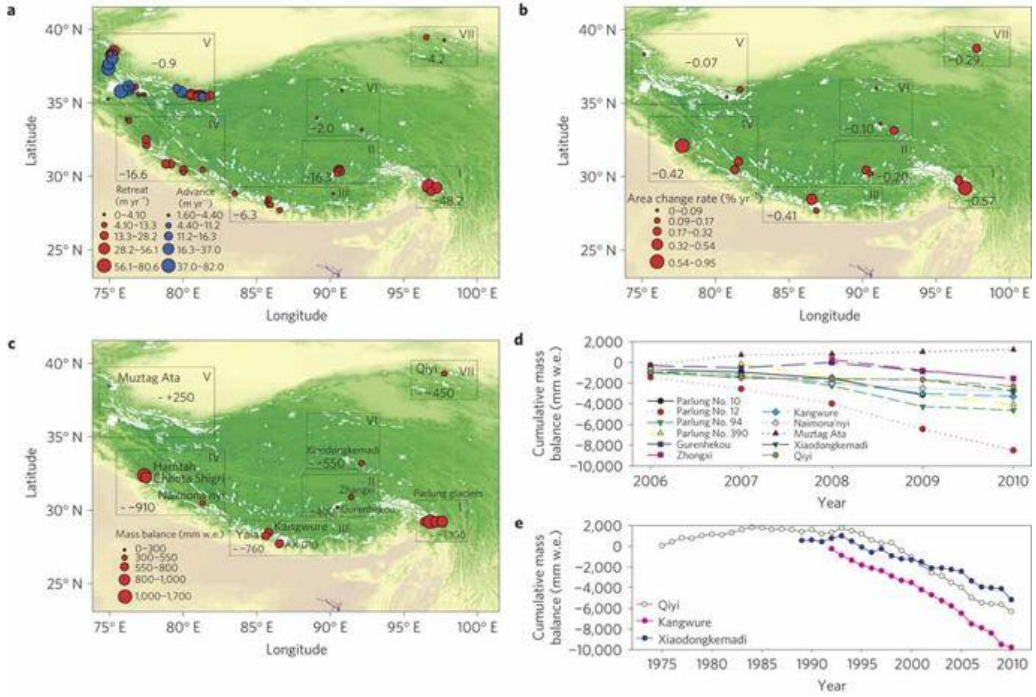
Nature **569**, 409–412(2019) | Cite this article

Abstract

Denisovans are members of a hominin group who are currently only known directly from fragmentary fossils, the genomes of which have been studied from a single site,

Different glacier status with atmospheric circulations in Tibetan Plateau and surroundings, NCC

doi: 10.11888/Glacio.tpdc.270100



Yao et al., 2012, NCC ***Different glacier status with atmospheric circulations in Tibetan Plateau and surroundings***

nature climate change

Letter | Published: 15 July 2012

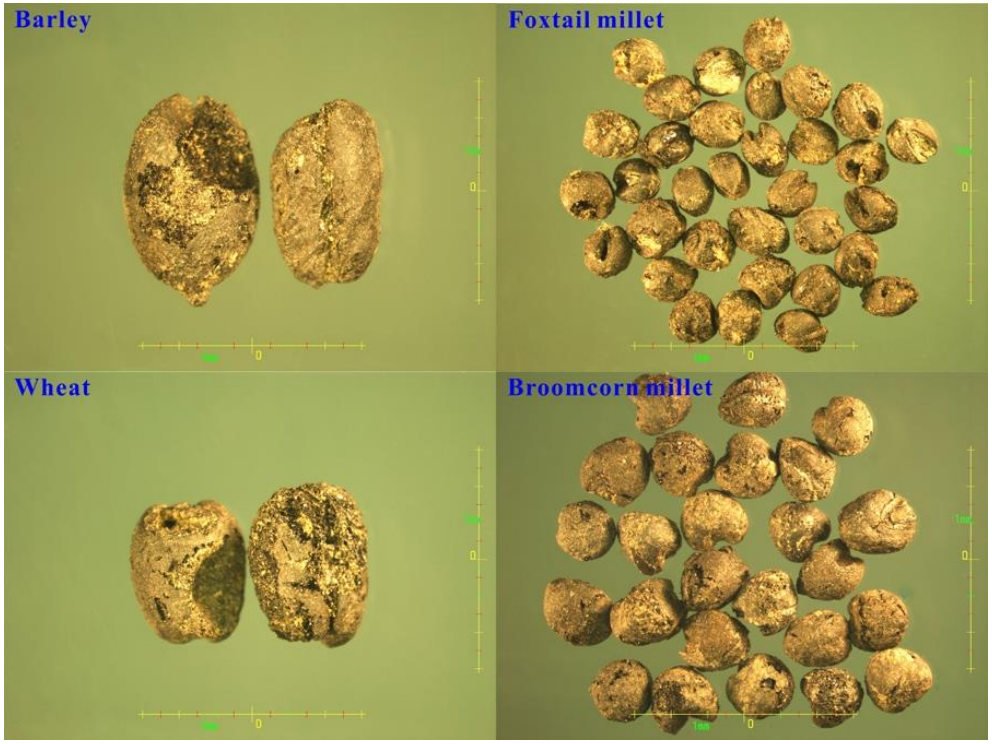
Different glacier status with atmospheric circulations in Tibetan Plateau and surroundings

Tandong Yao, Lonnie Thompson, Wei Yang, Wusheng Yu, Yang Gao, Xuejun Guo, Xiaoxin Yang, Keqin Duan, Huabiao Zhao, Baiqing Xu, Jiancheng Pu, Anxin Lu, Yang Xiang, Dambaru B. Kattel & Daniel Joswiak

Nature Climate Change **2**, 663–667 (2012) | Download Citation

Facilitated Permanent Human Occupation of the Tibetan Plateau after 3,600 BP, SCIENCE

doi: 10.11888/Paleoenv.tpdc.270105



Chen, F. , et al., 2015, SCIENCE *Agriculture facilitated permanent human occupation of the Tibetan Plateau after 3600 BP*

AAAS
Science Contents News Careers Journals

SHARE REPORT

Agriculture facilitated permanent human occupation of the Tibetan Plateau after 3600 B.P.

F. H. Chen[1,*], G. H. Dong[1,*], D. J. Zhang[1], X. Y. Liu[7], X. Jia[1], C. B. An[1], M. M. Ma[1], Y. ...
+ See all authors and affiliations

Science 16 Jan 2015:
Vol. 347, Issue 6219, pp. 248-250
DOI: 10.1126/science.1259172

Article Figures & Data Info & Metrics eLetters PDF

Colonizing the roof of the world

Humans only settled permanently on the Tibetan plateau about 3600 years ago. Chen *et al.* examined archaeological crop remains unearthed in northeastern Tibet, which elucidate the timing of agricultural settlement. Although much earlier traces of humans in Tibet have been dated to 20,000 years ago, year-round presence at the highest altitudes appears to have been impossible until the advent of suitable crops, such as barley. Surprisingly, these prehistoric farming communities expanded onto the plateau at the same time as climate was cooling.

Science, this issue p. **248**

4 Data Publishing & Data Repository

nature > scientific data > data descriptors > article

SCIENTIFIC DATA

Data Descriptor | Open Access | Published: 27 June 2017

A multiscale dataset for understanding complex eco-hydrological processes in heterogeneous oasis system

Xin Li, Shaomin Liu, Qin Xiao, Mingguo Ma, Rui Jin, Tao Che, Weizhen Wang, Hu, Ziwei Xu, Jianguang Wen & Liangxu Wang

Scientific Data **4**, Article number: 170083 (2017) | Cite this article

720 Accesses | **40** Citations | **4** Altmetric | Metrics

Abstract

We introduce a multiscale dataset obtained from Heihe Watershed Allied Telemetry Experimental Research (HiWATER) in an oasis-de area in 2012. Upscaling of eco-hydrological processes on a heterogeneous surface is a grand challenge. Progress in this field is hindered by the poor availability of multiscale observations. HiWATER is an experiment designed to address this challenge through

Earth Syst. Sci. Data, 11, 1337–1347, 2019
https://doi.org/10.5194/essd-11-1337-2019
© Author(s) 2019. This work is distributed under the Creative Commons Attribution 4.0 License.

Open Access Earth System Science Data

Integrated hydrometeorological – snow – frozen ground observations in the alpine region of the Heihe River Basin, China

Tao Che[1,2], Xin Li[2,3], Shaomin Liu[4], Hongyi Li[1], Ziwei Xu[4], Junlei Tan[1], Yang Zhang, Zhiguo Ren[1], Lin Xiao[1], Jie Deng[1,5], Rui Jin[1,2], Mingguo Ma[5], Jian Wang[1], and Xiaohu Yang[4]

[1] Heihe Remote Sensing Experimental Research Station, Key Laboratory of Remote Sensing of Province, Northwest Institute of Eco-Environment and Resources, Chinese Academy of Scien Lanzhou 730000, China

[2] Center for Excellence in Tibetan Plateau Earth Sciences, Chinese Academy of Sciences, Bei 100101, China

[3] Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing 100101, Chi

[4] State Key Laboratory of Earth Surface Processes and Resource Ecology, Faculty of Geograph Science, Beijing Normal University, Beijing 100875, China

[5] Chongqing Engineering Research Center for Remote Sensing Big Data Application, School Geographical Sciences, Southwest University, Chongqing 400715, China

[6] Jiangsu Center for Collaborative Innovation in Geographical Information Resource Development and Application, Nanjing 21003, China

Correspondenc: Xin Li (xinli@itpcas.ac.cn)

The effects of surface heterogeneity scale on the flux imbalance under free convection

Stats | Comments | Citations | References (109) | Related research (10+)

AGU100

JGR Atmospheres

RESEARCH ARTICLE
10.1029/2018JD029550

The Effects of Surface Heterogeneity Scale on the Fl Imbalance under Free Convection

Yanzhao Zhou[1,2,3], Dan Li[4], and Xin Li[2,3]

[1]National Tibetan Plateau Data Center, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, China, [2]Key Laboratory of Remote Sensing of Gansu Province, Northwest Institute of Eco-Environment and Chinese Academy of Sciences, Lanzhou, China, [3]University of Chinese Academy of Sciences, Beijing, China, [4] of Earth and Environment, Boston University, Boston, MA, USA, [5]CAS Center for Excellence in Tibetan Pla Sciences, Chinese Academy of Sciences, Beijing, China

Key Points:
- The relation between flux imbalance and surface heterogeneity scale is investigated using large-eddy simulations and a conpectral model
- A diagnostic equation for flux imbalance is proposed
- The qualitative relations between flux imbalance and various factors reported in the literature can be explained by this equation

Correspondence to:
D. Li, and X. Li,
lidan@bu.edu
xinli@itpcas.ac.cn

Citation:
Zhou, Y., Li, D., & Li, X. (2019). The effects of surface heterogeneity scale on the flux imbalance under free convection. *Journal of Geophysical Research: Atmospheres, 124*, 8424–8448. https://doi.org/10.1029/2018JD029550

Received 25 AUG 2018
Accepted 1 JUL 2019
Accepted article online 12 JUL 2019
Published online 2 AUG 2019

Abstract It is well known that the available energy (i.e., the net radiation minus the ground h often 10–30% larger than the sum of turbulent fluxes measured by the eddy-covariance method. field observations and previous large-eddy simulation studies have shown that surface heterogen induce flux imbalance, the relationship between the flux imbalance magnitude and the surface heterogeneity scale remains to be investigated in more detail. Here we examine the flux imbala landscapes characterized by different surface heterogeneity scales in a dry freely convective boun We reveal that the flux imbalance initially increases with increasing surface heterogeneity scale when the surface heterogeneity scale becomes larger than the boundary layer height, the surfac behave locally homogeneous, which leads to a lower flux imbalance. Based on large-eddy simulation results, we propose a conceptual model to explain how the domain average flux imbalance is influenced by surface heterogeneity. The flux imbalance is found to be controlled by the ratio of the boundary layer height to the Obukhov length ($-z_i/L$), the integral length scale of vertical velocity (I_w), the mean horizontal speed (U), and the time averaging interval (T). Among these four variables, I_w determines the size of turbulent coherent structures (i.e., large eddies), whereas $-z_i/L$ affects the form of these large eddies. Meanwhile, the U and T determine how many these large eddies can be sampled by the eddy covariance. This finding indicates that it may be possible to diagnose the flux imbalance using these four variables under convective conditions.

ESSD

Article | Assets | Peer review | Metrics | Related articles

ESSD | Articles | Volume 11, issue 4

Earth Syst. Sci. Data, 11, 1905–1915, 2019
https://doi.org/10.5194/essd-11-1905-2019
© Author(s) 2019. This work is distributed under the Creative Commons Attribution 4.0 License.

Data description paper | 11 Dec 2019

A 16-year dataset (2000–2015) of high-resolution (3 h, 10 km) global surface solar radiation

Wenjun Tang[1,2], Kun Yang[3,2], Jun Qin[1], Xin Li[1,2], and Xiaolei Niu[1]

[1]National Tibetan Plateau Data Center, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing 100101, China

[2]CAS Center for Excellence in Tibetan Plateau Earth Sciences, Chinese Academy of Sciences, Beijing 100101, China

[3]Ministry of Education Key Laboratory for Earth System Modeling, Department of Earth System Science, Tsinghua University, Beijing 100084, China

Correspondence: Wenjun Tang (tangwj@itpcas.ac.cn)

Received: 08 Jul 2019 – Discussion started: 18 Jul 2019 – Revised: 13 Nov 2019 –

nature > scientific data > data descriptors > article

SCIENTIFIC DATA

Data Descriptor | Open Access | Published: 27 June 2017

A multiscale dataset for understanding complex eco-hydrological processes in a heterogeneous oasis system

Xin Li, Shaomin Liu, Qin Xiao, Mingguo Ma, Rui Jin, Tao Che, Weizhen Wang, Xiaoli Hu, Ziwei Xu, Jianguang Wen & Liangxu Wang

Scientific Data **4**, Article number: 170083 (2017) | Cite this article

Abstract

We introduce a multiscale dataset obtained from Heihe Watershed Allied Telemetry Experimental Research (HiWATER) in an oasis-desert area in 2012. Upscaling of eco-hydrological processes on a heterogeneous surface is a grand challenge. Progress in this field is hindered by the poor availability of multiscale observations. HiWATER is an experiment designed to address this challenge through

This article introduced more than 120 observational datasets on eco-hydrological network in oasis, has been cited 43 times, is marked as ESI.

English | 中文 注册 登录

国家青藏高原科学数据中心
National Tibetan Plateau Data Center

请输入搜索内容 搜索

首页 数据产品 大数据分析 模型库 新闻 关于我们

黑河生态水文遥感试验：黑河流域中游植被类型和种植结构调查观测数据集（2012年6月-8月）

HiWATER: Dataset of vegetation type and plant structure investigation in the middle of Heihe River Basin form Jun to Aug, 2012

黑河生态水文遥感试验：黑河流域中游叶绿素观测数据集（2012年5月-7月）

HiWATER: Dataset of chlorophyll observed in the middle of Heihe River Basin from May to Jul, 2012

黑河生态水文遥感试验：黑河流域中游LAI2000测量LAI数据集

HiWATER: Dataset of vegetation LAI measured by LAI2000 in the middle reaches of the Heihe River Basin

黑河生态水文遥感试验：黑河流域中游生物量观测数据集

HiWATER: Dataset of biomass observed in the middle reaches of the Heihe River Basin

黑河生态水文遥感试验：黑河流域中游地物光谱数据集

HiWATER: Dataset of the spectral reflectance in the middle of Heihe River Basin

黑河生态水文遥感试验：黑河流域中游比辐射率数据集

HiWATER: Dataset of emissivity in the middle reaches of the Heihe River Basin in 2012

黑河生态水文遥感试验：黑河流域中游BRDF观测数据集

HiWATER: Dataset of BRDF observations in the midstream of the Heihe River Basin

黑河生态水文遥感试验：黑河流域中游土壤呼吸观测数据集

HiWATER: Dataset of soil respiration observed in the middle reaches of the Heihe River Basin

黑河生态水文遥感试验：黑河流域中游通量观测矩阵核心试验区CCD参考影像

HiWATER: CCD reference image in core experimental area of flux observation matrix in the midstream of the Heihe River Basin

本数据包含HiWATER中游试验前本底参考影像和试验中期参考影像。
试验前本底参考影像由天下图利用无人机携带的CCD相机拍摄，成像时间为2011年11月8日，并完成了镶嵌生成数字镶嵌图。主要用于中游通量观测矩阵核心试验区观测系统布设方案设计。
数据原始分辨率为0.3m，镶嵌后的影像为0.5m。
试验中期参考影像由航空飞行提供CASI数据制作，成像时间为2012年6月29日。该数据主要支持中游通量观测矩阵核心试验区其他数据分析和中游种植结构分类。
数据原始分辨率为0.3m，镶嵌后的影像为0.5m。
数据格式：
GeoTIFF
地图投影：
2000国家大地坐标系

查看大图

本数据要求的引用方式

数据引用必读 查看数据引用帮助

文章的引用

1. Li, X., Liu, S.M., Xiao, Q., Ma, M.G., Jin, R., Che, T., Wang, W.Z., Hu, X.L., Xu, Z.W., Wen, J.G., & Wang, L.X. (2017). A multiscale dataset for understanding complex eco-hydrological processes in a heterogeneous oasis system. Scientific Data, 4, 170083. doi:10.1038/sdata.2017.83.(查看 | 下载 | Bibtex格式)

数据的引用

黑河生态水文遥感试验：黑河流域中游通量观测矩阵核心试验区CCD参考影像. 国家青藏高原科学数据中心, 2017. doi: 10.3972/hiwater.045.2013.db.

[HiWATER: CCD reference image in core experimental area of flux observation matrix in the midstream of the Heihe River Basin. National Tibetan Plateau Data Center, 2017. doi: 10.3972/hiwater.045.2013.db.] (下载引用： RIS格式 | RIS英文格式 | Bibtex格式 | Bibtex英文格式)

Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2019-11
Manuscript under review for journal Earth Syst. Sci. Data
Discussion started: 25 February 2019

Open Access Earth System Science Data Discussions

Integrated hydrometeorological – snow – frozen ground observations in the alpine region of the Heihe River Basin, China

Tao Che[1,2,3], Xin Li[2,3], Shaomin Liu[4], Hongyi Li[1], Ziwei Xu[4], Junlei Tan[1], Yang Zhang[1], Zhiguo Ren[1], Lin Xiao[1], Jie Deng[1,6], Rui Jin[1], Mingguo Ma[5], Jian Wang[1], Xiaofan Yang[4]

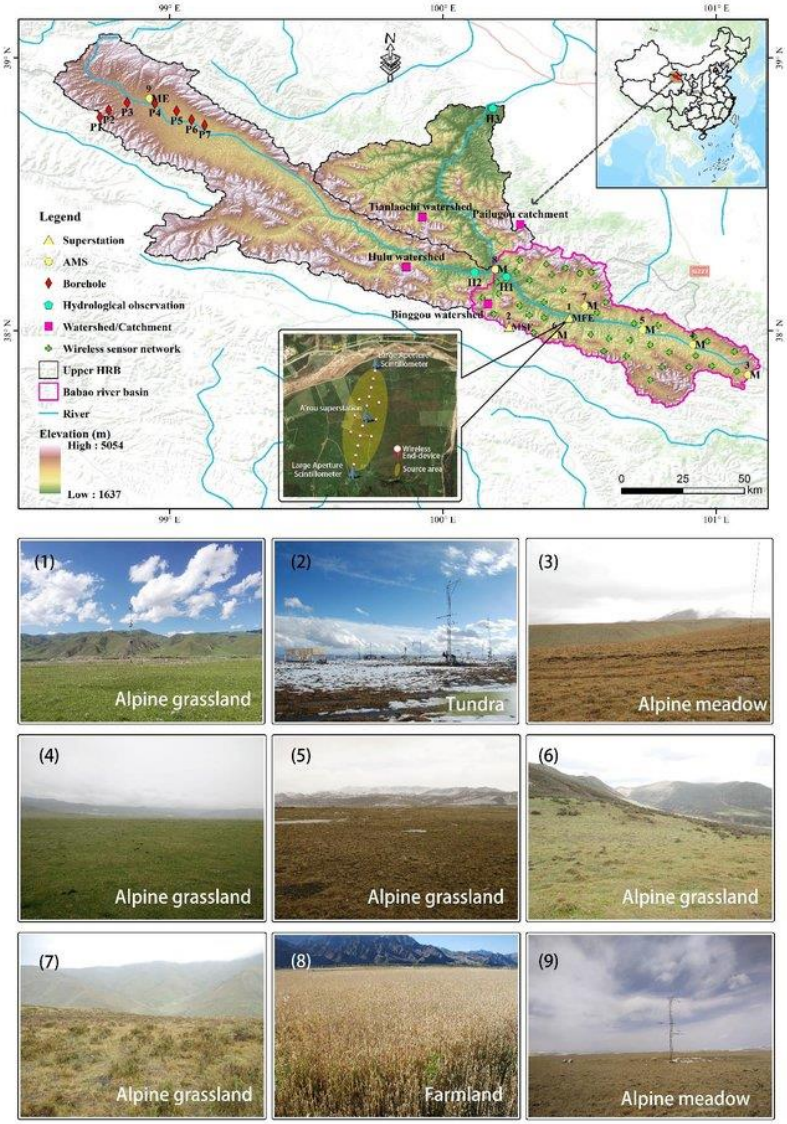
[1] Heihe Remote Sensing Experimental Research Station, Key Laboratory of Remote Sensing of Gansu Province, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou 730000, China
[2] Center for Excellence in Tibetan Plateau Earth Sciences, Chinese Academy of Sciences, Beijing 100101, China
[3] Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing 100101, China
[4] State Key Laboratory of Earth Surface Processes and Resource Ecology, Faculty of Geographical Science, Beijing Normal University, Beijing 100875, China
[5] Chongqing Engineering Research Center for Remote Sensing Big Data Application, School of Geographical Sciences, Southwest University, Chongqing 400715, China
[6] Jiangsu Center for Collaborative Innovation in Geographical Information Resource Development and Application, Nanjing 21003, China

Correspondence to: Xin Li (xinli@itpcas.ac.cn)

Abstract. The alpine region is important in riverine and watershed ecosystems as a contributor of freshwater, providing and stimulating specific habitats for biodiversity. In parallel, recent climate change, human activities and other perturbations may disturb hydrological processes and eco-functions, creating the need for next-generation observational and modeling approaches to advance a predictive understanding of such processes in the alpine region. However, several formidable challenges, including the cold and harsh climate, high altitude and complex topography, inhibit complete and consistent data collection where/when needed, which hinders the development of remote sensing technologies and alpine hydrological models. The current study presents a suite of datasets consisting of long-term hydrometeorological, snow cover and frozen ground data for investigating watershed science and functions from an integrated, distributed and multiscale observation network in the upper reaches of the Heihe River Basin (HRB) in China. Gap-free meteorological and hydrological data were monitored from an observation network connecting a group of automatic meteorological stations (AMSs). In addition, to capture snow accumulation and ablation processes, snow cover properties were collected from a snow observation superstation using state-of-the-art techniques and instruments. High-resolution soil physics datasets were also obtained to capture the freeze-thaw processes from a frozen ground observation superstation. The updated datasets were released to scientists with multidisciplinary backgrounds (*i.e.*, cryosphere science, hydrology, and meteorology), and they are expected to serve as a testing platform to provide accurate forcing data and validate and evaluate remote sensing products and hydrological models for a broader community. The datasets are available from the Cold and Arid Regions Science Data Center at Lanzhou https://doi.org/10.3972/hiwater.001.2019.db.

1. Introduction

Water resources in the alpine region are headwaters that need to be regulated to sustain downstream ecosystems. However, perturbations induced by nature/climate change and human activities in recent years have significantly reformed hydrological processes and eco-functions (Li *et al.*, 2018b). Accurate estimation and prediction of hydrological processes and their key impact factors has since become crucial (Pomeroy *et al.*, 2007; Chen *et al.*, 2014; Li *et al.*, 2018c). Process-based alpine hydrological models (*e.g.*, the Geomorphology-Based Eco-Hydrological Model (GBEHM), Yang *et al.*, 2015; the Water and Energy Budget-based Distributed Hydrological Model (WEB-DHM), Wang *et al.*, 2010; the Cold Regions Hydrological Model (CRHM), Pomeroy *et al.*, 2007; and the Cryospheric Basin Hydrological Model (CBHM), Chen *et al.*, 2018) are feasible to advance a fundamental understanding of the hydrological cycle and its individual components, *i.e.*, separating the contributions from processes such as snow melting, freeze-thaw, precipitation, evapotranspiration, runoff, and determining



ESSD

Article | Assets | Peer review | Metrics | Related articles

ESSD | Articles | Volume 11, issue 4
Earth Syst. Sci. Data, 11, 1905–1915, 2019
https://doi.org/10.5194/essd-11-1905-2019

Data description paper | 11 Dec 2019

A 16-year dataset (2000–2015) of high-resolution (3 h, 10 km) global surface solar radiation

Wenjun Tang[1,2], Kun Yang[3,2], Jun Qin[1], Xin Li[1,2], and Xiaolei Niu[1]

[1]National Tibetan Plateau Data Center, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing 100101, China

[2]CAS Center for Excellence in Tibetan Plateau Earth Sciences, Chinese Academy of Sciences, Beijing 100101, China

[3]Ministry of Education Key Laboratory for Earth System Modeling, Department of Earth System Science, Tsinghua University, Beijing 100084, China

Correspondence: Wenjun Tang (tangwj@itpcas.ac.cn)

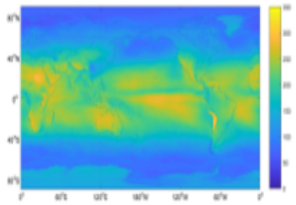
Received: 08 Jul 2019 – Discussion started: 18 Jul 2019 – Revised: 13 Nov 2019 –

National Tibetan Plateau Data Center

Home | Data | Analysis | Model | News | About

Dataset of high-resolution (3 hour, 10 km) global surface solar radiation (19

The dataset is a 34-year (1983.7-2017.6) high-resolution (3 h, 10 km) global SSR (surface solar radiation) dataset, which can be used for hydrological modeling, land surface modeling and engineering application. The dataset was produced based on ISCCP-HXG cloud products, ERA5 reanalysis data, and MODIS aerosol and albedo products with an improved physical parameterization scheme. Validation and comparisons with other global satellite radiation products indicate that our SSR estimates were generally better than those of the ISCCP flux dataset (ISCCP-FD), the global energy and water cycle experiment surface radiation budget (GEWEX-SRB), and the Earth's Radiant Energy System (CERES). This SSR dataset will contribute to the land-surface process simulations and the photovoltaic applications in the future.



Zoom in

Data file naming and use method

Each data file is named as ISCCP_HXG_global_radiation_YYYY_MM_DD_HH.nc (e.g. ISCCP_HXG_global_radiation_2000_01_01_00.nc), where YYYY is the four-digital year, MM is the two-digital month, DD is the two-digital day, HH is the two-digital hour, that means one file contains data for only one hour, additionally, .nc is the file name suffix which indicates that the data were stored as NetCDF format; For more information about NetCDF, please see http://www.unidata.ucar.edu/software/netcdf.

Required Data Citation | About Data Citation | View Data Cite Help

Citations

1. Tang, W., Yang, K., Qin, J., Li, X., & Niu, X. (2019). A 16-year dataset (2000–2015) of high-resolution (3 h, 10 km) global surface solar radiation. Earth Syst. Sci. Data, 11, 1905–1915, https://doi.org/10.5194/essd-11-1905-2019.(View Details | Bibtex)

Cite the data

TANG Wenjun, Dataset of high-resolution (3 hour, 10 km) global surface solar radiation (1983-2017)

The effects of surface heterogeneity scale on the flux imbalance under free convection

w Stats Comments Citations References (109) Related research (10+)

Content may be subject to copyr

1

AGU100 ADVANCING EARTH AND SPACE SCIENCE

JGR Atmospheres

RESEARCH ARTICLE
10.1029/2018JD029550

Key Points:
- The relation between flux imbalance and surface heterogeneity scale is investigated using large-eddy simulations and a cospectral model
- A diagnostic equation for flux imbalance is proposed
- The qualitative relations between flux imbalance and various factors reported in the literature can be explained by this equation

Correspondence to:
D. Li, and X. Li,
lidan@bu.edu
xinli@itpcas.ac.cn

Citation:
Zhou, Y., Li, D., & Li, X. (2019). The effects of surface heterogeneity scale on the flux imbalance under free convection. *Journal of Geophysical Research: Atmospheres, 124*, 8424–8448. https://doi.org/10.1029/2018JD029550

Received 25 AUG 2018
Accepted 1 JUL 2019
Accepted article online 12 JUL 2019
Published online 2 AUG 2019

The Effects of Surface Heterogeneity Scale on the Flux Imbalance under Free Convection

Yanzhao Zhou[1,2,3], Dan Li[4], and Xin Li[1,5]

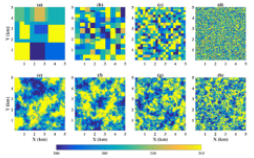
[1]National Tibetan Plateau Data Center, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing, China, [2]Key Laboratory of Remote Sensing of Gansu Province, Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, Lanzhou, China, [3]University of Chinese Academy of Sciences, Beijing, China, [4]Department of Earth and Environment, Boston University, Boston, MA, USA, [5]CAS Center for Excellence in Tibetan Plateau Earth Sciences, Chinese Academy of Sciences, Beijing, China

Abstract It is well known that the available energy (i.e., the net radiation minus the ground heat flux) is often 10–30% larger than the sum of turbulent fluxes measured by the eddy-covariance method. Although field observations and previous large-eddy simulation studies have shown that surface heterogeneity can induce flux imbalance, the relationship between the flux imbalance magnitude and the surface heterogeneity scale remains to be investigated in more detail. Here we examine the flux imbalance over landscapes characterized by different surface heterogeneity scales in a dry freely convective boundary layer. We reveal that the flux imbalance initially increases with increasing surface heterogeneity scale. However, when the surface heterogeneity scale becomes larger than the boundary layer height, the surface starts to behave locally homogeneous, which leads to a lower flux imbalance. Based on large-eddy simulation results, we propose a conceptual model to explain how the domain average flux imbalance is influenced by surface heterogeneity. The flux imbalance is found to be controlled by the ratio of the boundary layer height to the Obukhov length ($-z_i/L$), the integral length scale of vertical velocity (l_w), the mean horizontal speed (U), and the time averaging interval (T). Among these four variables, l_w determines the size of turbulent coherent structures (i.e., large eddies), whereas $-z_i/L$ affects the form of these large eddies. Meanwhile, the U and T determine how many these large eddies can be sampled by the eddy covariance. This finding indicates that it may be possible to diagnose the flux imbalance using these four variables under convective conditions.

National Tibetan Plateau Data Center

Home Data Analysis Model News About

The surface heterogeneity patterns and the flux Imbalance under free convection based on the WRF LES



Zoom in

The Tibetan plateau (TP), called as "the third pole of the earth" is the water tower of Asia not only feed tens of millions of people, but also maintain fragile ecosystems in arid region of northwestern China. Temporal-spatially complete representations of land surface temperature are required for many purposes in environmental science, especially in third pole where the traditional ground measurement is difficult and therefore the data is sparse.

The cloud-free datasets of daily mean land surface temperature (LST) and mean annual land surface temperature (MAST) during 2004 to 2016 were released and derived from the quartic daily MODIS (the Moderate Resolution Imaging Spectroradiometer) Terra/Aqua LST products with a resolution of 1 km using a pragmatic data processing algorithm (Ran et al., 2015; 2017a). The comparison between radiance-based LST measurement and the estimated LST shows good agreement in the daily and inter-annual variability, with a correlation of 0.95 and 0.99 and bias of -1.73℃ (±3.38℃) and -2.07℃ (±1.05℃) for daily-mean-LST and MAST, respectively (Ran et al., 2017c). The systematic error is mainly source from the defined of daily mean LST, which is represented by the arithmetic average of the daytime and nighttime LSTs. The random error is mainly source from the uncertainty of the original MODIS LST values, especially for the daytime LST products. Trend validation using air temperatures from 94 weather stations indicate that the warming trends derived from time series MAST data is comparable with that derived from CMA data. The dataset is potential useful for various studies, including climatology, hydrology, meteorology, ecology, agriculture, public health, and environmental monitoring in the third pole and around regions.

Data file naming and use method

Two types of simulations are designed (i.e., B case and H case). For each type, four simulations are performed with different heterogeneity length scales (e.g., 2000 m, 1200 m, 550 m and 240 m). Hence, the first char of the filename in our dateset refers to the simulation type and the following numbers represent the heterogeneity length scales.

Required Data Citation About Data Citation View Data Cite Help

Citations
1. Zhou, Y.Z., Li, D., Li, X. (2019). The Effects of Surface Heterogeneity Scale on the Flux Imbalance under Free Convection, Journal of Geophysical Research: Atmospheres, doi:10.1029/2018jd029550. (View Details | Bibtex)

Cite the data
ZHOU Yanzhao. The surface heterogeneity patterns and the flux Imbalance under free convection based on the WRF LES. National Tibetan Plateau Data Center, 2019. doi: 10.11888/Meteoro.tpdc.270103. (Download the reference: RIS | Bibtex)

www.nature.com/scientificdata

SCIENTIFIC DATA

OPEN

DATA DESCRIPTOR

The first high-resolution meteorological forcing dataset for land process studies over China

Jie He[1], Kun Yang[1,2*], Wenjun Tang[2,3], Hui Lu[1], Jun Qin[3], Yingying Chen[2,3] & Xin Li[2,3]

The China Meteorological Forcing Dataset (CMFD) is the first high spatial-temporal resolution gridded near-surface meteorological dataset developed specifically for studies of land surface processes in China. The dataset was made through fusion of remote sensing products, reanalysis datasets and *in-situ* station data. Its record begins in January 1979 and is ongoing (currently up to December 2018) with a temporal resolution of three hours and a spatial resolution of 0.1°. Seven near-surface meteorological elements are provided in the CMFD, including 2-meter air temperature, surface pressure, and specific humidity, 10-meter wind speed, downward shortwave radiation, downward longwave radiation and precipitation rate. Validations against observations measured at independent stations show that the CMFD is of superior quality than the GLDAS (Global Land Data Assimilation System); this is because a larger number of stations are used to generate the CMFD than are utilised in the GLDAS. Due to its continuous temporal coverage and consistent quality, the CMFD is one of the most widely-used climate datasets for China.

Background & Summary

Land, hydrological and ecosystem models all require the input of gridded near-surface meteorological datasets, called "forcing data". Accurate and high-resolution forcing data can help improve the outcome of these models, hence, high-quality forcing data are always desired by these scientific communities. To meet this demand, efforts were made during the 2000s to develop global-scale datasets specially for land surface and hydrology research, e.g. Princeton University's Global Land Surface Model Data[1,2] and the Global Land Data Assimilation System (GLDAS)[3]. Meanwhile, remote sensing datasets obtained from some earth-observing satellites, like the Tropical Rainfall Measuring Mission (TRMM) precipitation rate dataset[4], and remote sensing-derived data products such

National Tibetan Plateau Data Center

Home | Data | Analysis | Model | News | About

China meteorological forcing dataset (1979-2018)

The China Meteorological Forcing Dataset (CMFD) is a high spatial-temporal resolution gridded near-surface meteorological dataset that was developed specifically for studies of land surface processes in China. The dataset was made through fusion of remote sensing products, reanalysis dataset and in-situ observation data at weather stations. Its record starts from January 1979 and keeps extending (currently up to December 2018) with a temporal resolution of three hours and a spatial resolution of 0.1°. Seven near-surface meteorological elements are provided in CMFD, including 2-meter air temperature, surface pressure, specific humidity, 10-meter wind speed, downward shortwave radiation, downward longwave radiation and precipitation rate.

Zoom in

Required Data Citation

About Data Citation | View Data Cite Help

Citations

1. He, J., Yang, K., Tang, W. Lu, H., Qin, J., Chen, Y.Y., Li, X. (2020). The first high-resolution meteorological forcing dataset for land process studies over China. Scientific Data, 7, 25, https://doi.org/10.1038/s41597-020-0369-y.(View Details | Bibtex)

2. Yang, K., He, J.,Tang, W.J., Qin, J., Cheng, C.C.K. (2010). On downward shortwave and longwave radiations over high altitude regions: Observation and modeling in the Tibetan Plateau. Agricultural and Forest Meteorology, 150(1), 38-46.(View Details | Bibtex)

Cite the data

YANG Kun, HE Jie. China meteorological forcing dataset (1979-2018). National Tibetan Plateau Data Center, 2018. doi: 10.11888/AtmosphericPhysics.tpe.249369.file. (Download the reference: RIS | Bibtex)

Using this data, you must reference one or more article references listed in the Required Data Citation and reference data

Support Program

Pan-Third Pole Environment Study for a Green Silk Road-A CAS Strategic Priority A Program (No:XDA20000000)

User Limit

To respect the intellectual property rights, protect the rights of data authors,expand servglacials of the data center, and evaluate the application potential of data, data users should clearly indicate the source of the data and the author of the data in the research results generated by using the data (including published papers, articles, data products, and unpublished research reports, data products and other results). For re-posting (second or multiple releases) data, the author must also indicate the source of the original data.

Thank you for your attentions