

 United Nations World Geospatial Information Congress
The Geospatial Way to a Better World 

DBAR-HIMAC : High Mountain and Cold Regions Data Aspects

Yubao Qiu¹, Massimo Menenti², Xin Li³, Juha Lemmetyinen⁴
(qiuwb@radi.ac.cn)

1 Aerospace Information Research Institute, CAS
2 Delft University of technology, Netherlands
3 Institute of Tibetan Plateau Research, CAS
4 Arctic Space Center, Finnish Meteorological Institute, Finland

2018.11.21@Deqing, China

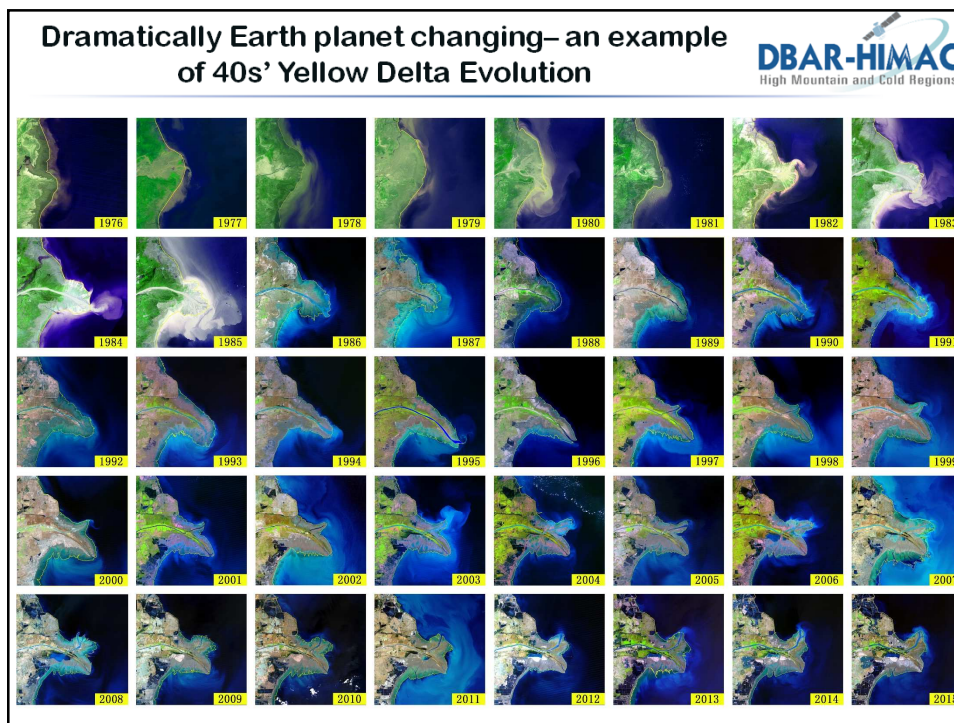
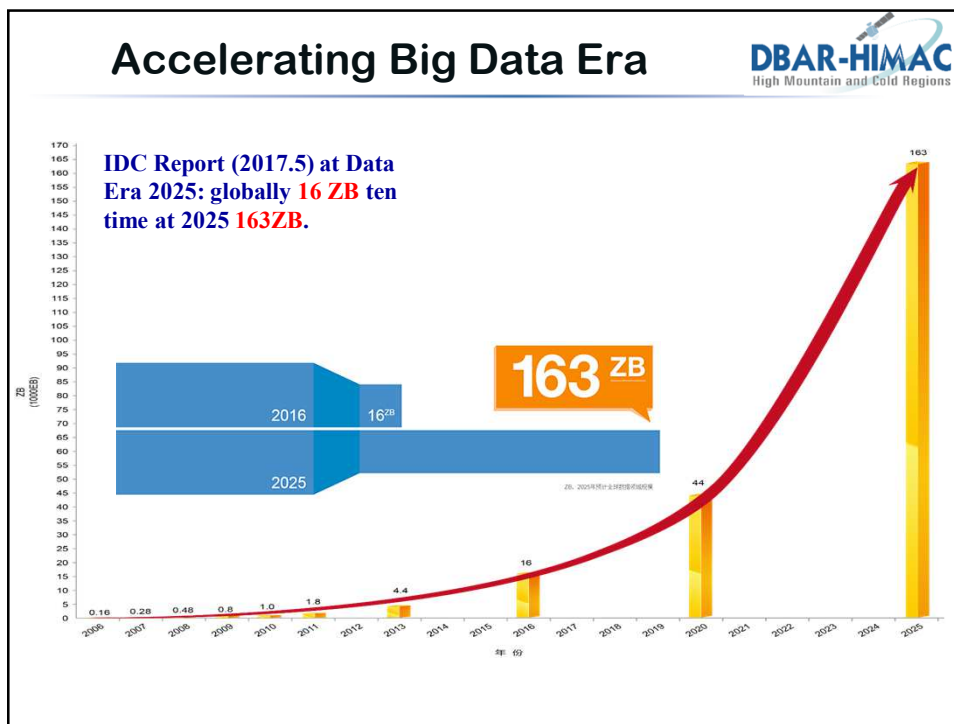


A Living Blue Planet for Human Kind 

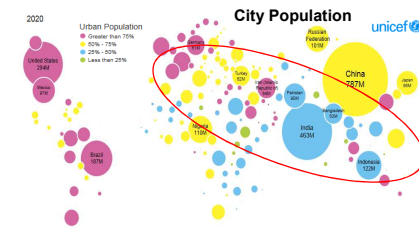
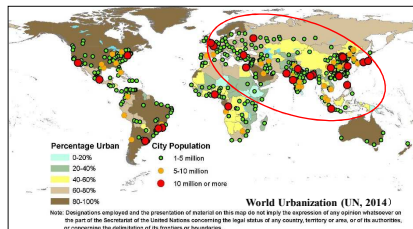
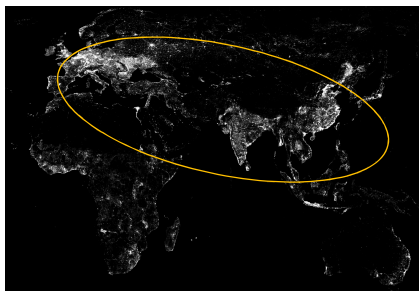
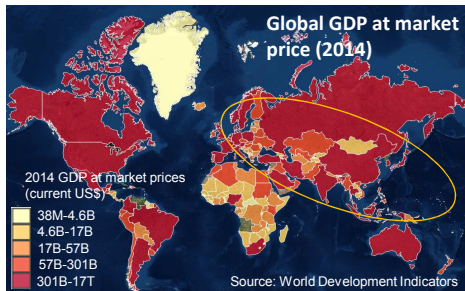
Human Activities









A breathing Earth




Data runs into the details of the Environment and Human activities, not only tell the truth, also provide the solutions and decision makers for the future.




China's Earth Observation Data

	<p>Meteorological Satellites</p> <p>FY-1 series: polar orbit satellites; FY-2 series: stationary orbit satellites; FY-3 series: polar orbit satellites</p>
	<p>Resource Satellites</p> <p>CBERS series: developed jointly by China and Brazil; ZY3-01/02: surveying, mapping and resource investigation.</p>
	<p>Ocean Satellites</p> <p>HY-1A/B: ocean color satellites; HY-2A: ocean dynamics and environment satellite.</p>
	<p>Environment and Disaster Reduction Satellites:</p> <p>HJ-1A/B: optical sensors; HJ-1C: S-band SAR sensor.</p>
	<p>High Resolution Satellites</p> <p>GF series: construction period: 2010-2020; including optical and SAR satellites.</p>
	<p>BeiDou Navigation and Positioning Satellites</p> <p>BeiDou series: including 35 satellites, networked operation; global coverage.</p>

EO Satellite Ground Stations







RADI's Ground Stations




DE Scientific Platform

Big Earth Observation Data in RADI

- **250TB - Archived Data**
 - More than **300GB** acquired by 3 ground stations per day
- **2 more ground stations will be built**
 - Launch more than **10** remote sensing satellites with high-resolution sensors in the next 5 years




Cessna Citation S/II




New Airplane

Data in Chinese Academy of Science





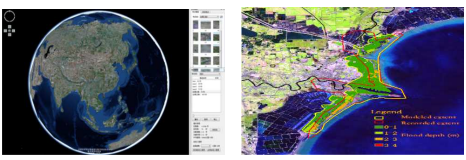
- The big Earth data resources are about **38PB**, and **8,000 million records**
 - **Earth observation data**: ~ 12PB
 - **Biology** (biodiversity, biological resources, etc.): ~22PB
 - **Ecology** (ecosystem monitoring, assessment, investigation, etc.) : ~ 3PB
 - **Resources and environment** (atmosphere, soil, fresh water, ocean, etc.) : ~ 1PB
- New data is expected to exceed 10PB over the next 5 years
 - Earth observation satellite raw data: increasing **2.5 TB daily**.


CASEarth Project



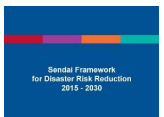
Big Earth Data Science Engineering Project

- ❑ A Project of the **Strategic Priority Research Program (SPRP)** of CAS, which focus on **Big Earth Data** study.
- ❑ Oriented toward **technological problems** concerning overall and long-term development resolving major scientific problems.



UN World Conference on Disaster Risk Reduction
2015 Sendai, Japan



- ❑ A strategic action plan that integrates technical problem-solving with **team- and platform-building**.
- ❑ Provide a new impetus for **interdisciplinary, cross-scale, macro-scientific discoveries** using big Earth data.

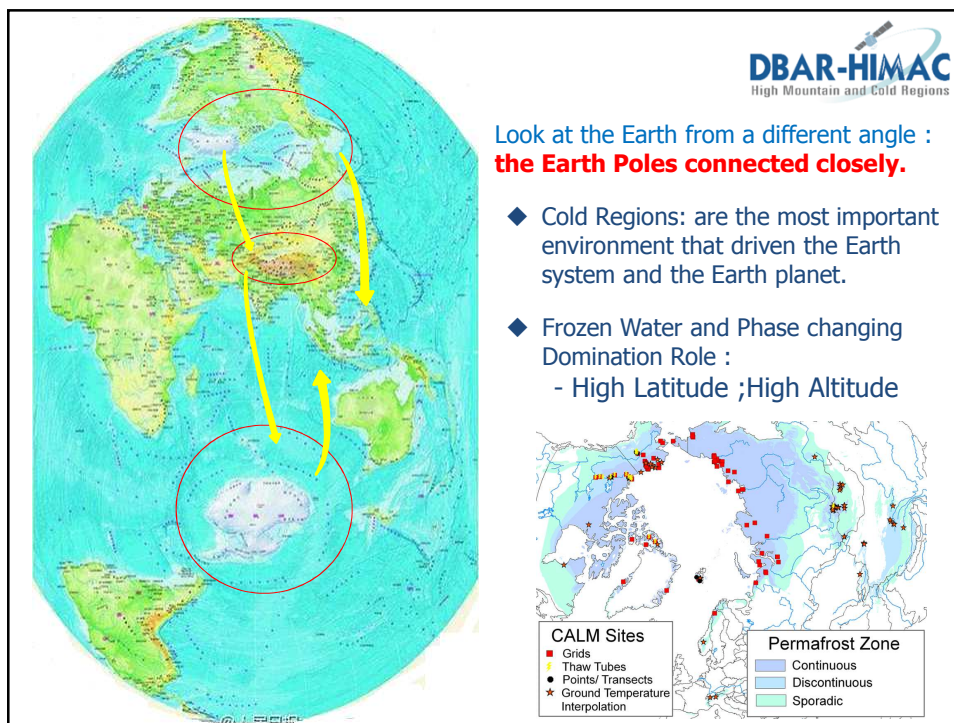
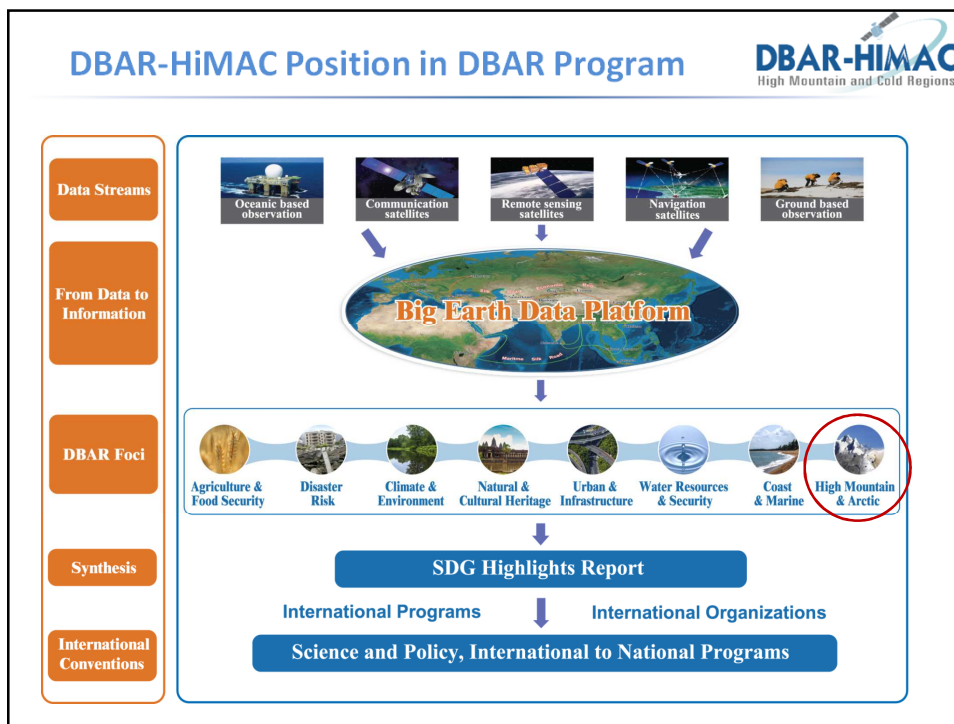
A New Journal

BIG EARTH

Data

VOLUME 1
ISSUES 1,2
DECEMBER 2017
PRINT ISSN: 2096-4471
ONLINE ISSN: 2574-5417
CN 10 - 1435/P
地球大数据(英文)
创刊号 简本





DBAR-HiMAC Task Force



Under the auspices of DBAR, the Task Force on High Mountain and Cold Regions (HiMAC) was established to address the challenges through **collaborations with the national and international programs and initiatives.**



Members of DBAR-HiMAC Task Force

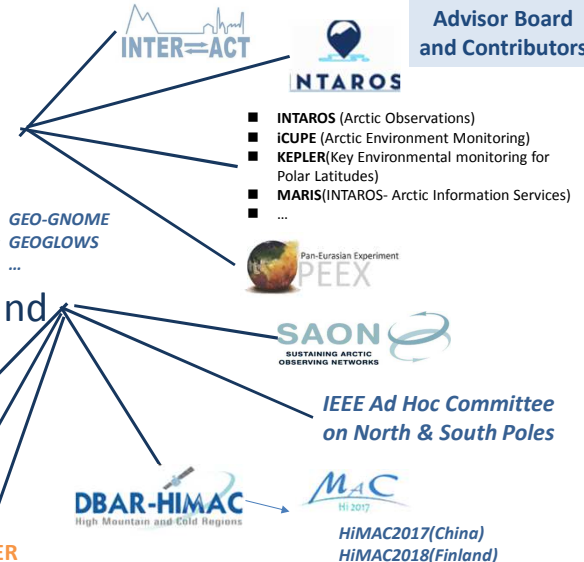


DBAR-HiMAC focuses on science objectives to build a **HiMAC Big Earth Data** component by linking the **existing Earth observations, archiving and documenting Earth observation data and geophysical products**, producing knowledge and services.

Collaborations



- Within GEOCRI
- Within GEO
- With other organizations and networks



Recent Activities of DBAR-HiMAC









- The 2017 International Workshop on Observations and Understanding of Changes in High Mountain and Cold Regions (HiMAC2017) was held in Beijing, China on 3-4th, March, 2017







- DBAR HiMAC White Paper: DBAR-HiMAC Publication – Position Paper in CAS Bulletin
- DBAR HiMAC Work Meeting on 4th, March, 2017
- Collaboration with GEO CRI

HiMAC2018 @ FMI-ASC, Finland





HiMAC2018 Workshop in Oct., 29-30, 2018

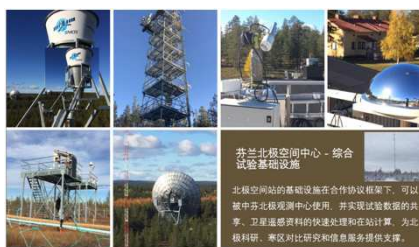
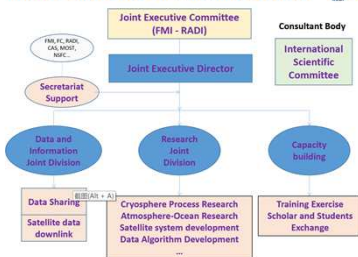
- Hosted by FMI-Arctic Research Center
- DBAR-HiMAC Task Force effort
- Inauguration of FMI-AIR Joint Research Center for Arctic Observations
- Six Sessions including international program, EU big projects, data ecosystem, essential variables, products, in-situ experiment, satellite systems, and earth science application, and adaption to societal benefits.






FMI-AIR Joint Research Center for Arctic Observations

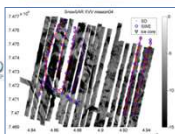
Joint Research Unit Collaboration Structure



Events, Partnership and MoU

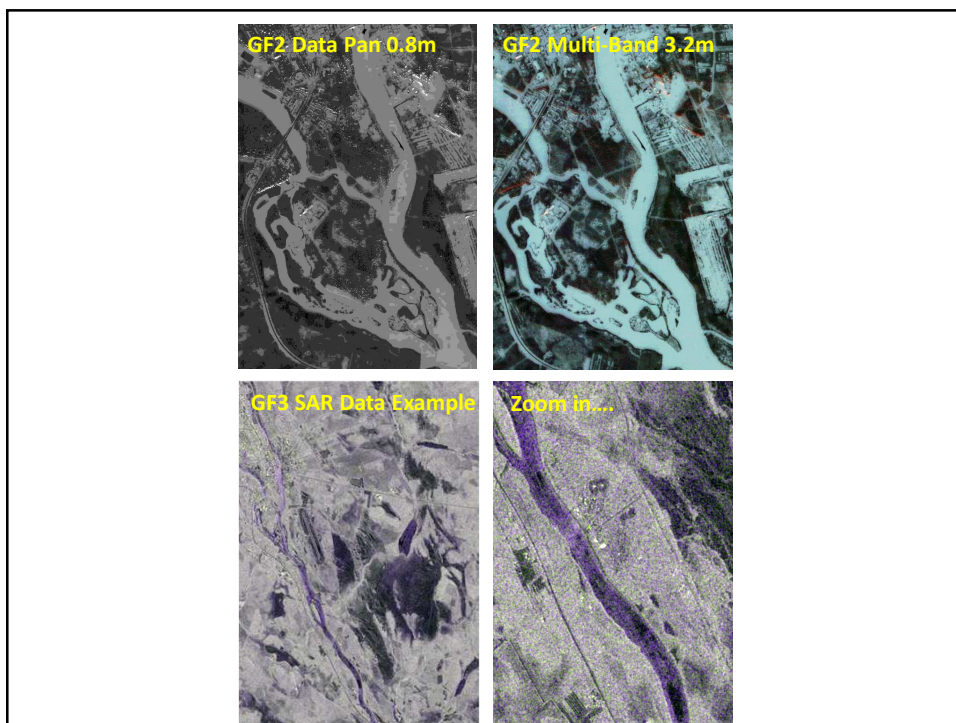
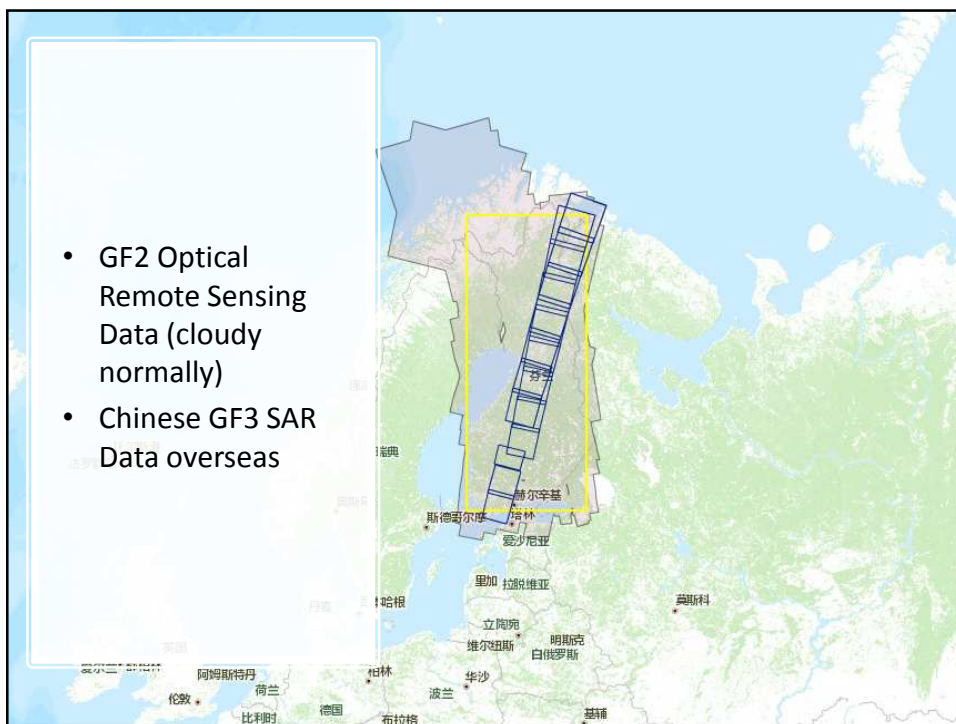


Partnership with FMI ARC (Sodankyla station)



FMI EO Data Center

- ✓ AOI Sentinel 1/2/3
- ✓ Sentinel 1 NRT ;
- ✓ Chinese Dataset from GF and others



MOST Projects contribute to the HiMAC

国家重点研发计划政府间重点专项 中欧政府间合作项目（空间）

北极环境多要素空间观测与信息服务研究 Multi-Parameters Arctic Environmental Observations and Information Services (MARIS)

汇报人：邱玉宝

主持单位：中国科学院遥感与数字地球研究所 (RADI-CAS)

参与单位：国家海洋环境预报中心 (NMEFC)

中国极地研究中心 (PRIC)

合作项目：EU-H2020北极综合观测系统 (INTATOS)

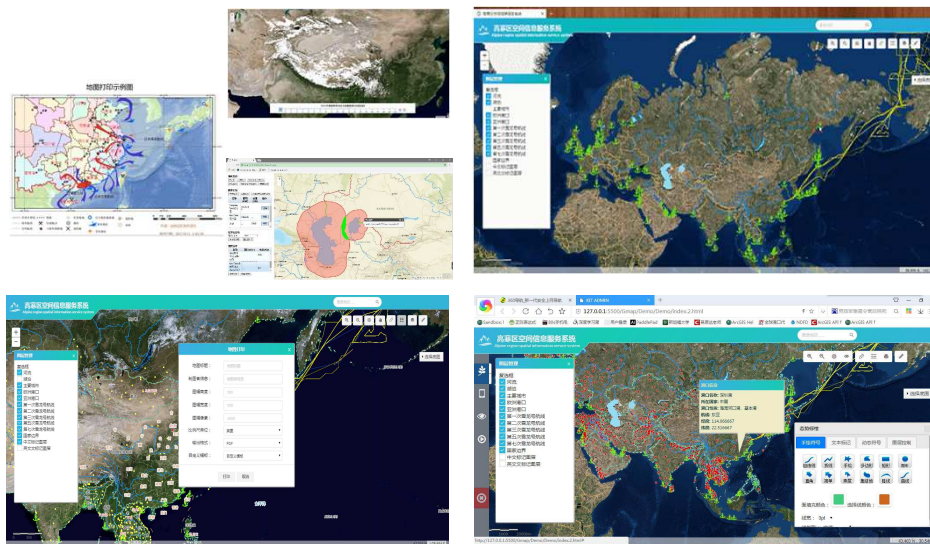
合作单位：挪威南森环境与遥感中心 (NERSC)

芬兰气象研究所北极研究中心 (FMI-ARC)

2018年10月16日 北京

HiMAC : Information Service system

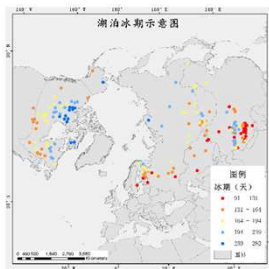
DBAR-HIMAC
High Mountain and Cold Regions



Big Earth Data Sub Package – Lake Ice, River Cie, and Sea Ice monitoring to HiAMC

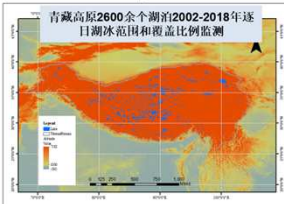
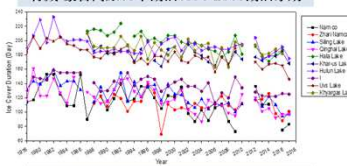
□ 湖冰物候监测结果：获取了三极区210个湖泊（含2002–2018年）湖冰物候数据集；其中含10个湖泊1978–2018年精细湖冰物候数据。

中大型湖泊冰期变化

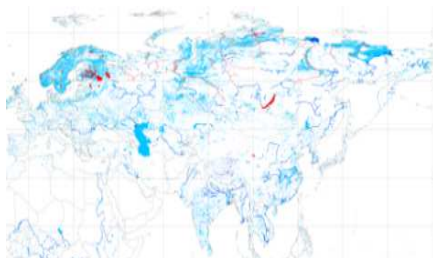
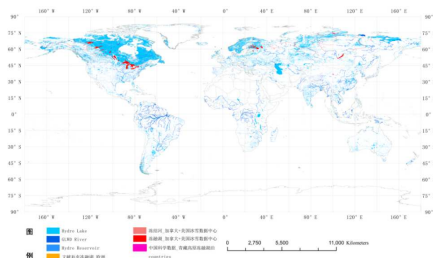


■ 完成了高亚洲地区2600余个湖泊5800多天的物候产品数据集，撰写投稿Big Earth Data (Dataset for MODIS-based Daily Lake Ice Extent and Coverage over Tibetan Plateau, 2018)；

青藏-蒙古高原10个湖泊1978-2018湖泊冰期



Big Earth Data Sub Package – Lake Ice, River Cie, and Sea Ice monitoring to HiAMC




CAS-GMELT Community Portal



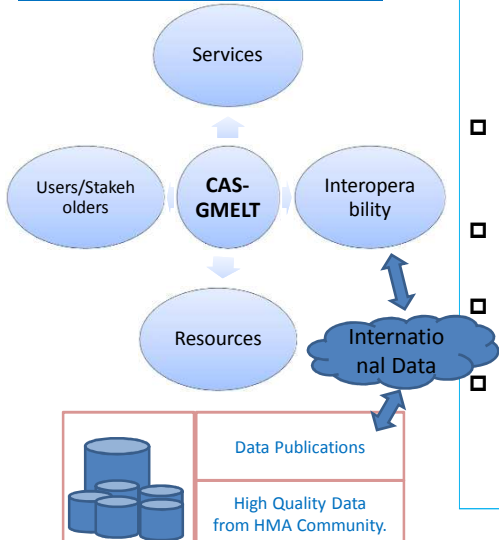
CAS-GMELT : A HMA Community Portal



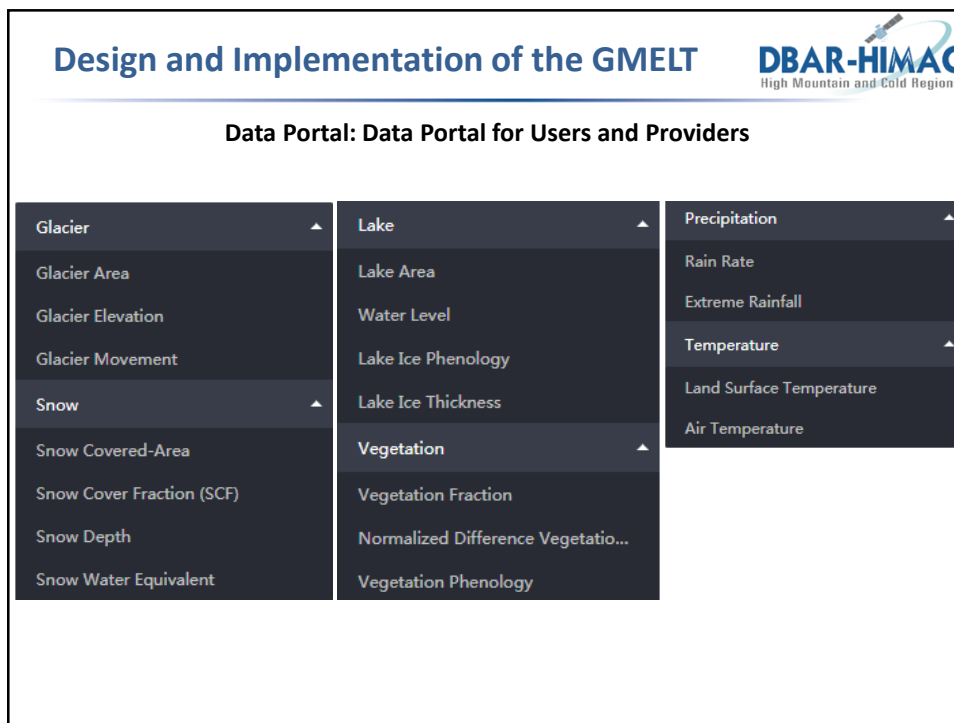
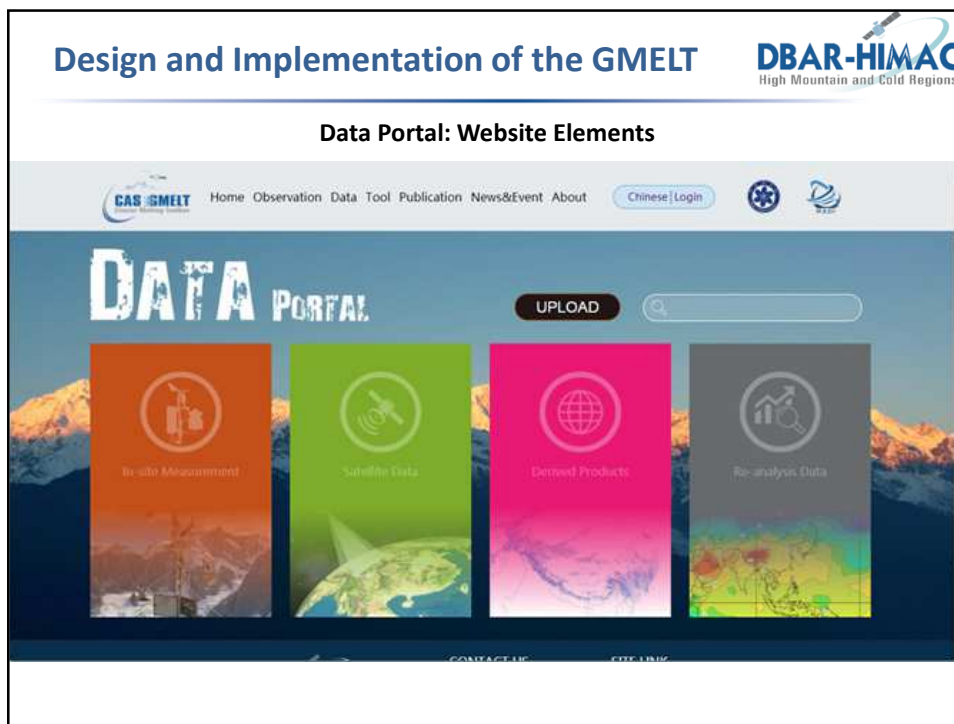
Design and Implementation of CAS-GMELT




CAS-GMELT Functions



- ❑ **Data/Tools Resource**
 - Integrate both CAS-HiMAT and non-HiMAT resources (data, tools, algorithm)
 - Registration Service : Dialogue with the individual information providers.
 - Harvesting from public resources
- ❑ **Services**
 - Build specialized applications and components that provide value-added services within the HMA Communities.
- ❑ **Stakeholders/Users**
 - Externals can have access to its resources and services (humans or machines).
- ❑ **Interoperability**
 - Exchange with the international portals, especially the NASA-GMELT, BED ...
- ❑ **Portal Management**
 - Documents/Publications Services
 - User management system
 - English/Chinese version
 - ...




Design and Implementation of the GMELT



Observation: Information Service and Data Viewer

Two folders:

- Data Statistic/Big Data
- Service (Glacier/Snow/Lake...)





Thank You

Contact details :

Yubao QIU: qiuyb@radi.ac.cn