

Data Integration and Service for the Third Pole

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Outline

1. Data centers for the Third Pole
2. Featured datasets for the Third Pole research
3. Big data project for the three poles

1. Data centers for the Third Pole



Cold and Arid Regions Science Data Center at Lanzhou (English Website)

Cold and Arid Regions Science Data Center at Lanzhou

WORLD DATA SYSTEM

Full Text Search

CARD - WDS member [Home](#) [Dataset](#) [For Author](#) [Knowledge](#) [News & Events](#) [About](#) [Login Register](#)

News & Events

- The Datasets of Second Glacier Inventory of China were formally released [2014-12-15]
- CARD has signed the LoA with WDS Scientific Committee [2014-05-30]
- Watershed Allied Telemetry Experimental Research (WATER) datasets is indexed by Data Citation Index (DCI) [2014-05-15]
- CARD become a recommended data repository of Nature Scientific Data [2014-05-09]
- NOAA release the globe vegetation index dataset [2013-06-22]
- new Open Access 'Geoscience Data Journal', specifically for describing geospatial datasets [2012-09-09]
- WATER - Watershed Allied Telemetry Experimental [2010-07-10]

Data Collections

Watershed Allied Telemetry Experimental Research (WATER)

WATER is an airborne, satellite- and ground-based integrated remote sensing experiment aiming to improve the observing ability of remote sensing technique, and understanding and predictability of hydrological and related ecological processes on catchment scale



[WATER](#)

Heihe Watershed Allied Telemetry Experimental Research (HiWATER)

HiWATER is an eco-hydrological experiment designed from an interdisciplinary perspective to addresses problems including heterogeneity, scaling, uncertainty, and closing water cycle at the watershed scale. HiWATER was formally initialized in May 2012 and will last four years until 2015.



[HiWATER](#)

<http://card.westgis.ac.cn/>

Cold and Arid Regions Science Data Center at Lanzhou (Chinese Website)



The screenshot displays the WestDC website interface. At the top left is the logo for the Cold and Arid Regions Science Data Center (寒区旱区科学数据中心) and the National Earth System Science Data Platform (国家地球系统科学数据平台). A search bar is located at the top right. Below the header is a navigation menu with links for 'WestDC', '首页' (Home), '数据产品' (Data Products), '数据评审' (Data Review), '数据作者' (Data Authors), '知识库' (Knowledge Base), '新闻动态' (News), and '关于本站' (About This Site). There are also links for '登录' (Login) and '注册' (Registration).

The main content area features a global map titled 'RADI_AMSRE_EMMO_200207_EG_V1.0' with a frequency of '10.7GHz H'. The map shows radiance temperature data across the globe, with a color scale from blue (low) to red (high). Below the map is a news item: 'AMSR-E全球陆表被动微波遥感发射率数据集 (2002.8-2011.10) 正式出版发布' [2016-08-17].

To the right of the map is a '新闻' (News) section with a list of recent publications:

- AMSR-E全球陆表被动微波遥感发射率数据集 [2002.8-2011.10] 正式出版发布 [2016-08-17]
- 2015年海河流域水文气象观测网数据集正式发布 [2016-07-07]
- SWAT模型中国大气同化驱动数据集发布 [2016-05-13]
- 海河流域环太站2013-2014年地表通量与气象要素数据集 [2015-07-01] 对外发布
- HWATER流域水文气象观测网2014年数据已发布 [2015-06-16]
- 尼泊尔地震科技应急援助：中科院寒旱所在行动 [2015-04-28]
- 学术综述：海河流域水-生态-经济系统集成研究 [2014-12-23]
- The Datasets of Second Glacier Inventory of China were formally released [2014-12-15]
- 中国第二次冰川编目数据集发布 [2014-12-15]

At the bottom left, there is a section for '在线下载热门数据' (Online Download Popular Data) with a list of datasets:

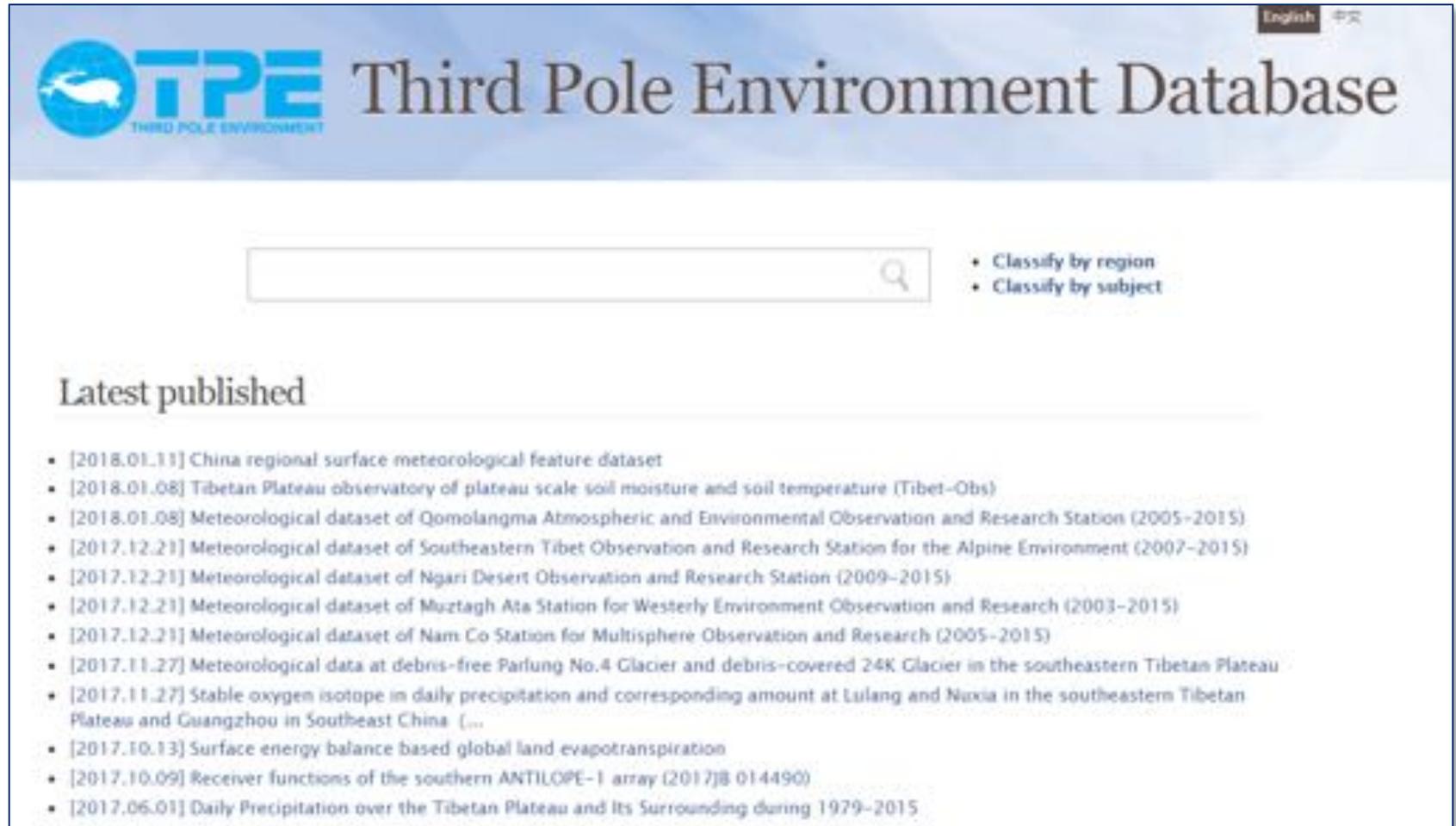
- 基于世界土壤数据库 (HWSD) 的中国土壤数据集 (v1.1)
- 中国地区土地覆被综合数据集
- 中国地区长时间序列SPOT_Vegetation植被指数数据集
- 中国1km分辨率数字高程模型数据集
- 中国地区长时间序列GIMMS植被指数数据集

At the bottom right, there is a section for '最新注册DOI数据' (Latest Registered DOI Data) with two entries:

- [2016-09-10] 刘阳民, 综合为: 海河流域多尺度地表通量与气象要素观测数据集: 环太站-涡动相关仪 (10m塔) -2015. 寒区旱区科学数据中心, 2016. doi:10.3972/haihe.019.2016.cb
- [2016-09-10] 刘阳民, 综合为: 海河流域多尺度地表通量与气象要素观测数据集: 环太站-热湿仪-2015. 寒区旱区科学数据中心, 2016. doi:10.3972/haihe.020.2016.cb

<http://westdc.westgis.ac.cn/>

Third Pole Environment Database



The screenshot shows the homepage of the Third Pole Environment Database. At the top left is the logo for TPE (Third Pole Environment), which consists of a blue circle containing a white silhouette of a mountain range, followed by the letters 'TPE' in a bold, blue, sans-serif font, and 'THIRD POLE ENVIRONMENT' in a smaller, blue, sans-serif font below it. To the right of the logo, the text 'Third Pole Environment Database' is displayed in a large, dark brown, serif font. In the top right corner, there are two language selection buttons: 'English' and '中文'. Below the header, there is a search bar with a magnifying glass icon on the right. To the right of the search bar, there are two bullet points: '• Classify by region' and '• Classify by subject'. Below the search bar, the section 'Latest published' is highlighted in a light blue color. Underneath this section, there is a list of ten entries, each starting with a date in brackets followed by a brief description of the dataset or study.

English 中文

TPE Third Pole Environment Database
THIRD POLE ENVIRONMENT



- Classify by region
- Classify by subject

Latest published

- [2018.01.11] China regional surface meteorological feature dataset
- [2018.01.08] Tibetan Plateau observatory of plateau scale soil moisture and soil temperature (Tibet-Obs)
- [2018.01.08] Meteorological dataset of Qomolangma Atmospheric and Environmental Observation and Research Station (2005–2015)
- [2017.12.21] Meteorological dataset of Southeastern Tibet Observation and Research Station for the Alpine Environment (2007–2015)
- [2017.12.21] Meteorological dataset of Ngari Desert Observation and Research Station (2009–2015)
- [2017.12.21] Meteorological dataset of Muztagh Ata Station for Westerly Environment Observation and Research (2003–2015)
- [2017.12.21] Meteorological dataset of Nam Co Station for Multisphere Observation and Research (2005–2015)
- [2017.11.27] Meteorological data at debris-free Parlung No.4 Glacier and debris-covered 24K Glacier in the southeastern Tibetan Plateau
- [2017.11.27] Stable oxygen isotope in daily precipitation and corresponding amount at Lulang and Nuxia in the southeastern Tibetan Plateau and Guangzhou in Southeast China [...]
- [2017.10.13] Surface energy balance based global land evapotranspiration
- [2017.10.09] Receiver functions of the southern ANTILOPE-1 array (2017)JB 014490
- [2017.06.01] Daily Precipitation over the Tibetan Plateau and Its Surrounding during 1979–2015

<http://en.tpedatabase.cn/>



Data

Datasets

Search on map

Browse by Keywords

Browse by Literature

Browse by Topic

Browse by Thumbnail

Contact Support



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CAS

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road, chaoyang district, Beijing

E-mail: sdb@itpcas.ac.cn

phone: 010-84097033

Home / Data / Data list browsing



The Observation Data Set of Glacial Hydrological Stations in the Na...

1 0 1

This data set is the observed runoff data of the glacial hydrological stations in the Namco Basin in Tibet from 2006 to 2008. It contains monthly mean runoff data from four regions: Niyuqu river, Qugaqie river, Zhadang river, and Angqu river. The data was used to study the regional hydrology and water resourc...

→ More



The Lake Level Observation Data of Lake Namco from the Integrate...

1 0 1

The daily lake level observation data of lake Namco obtained from the Integrated Observation and Research Station of Multi-sphere in Namco in summers during 2007 to 2016. Every winter, the water gauge is destroyed by the lake ice, and is re-installed every summer. Taking the observati...

→ More

历年县别有效灌溉面积表.xls						
年份	县别	有效灌溉面积	旱地	有效灌溉面积		
year	county	cultivate	dry	irrigate		
		area	land	area		
耕地面积表.xls						
年份	年末实有耕地面积	旱地	水田	当年减少	国家建设	当年增加
year	area	dry	paddy	decrea	constr	increa
				tion	ction	se

The Basic Data of Cultivated Land Area in Tibetan Autonomous Reg...

1 0 1

The data set contains two tables, including the cultivated land area and that of every county at the end of each year. It recorded the sequence data of cultivated land, dry land, paddy field and effective irrigated area in Tibet from 1959 to 2016. The Data was derived from the Tibet Society and Economi...

→ More

Data centers

Data center	Web site	Number of datasets
CARD	http://card.westgis.ac.cn/	380
WESTDC	http://westdc.westgis.ac.cn/	1432
TPE database	http://en.tpedatabase.cn/	148
Pan-Third Pole database	http://ptpe.tpdc.ac.cn/en/	340

2. Featured datasets for the Third Pole research



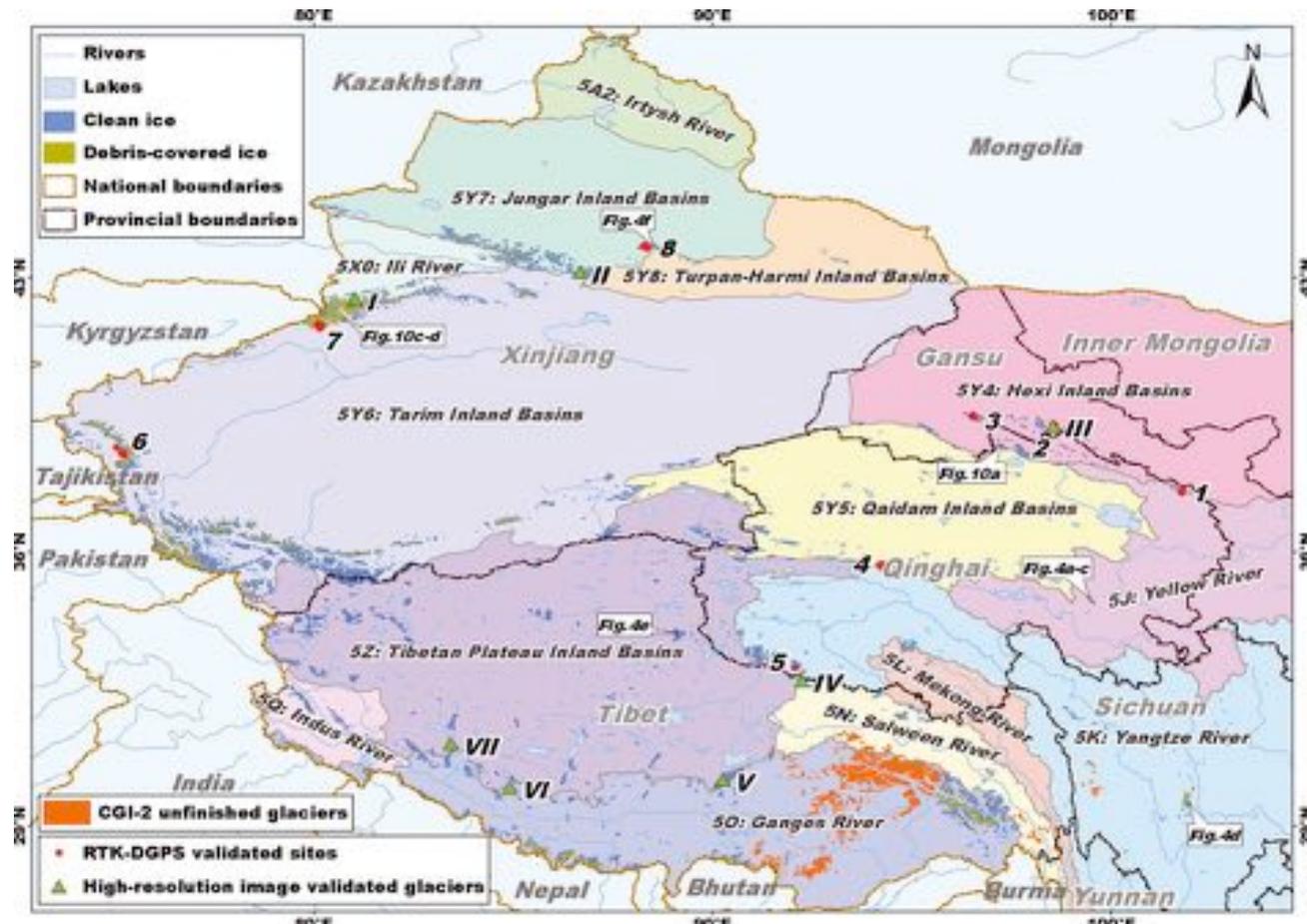
Featured datasets

- Cryospheric data
 - Glacier, permafrost, snow
- Near-surface atmospheric forcing and model parameter datasets
- Validation data
 - HiWATER datasets
 - Soil moisture network on the Tibetan Plateau

2.1 Cryospheric data

The Second Glacier Inventory

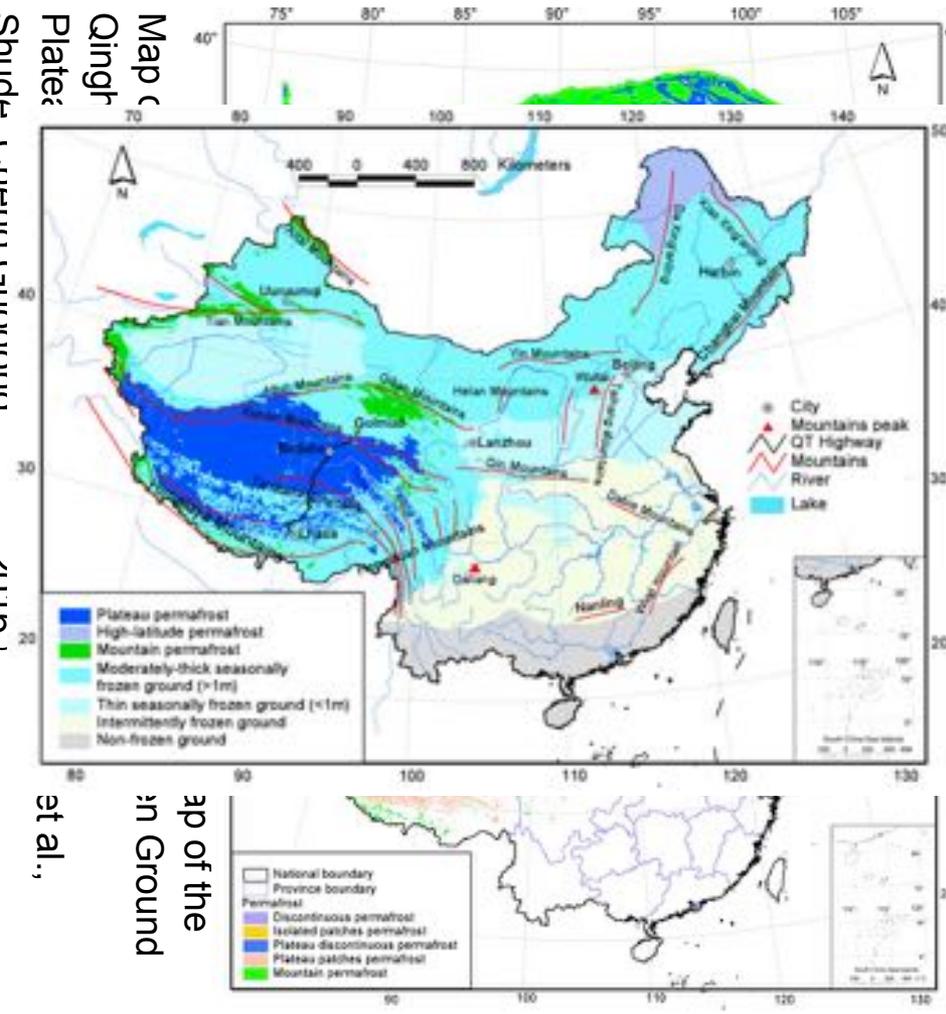
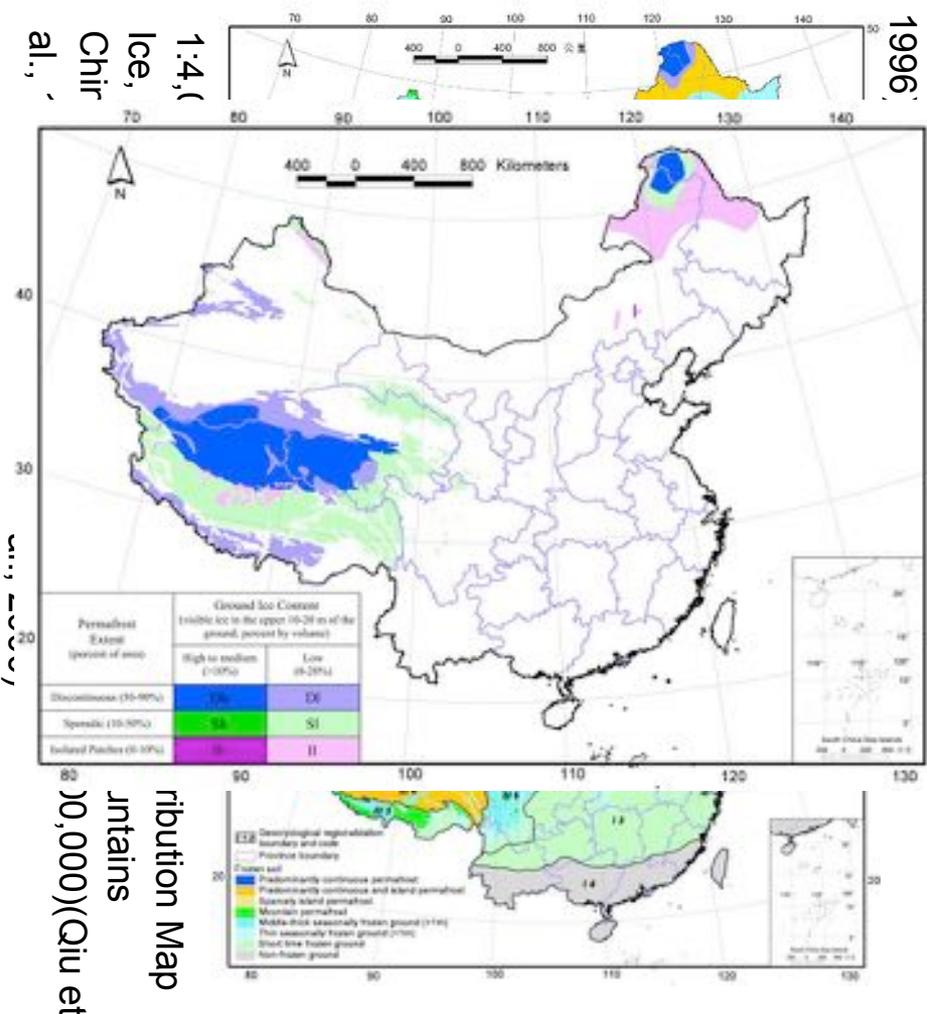
doi:10.3972/glacier.001.2013.db



Guo WQ, Liu SY, Xu JL, Wu LZ, Shangguan DH, Yao XJ, Wei JF, Bao WJ, Yu PC, Liu Q, Jiang ZL. The second Chinese glacier inventory: Data, methods and results. *Journal of Glaciology*, 2015, 61(226): 357-372.

Maps of Permafrost in China

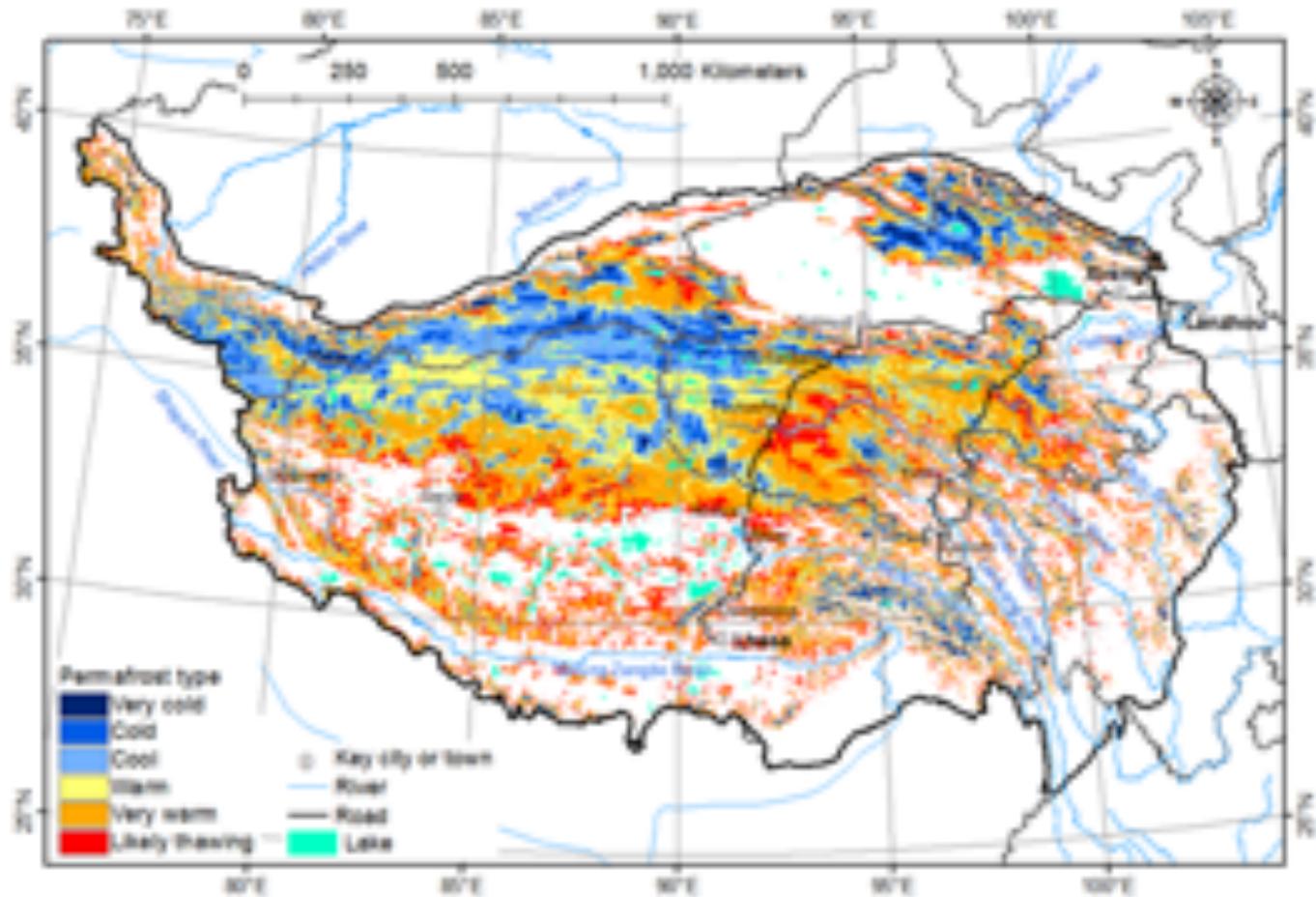
DOI: 10.3972/westdc.020.2013.db



Ran YH, Li X, Cheng GD, Zhang TJ, Wu QB, Jin HJ, Jin R. Distribution of permafrost in China: An overview of existing permafrost maps. *Permafrost and Periglacial Processes*, 2012, 23(4): 322-333.

Permafrost stability map on the Qinghai-Tibetan Plateau

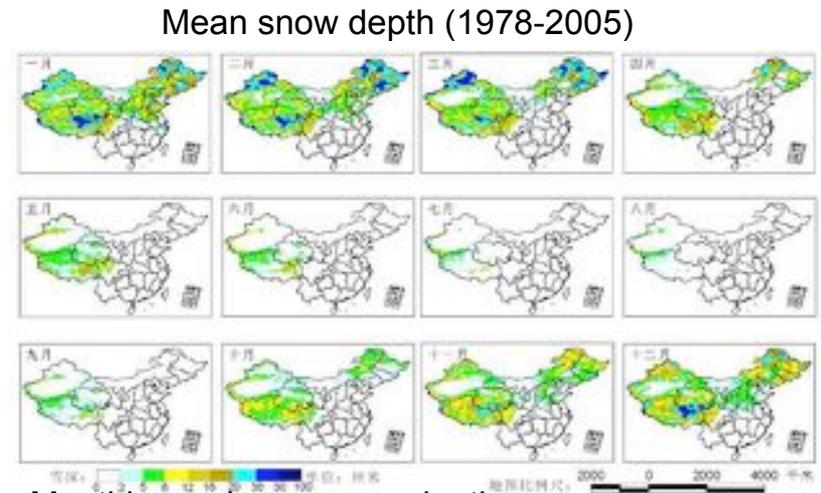
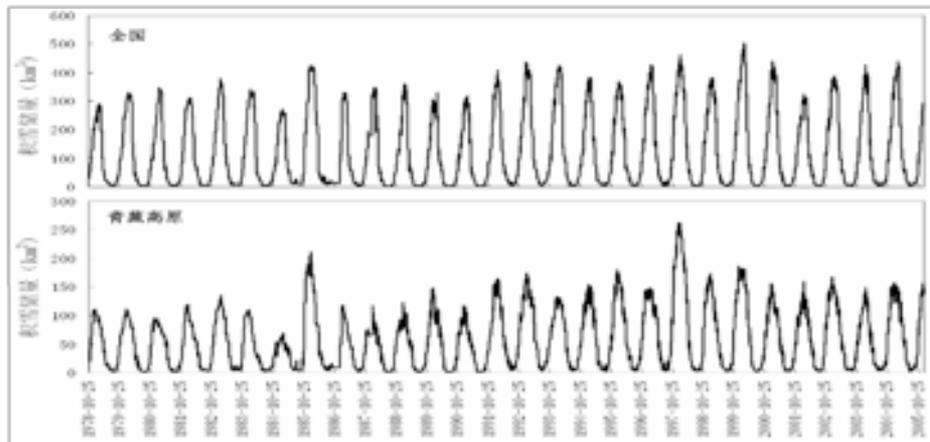
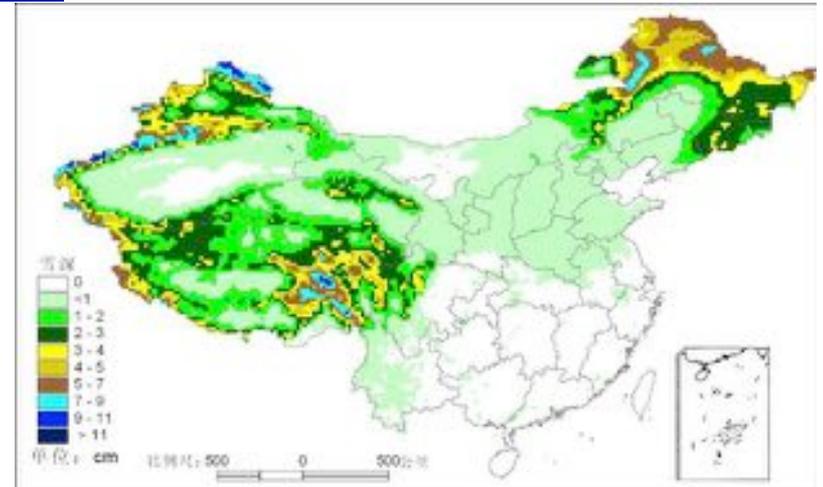
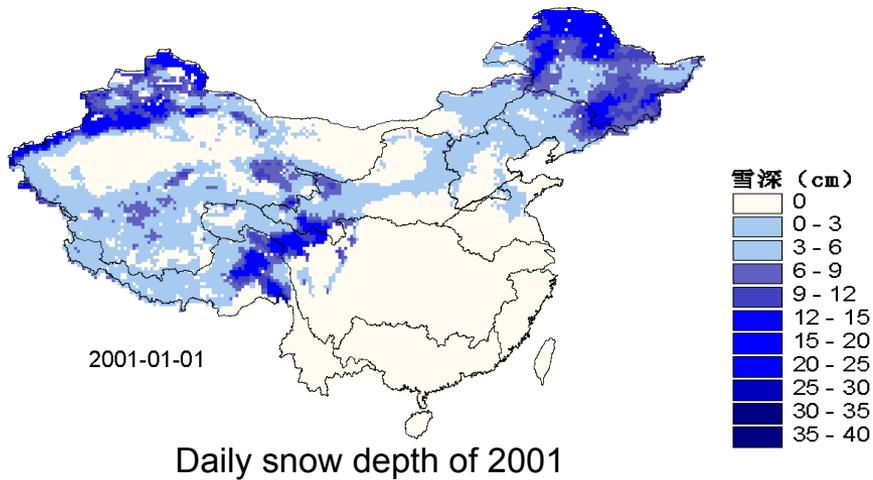
<http://www.poles.ac.cn/data/d8776cb4-15d8-4ac7-a378-742e9a60d674>



Ran YH, Li X, Cheng GD. Climate warming over the past half century has led to thermal degradation of permafrost on the Qinghai-Tibet Plateau. *The Cryosphere*, 2018, 12(2): 595-608.

Snow depth datasets

doi: 10.3972/westdc.001.2015.db



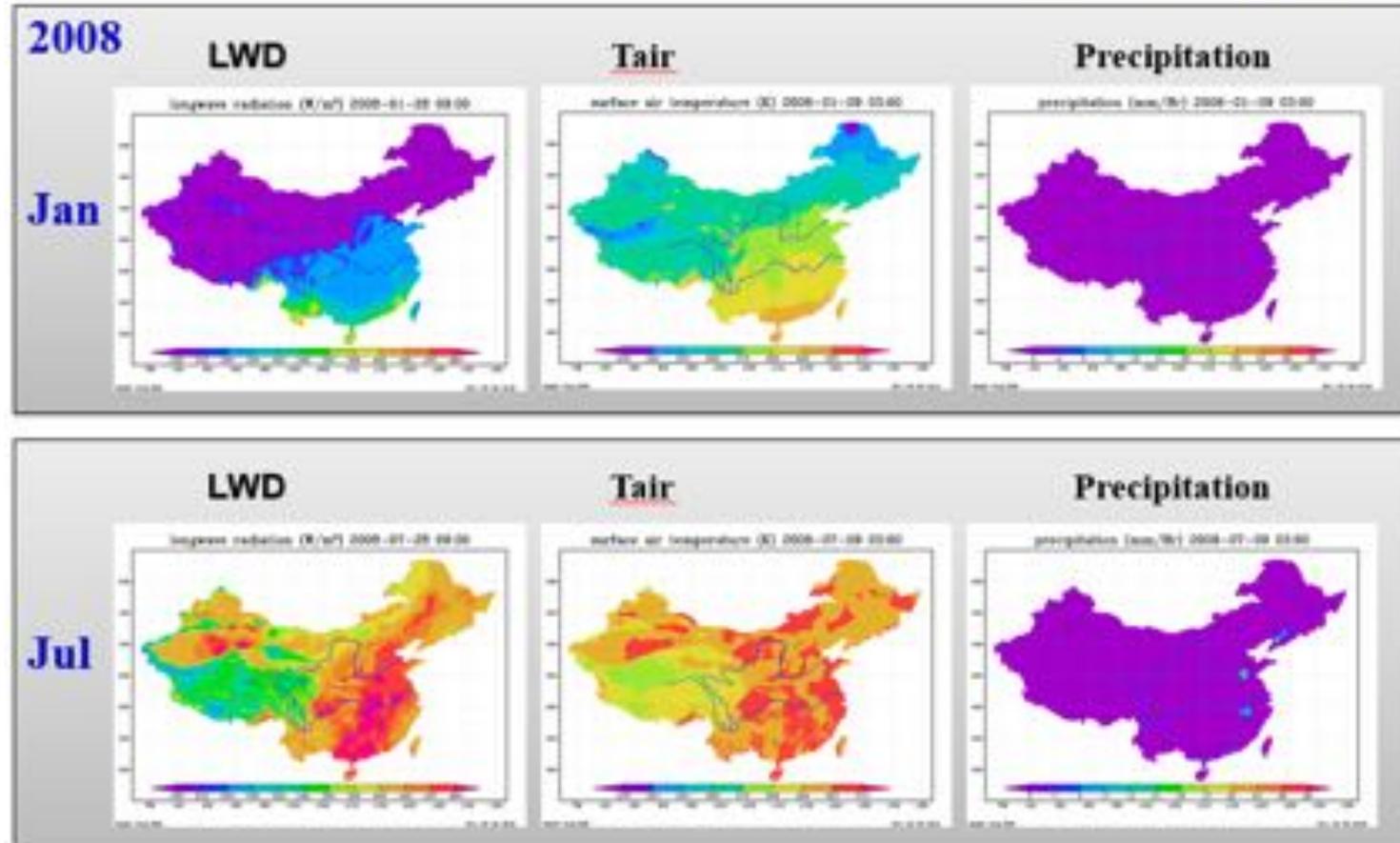
Che et al., 2008 Che T, Li X, Jin R, Armstrong RL, Zhang TJ. Snow depth derived from passive microwave-remote sensing data in China. *Annals of Glaciology*, 2008, 49: 145-154.

Dai et al., 2012, *Remote Sensing of Environment*; Dai et al., 2015, *Remote Sensing*.

2.2 Near-surface atmospheric forcing and model parameter datasets

China Meteorological Forcing Dataset

doi: 10.3972/westdc.002.2014.db

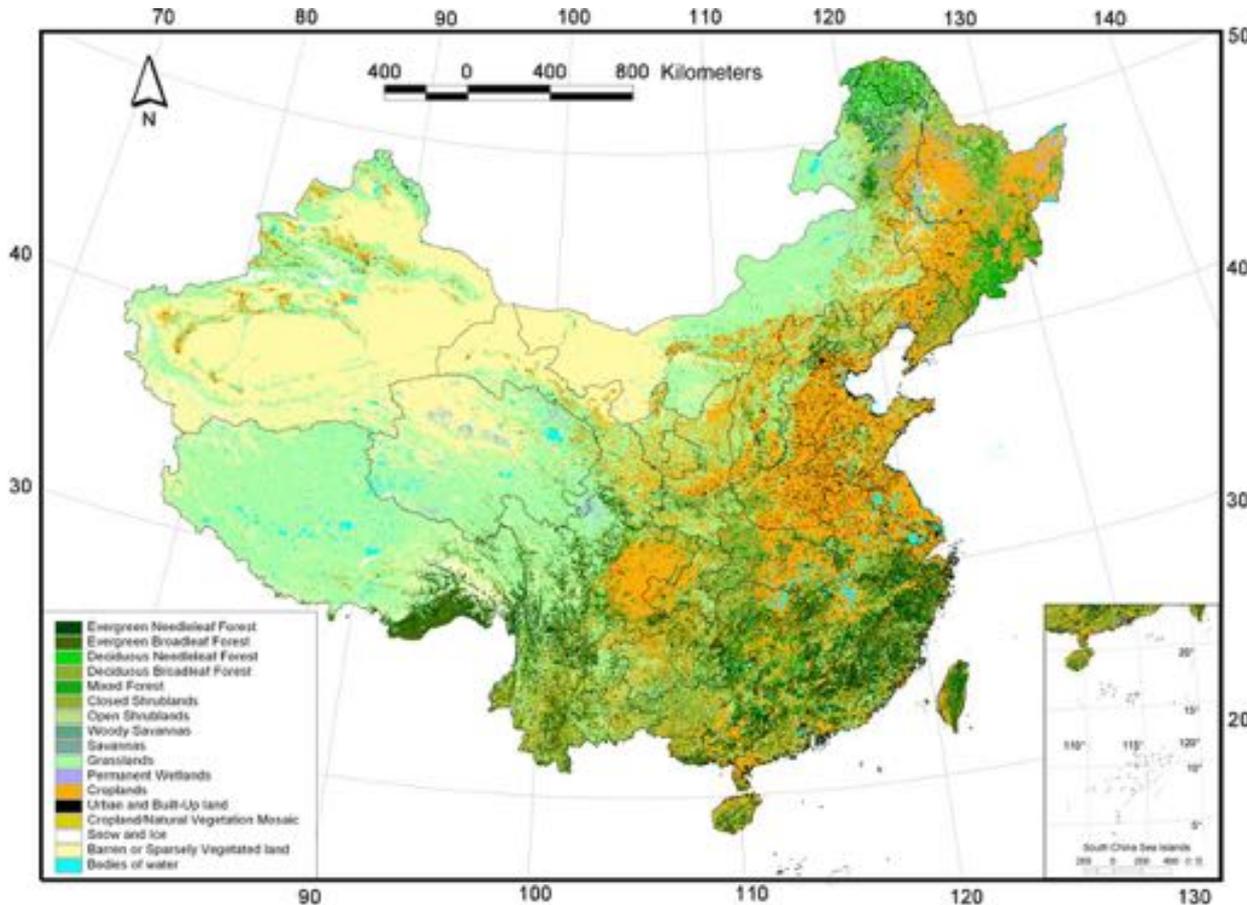


ITPCAS forcing data (0.1 degree, 3 hour)

Chen, Y. Y., K. Yang, J. He, J. Qin, J-C Shi, J-Y Du, Q. He, 2011: Improving land surface temperature modeling for dry land of China. *J. Geophys. Res.*, 116, D20104, doi:10.1029/2011JD015921

Multi-source Integrated Land Cover Map of China

DOI:10.1080/13658816.2011.577745



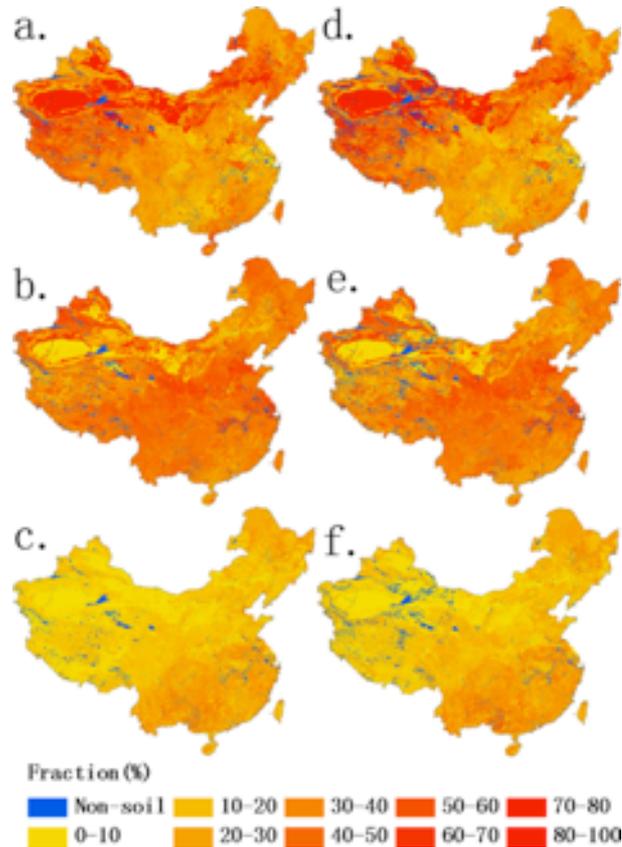
IGBP Classification

1:100,000 land use data of China in 2000, Chinese vegetation map (1:1,000,000), 1:100,000 glacier map, 1:1,000,000 wetland map in China and MODIS land use data in 2001(MOD12Q1)

Ran YH, Li X, Lu L, Li ZY. Large-scale land cover mapping with the integration of multi-source information based on the Dempster-Shafer theory. *International Journal of Geographical Information Science*, 2012, 26(1): 169-191, 10.1080/13658816.2011.577745.

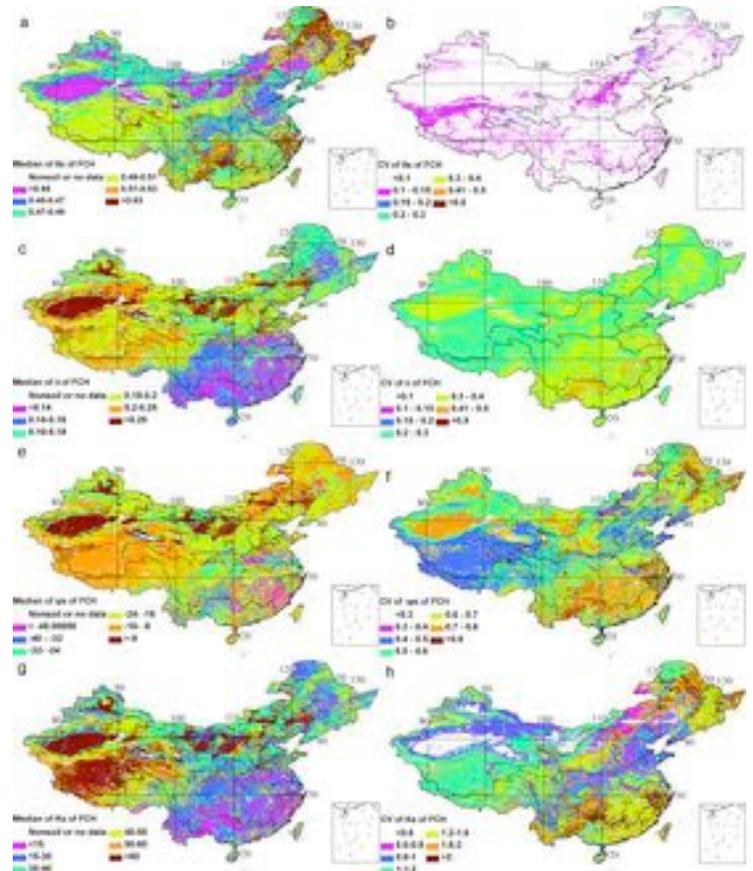
Soil datasets of China

<http://globalchange.bnu.edu.cn/research/soil>, Shangguan et al., 2013, JAMES, Dai et al., 2013, JHM



(a), sand of topsoil. (b), silt of topsoil. (c), clay of topsoil.
 (d), sand of subsoil. (e), silt of subsoil. (f), clay of subsoil.

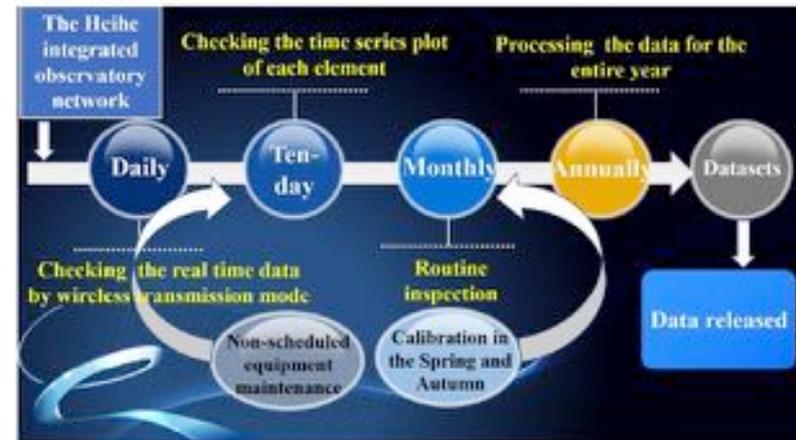
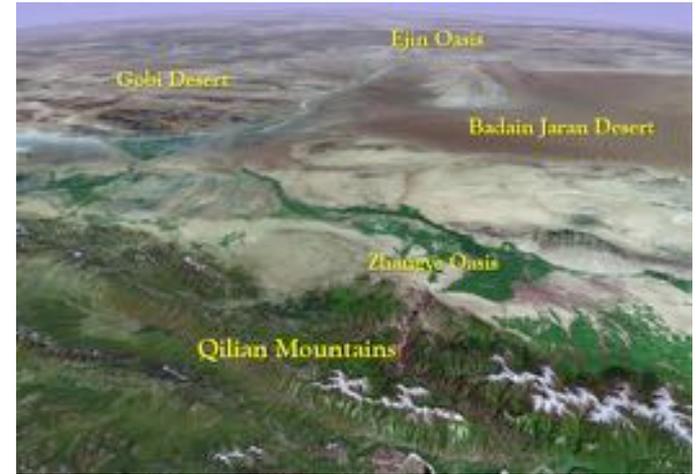
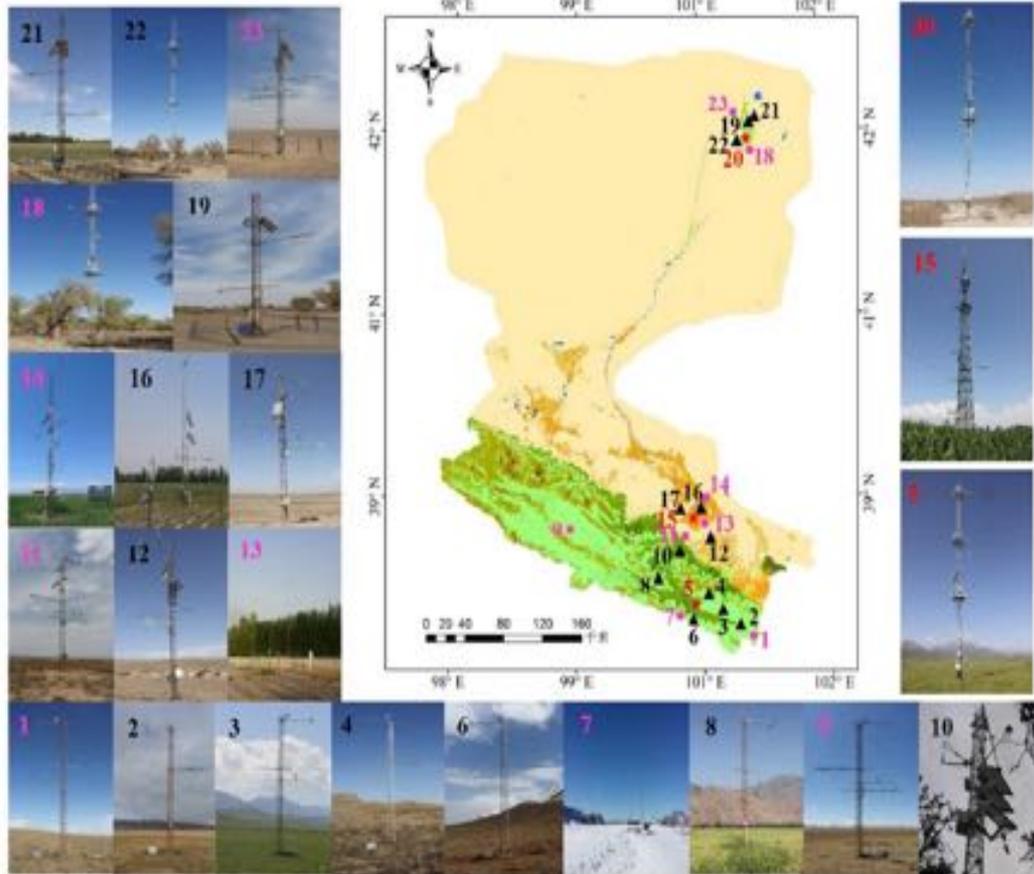
The soil particle-size distribution dataset for regional land and climate modelling in China



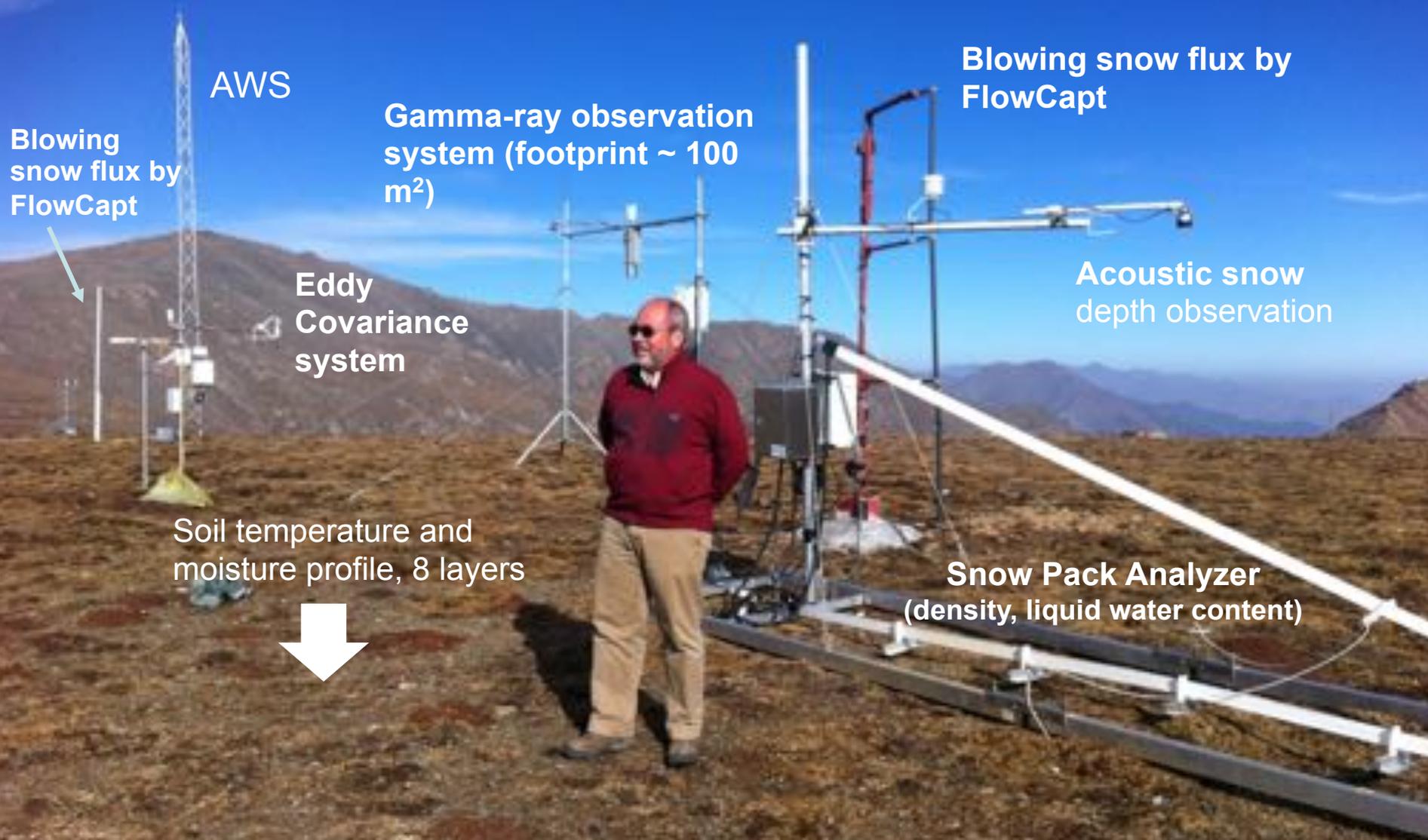
The China dataset of soil hydraulic parameters for land surface modeling

2.3 Validation data

Heihe Watershed Allied Telemetry Experimental Research (HiWATER)



Snow observatory in the upstream area of the HRB



AWS

Gamma-ray observation system (footprint ~ 100 m²)

Blowing snow flux by FlowCapt

Blowing snow flux by FlowCapt

Eddy Covariance system

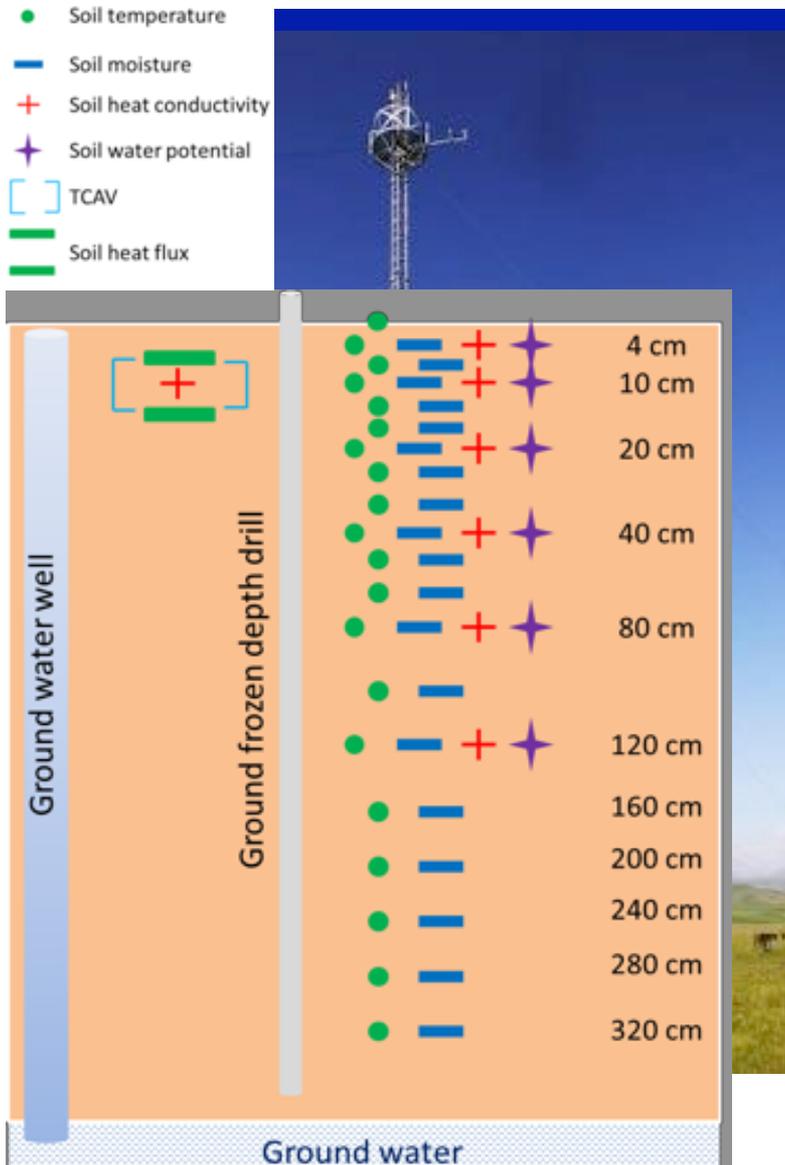
Acoustic snow depth observation

Soil temperature and moisture profile, 8 layers



Snow Pack Analyzer (density, liquid water content)

Frozen soil observatory in the upstream area of the HRB



Observation item	Setting
Wind Speed	1, 2, 5, 10, 15, 25 meter
Wind Direction	2 meter
Precipitation	0, 28 meter
Air temperature	1, 2, 5, 10, 15, 25 meter
Humidity	1, 2, 5, 10, 15, 25 meter
Air pressure	1 meter
Radiation (4 components)	5 meter
LST	5 meter
Snow depth	2 meter
Eddy correlation	4 meter
LAS	10 meter
COSMOS	1.5 meter

Data sharing: <http://card.westgis.ac.cn/hiwater> in English
<http://heihedata.org/hiwater> in Chinese

Cold and Arid Regions Science Data Center at Lanzhou

WORLD DATA SYSTEM

Full Text Search

CARD - WDS member Home Dataset For Author Knowledge News & Events About

Dataset / HiWATER

Introduction of HiWATER

- Airborne remote sensing data +
- Airborne remote sensing data products +
- Hydrometeorological observation network +
- Calibration and validation experiment +
- Eco-hydrological wireless sensor network +
- The multi-scale observation experiment on evapotranspiration over heterogeneous land surfaces +
- Satellite remote sensing data

Heihe Watershed Allied Telemetry Experimental Research (HiWATER)

HiWATER

Heihe Watershed Allied Telemetry Experimental Research

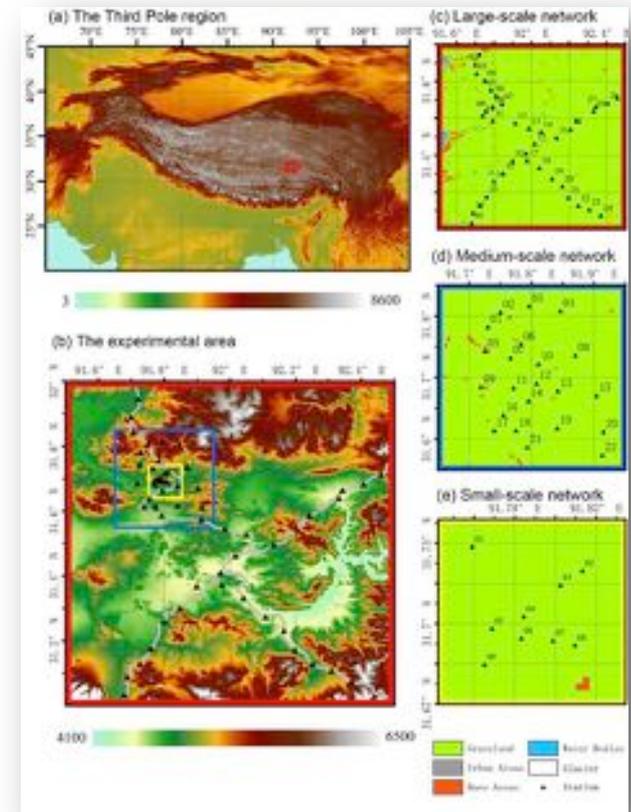
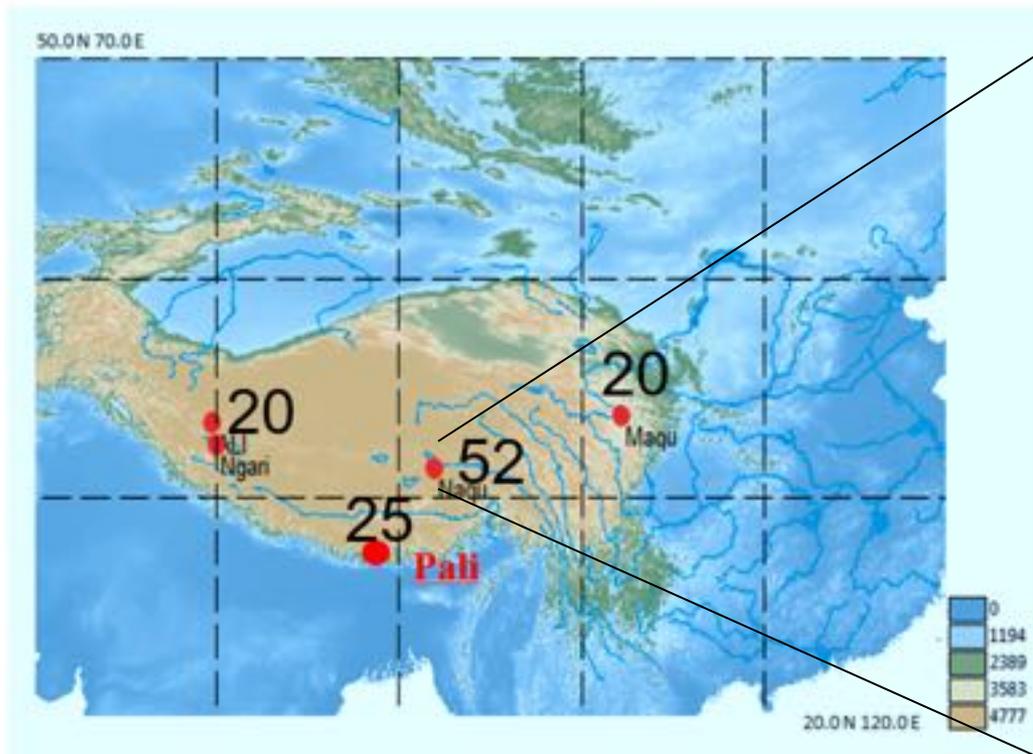
HiWATER is designed to be a comprehensive eco-hydrological experiment in the framework of the "Integrated research on the eco-hydrological process of the Heihe River Basin", based on the diverse needs of the interdisciplinary studies of the research plan and the existing observing infrastructures in the basin. The overall objective of HiWATER is to improve the observability of hydrological and ecological processes, to build a world-class watershed observing system and to enhance the applicability of remote sensing in integrated eco-hydrological studies and water resource management at the basin scale. HiWATER was formally initialized in May 2012 and will last four years until 2015.

HiWATER is jointly supported by two project groups titled "Heihe Watershed Allied Telemetry Experimental Research" (grant numbers: 91125001, 91125002, 91125003, 91125004) and "Remote Sensing Data Products in the Heihe River Basin: Algorithm Development, Data Products Generation and Application Experiments" (KZCX2-XB3-15), which are funded by the NSFC and Chinese Academy of Sciences, respectively.

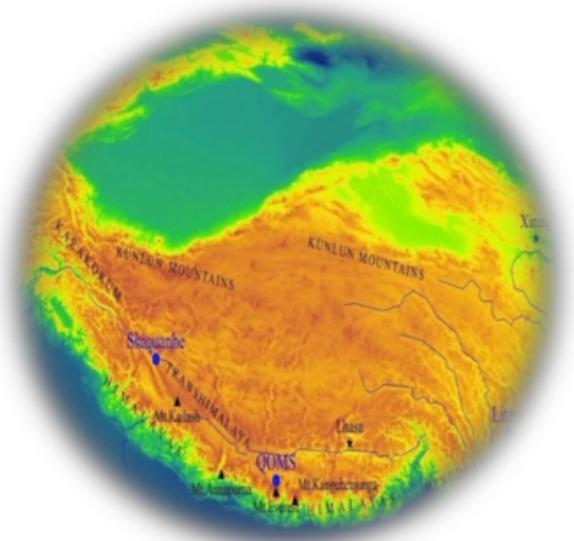
Soil moisture and temperature networks in Tibetan Plateau

<http://en.tpedatabase.cn/>, or international soil moisture network

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



3. Big data project for the three poles

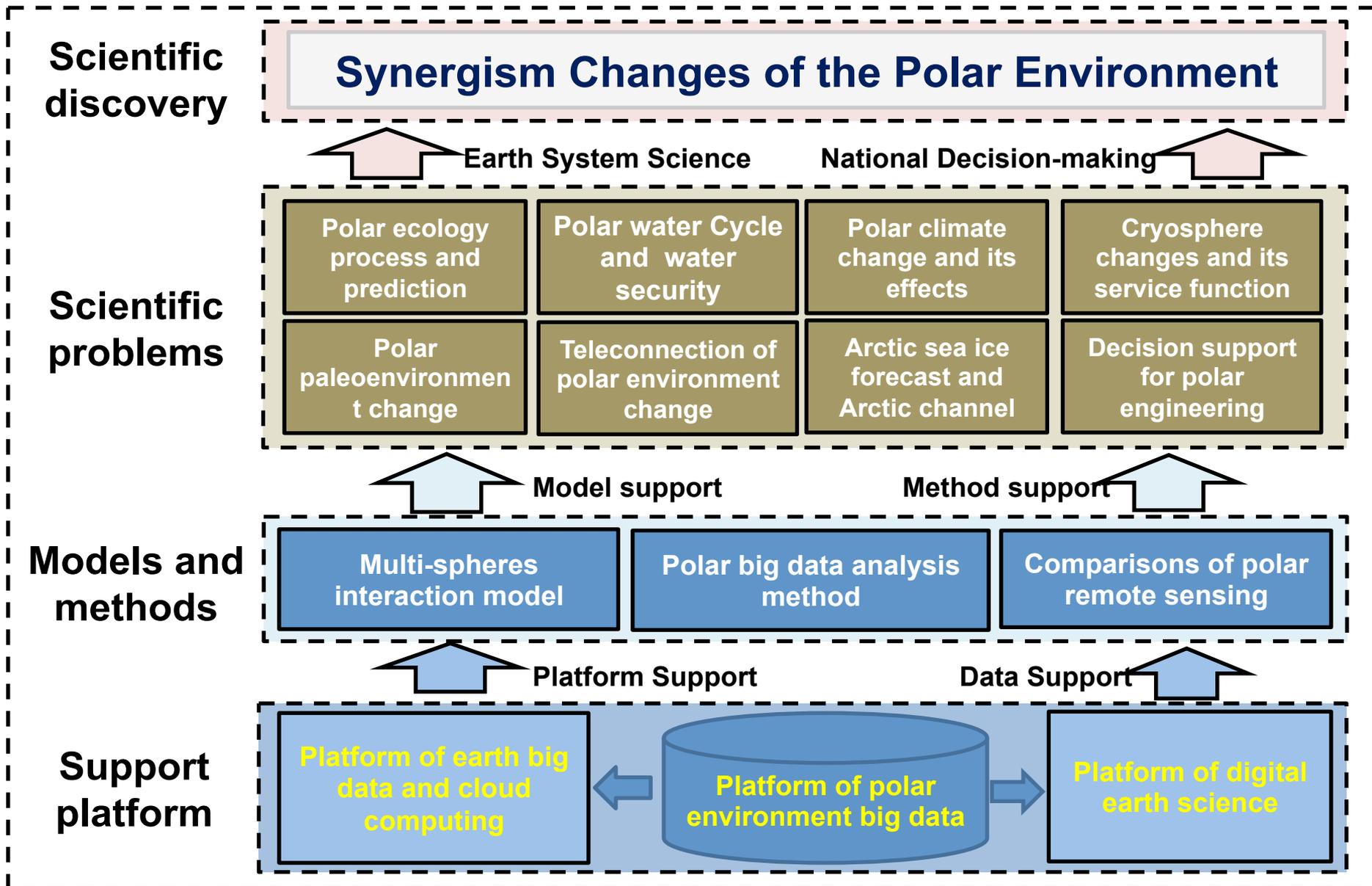




The Strategic Priority Research Program of Chinese Academy of Sciences: **Big Earth Data Science and Engineering**

CASEarth Poles: A Big Earth Data Platform for Three Poles

Overall technical framework of this project



Task groups of this project

Index	Tasks	Supporting institutions	Principal Investigator
1	Integration and sharing of polar data, method and model	Northwest Institute of Eco-Environment and Resources (NIEER), CAS	Tao Che
2	Synergism and comparison of polar remote sensing	Institute of Remote Sensing and Digital Earth (RADI), CAS	Xinwu Li
3	Spatial-temporal dynamics of polar water and ecology	Institute of Tibetan Plateau Research (ITP), CAS	Lei Wang
4	Multi-spheres interaction of polar climate system	Institute of Atmospheric Physics (IAP), CAS	Anmin Duan
5	Cryosphere service function and decision support	Northwest Institute of Eco-Environment and Resources (NIEER), CAS	Donghui Shangguan

Three Poles data center



- Data sharing with multiple layers (for modeling, computing, visualization)
- Service with different clients (Web, Mobile app, Web Service and SNS)
- Integrated with Hadoop & Spark
- Based on the ISO 19115/19139 Metadata
- Intellectual property protection for research data via DOI/Data Citation Index

- Antarctica and Arctic Ice Sheet Snowmelt Dataset
- Antarctica Ice Sheet Surface Elevation
- Sea ice concentration
- Key variables of water cycle in Arctic 1998-2017
- Global snow depth 1998-2017

<http://www.poles.ac.cn/#>

**Thank you for
your attentions**

