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GEO COLD REGIONS

GEOCRI – GEO Cold Regions Initiative

Information Service for Cold Regions

Yubao Qiu and Co-Leads

22 - 24 May 2018

@ University of Colorado Boulder, Colorado USA

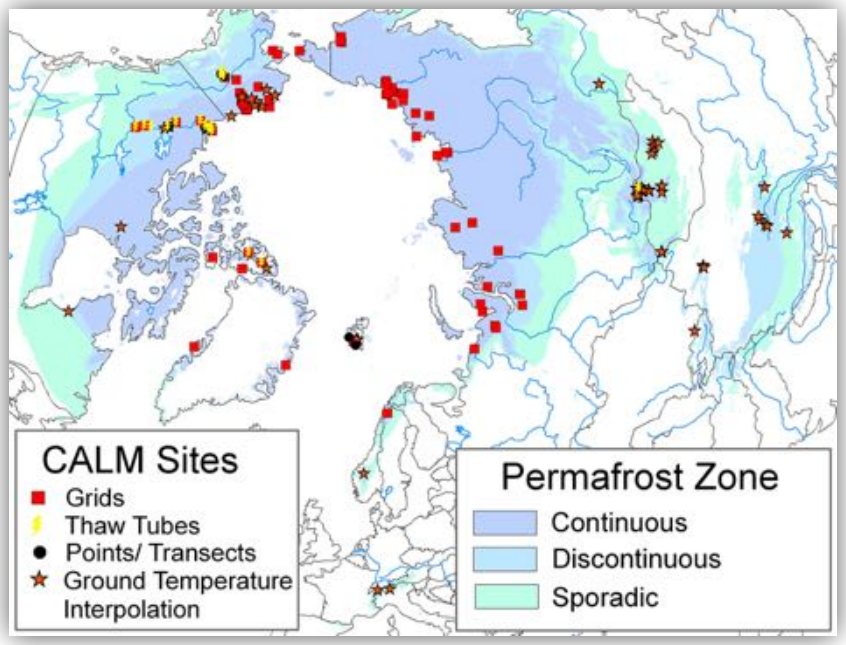
Thanks to former leading role for WA-01-03:
Information Service to Cold Regions

from

Prof. Ellsworth LeDrew

Look at the Earth from a different way : **the Earth Poles connected closely.**

- Cold Regions: are the most important environment that driven the Earth system and the Earth planet.
- Frozen Water and Phase changing Domination Role
  - ✓ High Latitude
  - ✓ High Altitude



GEOSS: An Information Service for Cold Regions

Conclusion and Recommendations from GEO Cold Regions Side Event
Geneva, Switzerland, January, 2014

An **Information Service for Cold Regions** (or GEO Cold Regions), exploiting the GEOSS information system, is needed to **provide easy access to observations and environmental information products by users across the globe**.

Why GEO Cold Regions?

The cold regions of our planet influence our entire world.

Scientific and Societal Development Importance

- More than 100 countries around the world have cryospheric elements.
- These elements are a main source of fresh water.
- Cold regions are the most ecologically and environmentally sensitive areas, and changes to these areas
- Comprehensively affect the dynamic earth system, impacting many aspects of society in all parts of the world.



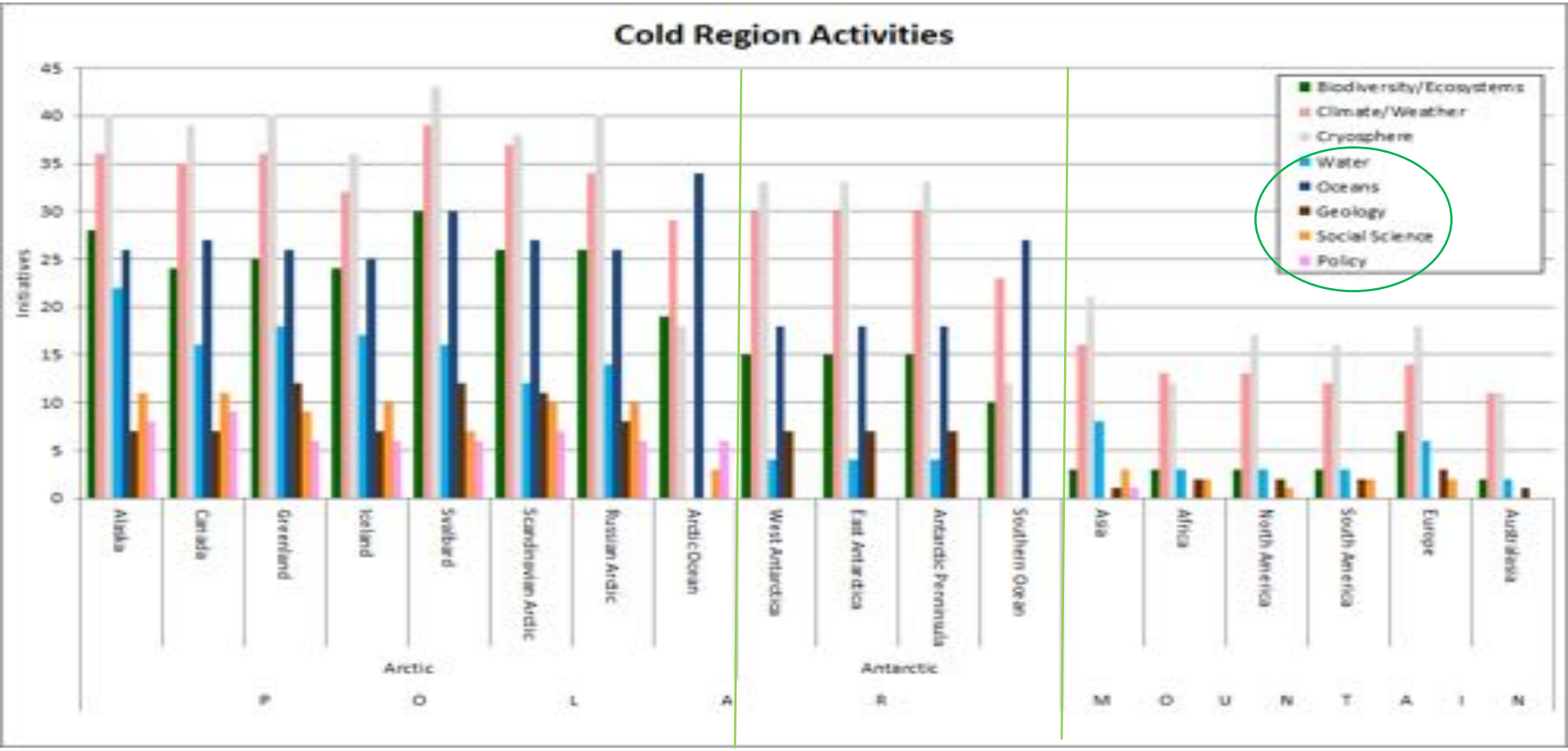

Environmental and Socio-Political Challenges

Specific Earth observation needs and requirements

Climate & Weather
Biodiversity & Ecosystems
International Relations & Cooperation
Sustainable Development, Indigenous Communities & Traditional Practices
Health
Agriculture, Fisheries, Hunting & Food
Water
Pollution & Environmental Protection
Hazards
Built Environment, Infrastructure & Transport
Energy
Mining & Fossil Fuels
Forestry
Shipping
Tourism

An Arctic Focus on Earth's Cold Regions

Activates related to Earth Observations and GEOCRI by domain



Numbers for the activities arranged by Regions

(Courtesy : Internship of GEO Sec., Mr Joseph Nolan)

GEOCRI – GEO Cold Regions Initiative

Aiming to coordinates global joint efforts for Earth observations and information services over a vast Cold Regions area including the North Pole, South Pole, High Latitude Ocean, Himalaya-Third Pole and Mountain Cold Regions.

- The ***GEO Cold Region Initiative (GEOCRI)*** is an initiated initiative in GEO XII at Nov. 2015, listed at GI-11: GEOCR Initiative, then approved formally in **GEO XIII Plenary**, Saint Petersburg, Russia.

- The AOS summit featured the GEO Cold Region Initiative (GEOCRI) that aims to **identify, address and fill observational gaps and improve networks through coordinated observation practices and information services worldwide**. See the *Statement on the GEO Cold Region Initiative(GEOCRI)*.

GEOCRI Mission and Objectives

Mission: Develop a **user-driven approach** for Cold Regions **information services to complement** the mainly current science-driven effort, and foster the collaboration for improved *Earth observations and information* on a global scale.

Objectives

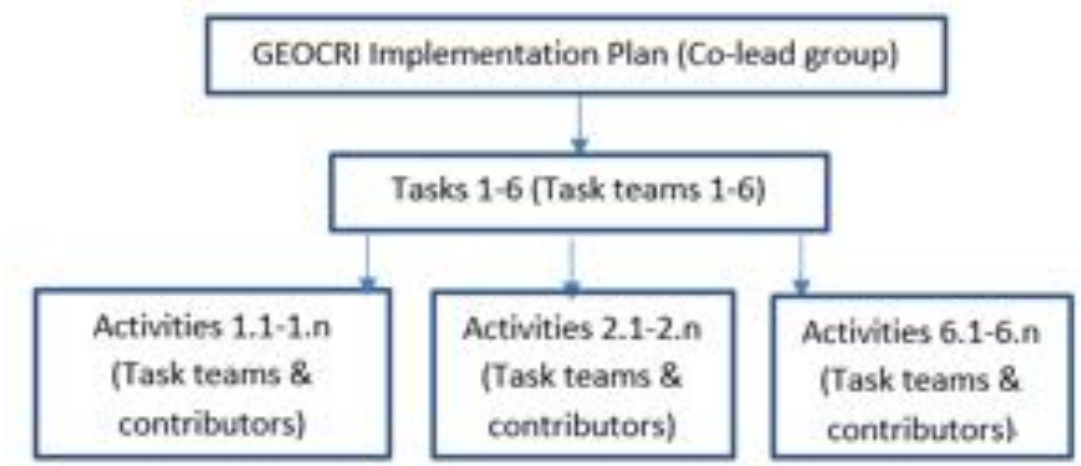
I. ***Integrating, Brokering and Promoting Earth Observations over Earth Cold Regions***

II. ***Advocating and Practicing Data Sharing***

III. ***Building Community Portal and Services***

IV. ***Strengthening Capacity building and Partnerships***

GEOCRI Task and Implentation Plan

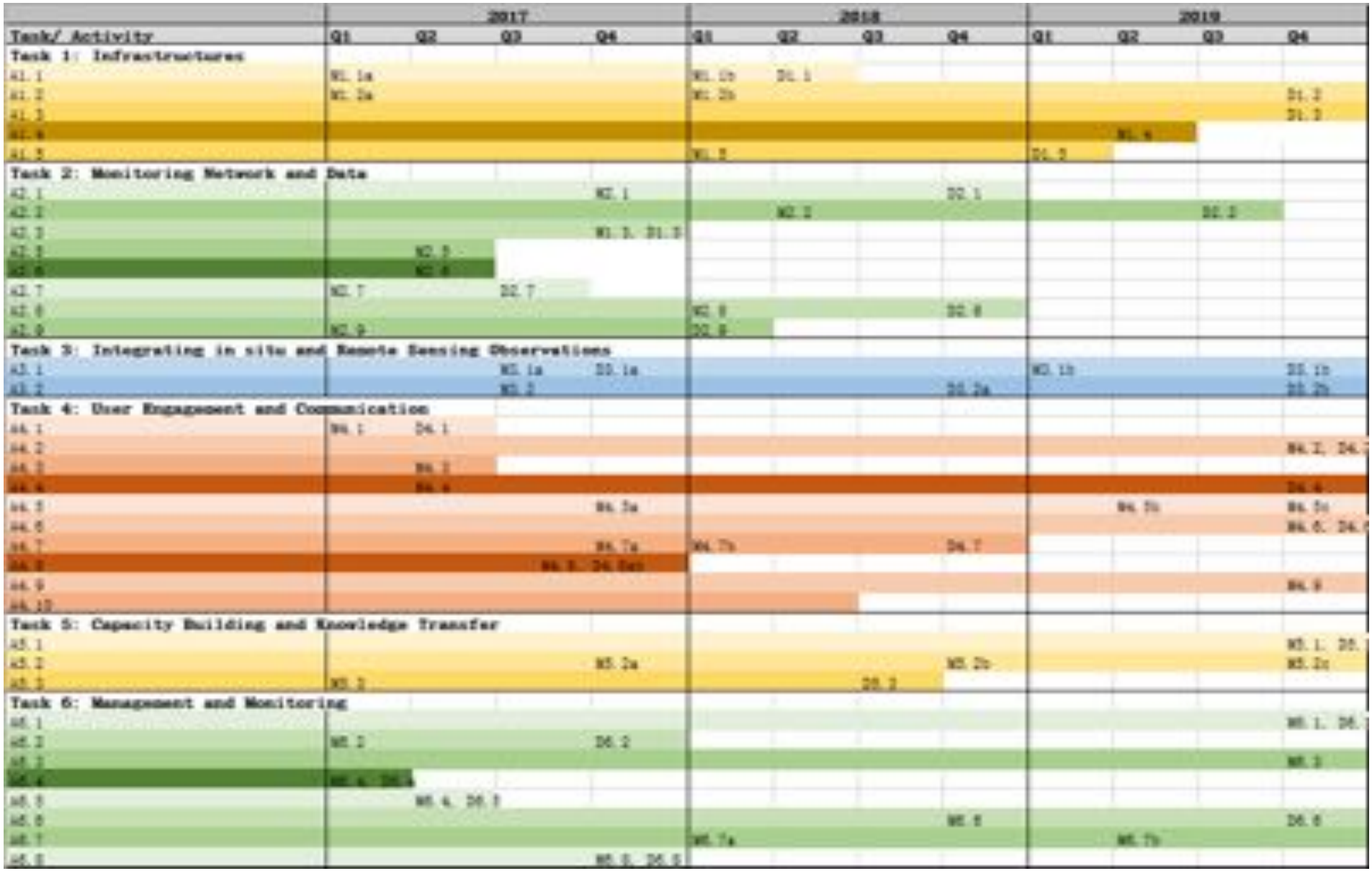


Hierarchy structure of the activities

Five Tasks:

- T1: Infrastructures
- T2: Monitoring Network and Data
- T3: Integrating in situ and Remote Sensing Observations
- T4: User Engagement and Communication
- T5: Capacity Buidling and Knowledge Transfer
- T6: Management and Monitoring

GEOCRI Task and Implentation Plan



Identified Activities - The Priorities

1) ***Community Portal Development – GEO CRI efforts***

- ***Data Management*** *compatible to GEO DM Principle*
- ***GEOSS*** *Data Infrastructure /Community Portal/Data Providers, Users*
- ***International body synergy*** *(SAON/SOOS/WDS/CODATA/RDA…)*
- ***Earth Three Poles Interaction*** *(Earth System/Climate adaption/ Environmental changes)*

2) ***Essential Variables for Cold Regions (GE CRI efforts – addressing the indicator)***

- ***Science Driven or Societal impact****: applications for* ***societal and economy development***
- ***Compatible to the existing EVs, and Indicators***
- *Interface between the* ***data and indicators*** *for evaluation process*
- *Deliverables:* ***White paper published***
- *GEO* ***Essential for the Earth Three Poles***
- ***SBA****: SDGs, Paris Agreement; Sendai Framework*

3) *Integration: In-situ, Remote Sensing, Model, and its Data Integrating*

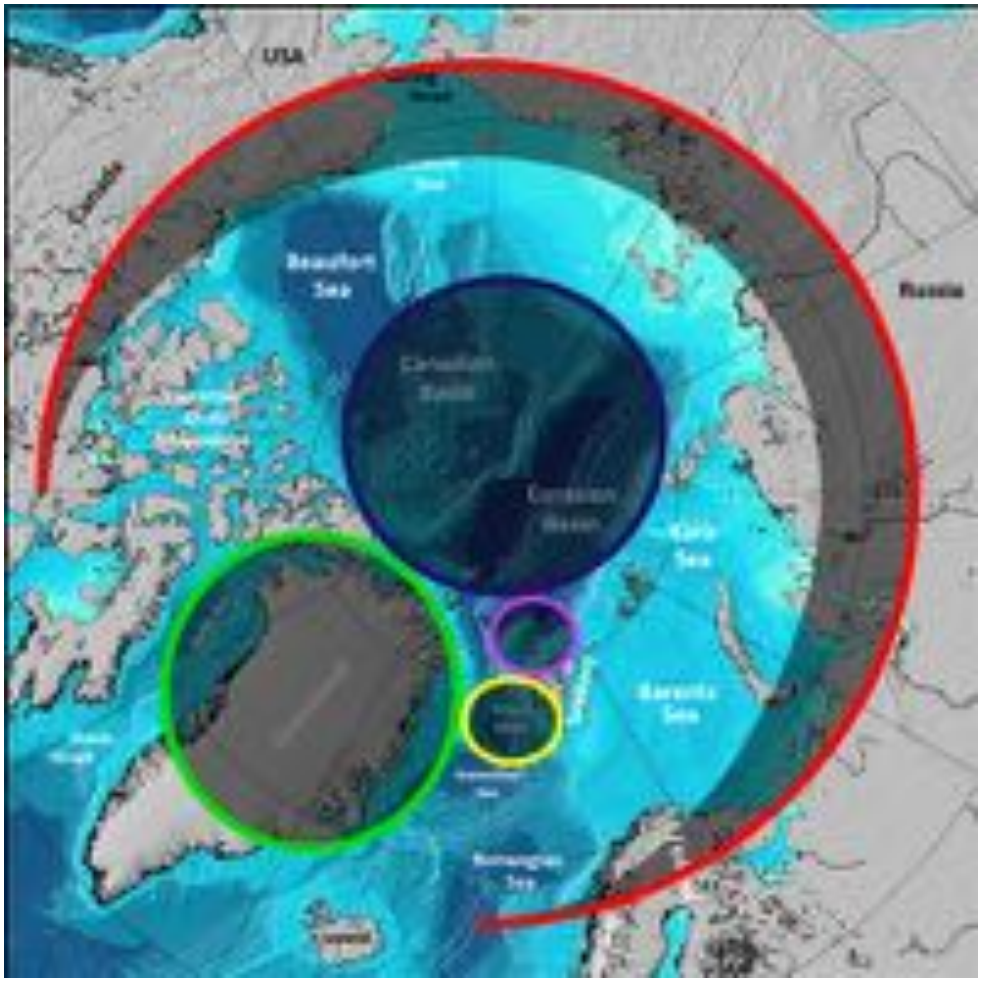
Example Networking and Collaborations

Networking : INTAROS overall objective

to develop an efficient integrated Arctic Observation System by

- extending,
- improving and
- unifying

existing and evolving systems in the different regions of the Arctic



Networking : IEEE Ad Hoc Committee on North & South Poles

Why this Ad Hoc Committee?

IEEE and GEO signed a MoU : GEO CRI is one of the priorities

Impact on transportation
Impact on Ecology
Impact on Security and Health

To identify ways in which IEEE can efficiently contribute to the different ongoing and planned initiatives to study and address changes that the North and South poles are experiencing from the environmental, communications, transportation, educational, and outreach points of view

Networking : GEO CRI Synergy Activities

Activities Recently (with NERSC/FMI)

Presented at INTAROS Meeting in Helsinki 2018

- 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

- HiMAC White Paper: DBAR-HiMAC Publication – Position Paper in CAS Bulletin

- DBAR HiMAC Work Meeting on 4th, March, 2017

Coming events for GEO CRI

Events : GEOCRI Side Meeting at Polar2018

The side meeting will provide an introduction to the GEOCRI, including its main contributors, activities and services to end-users of cold region related Earth observation data. The meeting will especially highlight **two ongoing GEOCRI activities: the development of the GEOCRI Community Portal** and **the Essential Cold Regions Variables**.

Tuesday, 19 June 2018; 12.30pm – 2pm; Room A Wisshorn ; Open meeting

Events : Participant to GEO Events 2018

Events : 2018 International Workshop on Observations and Understanding of Changes in High Mountain and Cold Regions (HiMAC2018)

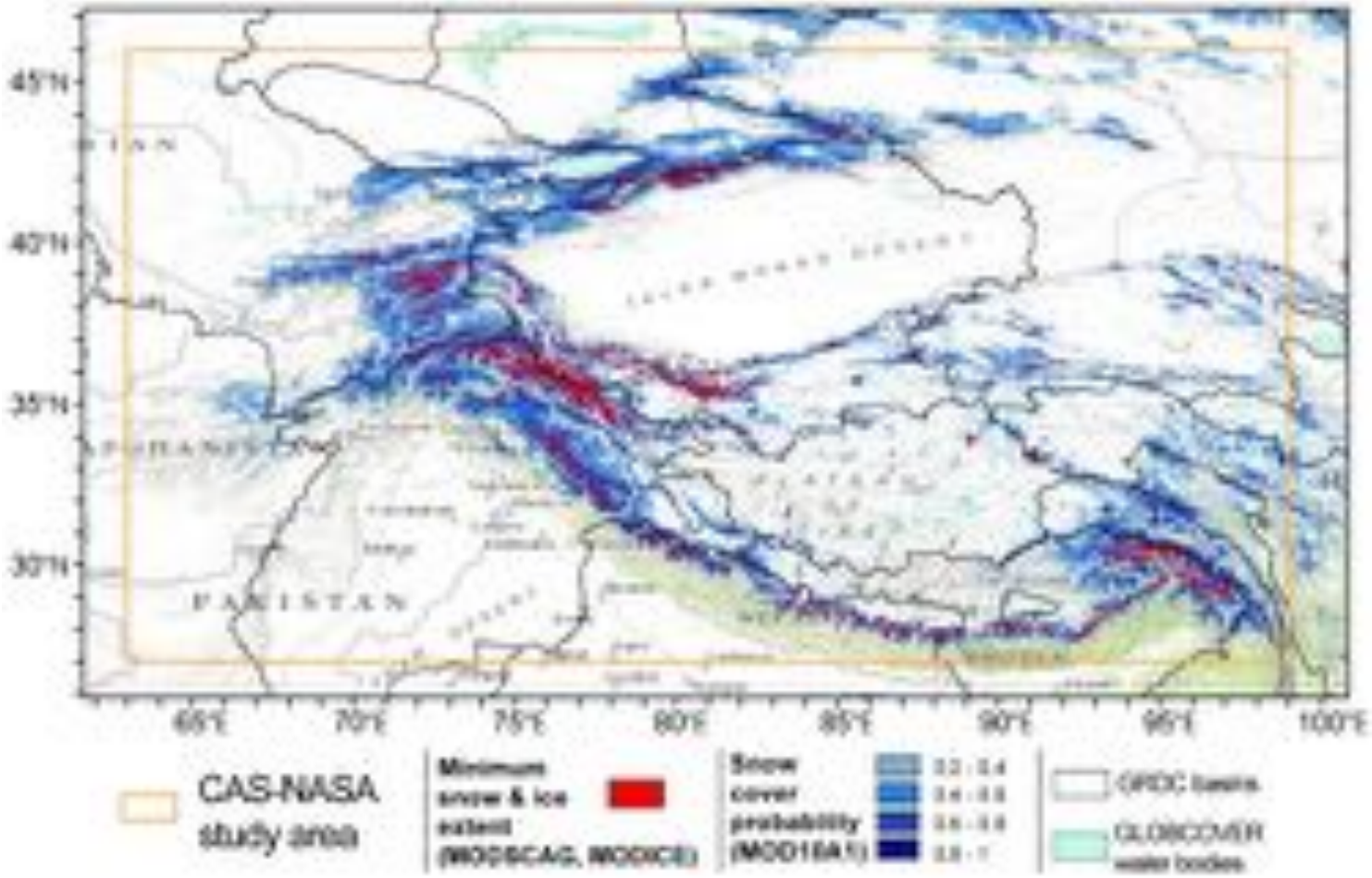
Late Oct @ Sodankylä, Finland

...

If time is available…

go

Data Related Activities for High Asia



Data Activities for High Asia

- Propose a High Asia Data Committee (HiDCON)
- Data Publications experience for open data efforts
- Data Portal – Customized User Portal for High Mountain Asia

Proposing High Asia Data Committee (HiDCON)

High Asia Data Committee (HiDCON)

- Member Countries over High Asia (Members/ POs)
- Regional and National Data Policy
- GEO Data Management
  - Data Activities/Portals
  - EO-based Information Service
- Data Provider / User Engagement

Proposing a Data Committee for the High Asia, addressing the data issue for the High Asia region, and to answer the Earth Cold Regions data issue (sharing/portal), and promote the information service for mountain cold regions over the Third Pole.

Data Publications experience for open data efforts

Data Publication – Special Issues I (2017)

Snow, Ice and Environment Over the Tibetan Plateau

Guest Editor: Qiu Yubao; Liu Shiyin; Chu Duo; Li Guoqing

Glacier Dataset:

- Southeastern Tibetan glacier inventory,
- Distribution of glacier surface movements in the mountainous areas of Muztagh Ata,
- Areal changes of the Kharola Glacier in Tibet, China.

Lake Ice/Area Dataset :

- Daily lake ice phenology of 51 large lakes in the plateau region during 2002-2016 and
- Changes in the lake surface area of medium-to-large plateau lakes during 2000-2012

Snow Dataset:

- Automatically observed snow depths on the Tibetan Plateau during 2013-2016
- Daily snow coverage on the Tibetan Plateau during 2002-2016.

Environment, climate and vegetation

- Extreme climate index of the Tibetan Plateau during 1960-2012,
- Regional phenology, vegetation coverage type and biomass during 2000-2015.

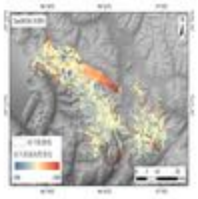
Data downloadable : http://www.csdata.org/en/p/issue/63/

Data Publications experience for open data efforts

Data Publication – Special Issues II (2018)

Ice, Snow and Environment Over High Mountain Asia

Guest Editor: LIU Shiyin, LI Xin, WANG Ninglian, ZHANG Yinsheng, LI Zhiwei, QIU Yubao



【高亚洲冰、雪和环境专题】发布时间：2018年4月28日 | 305 | 11

1980~2014年岗日嘎布地区冰川高程变化数据集

吴坤鹏，刘时银，蒋宗立，等

关键词： 数字高程模型；冰川高程变化；岗日嘎布；DInSAR；TerraSAR/TanDEM

doi：10.11922/csdata.2018.0011.zh

Glacier Data Typically

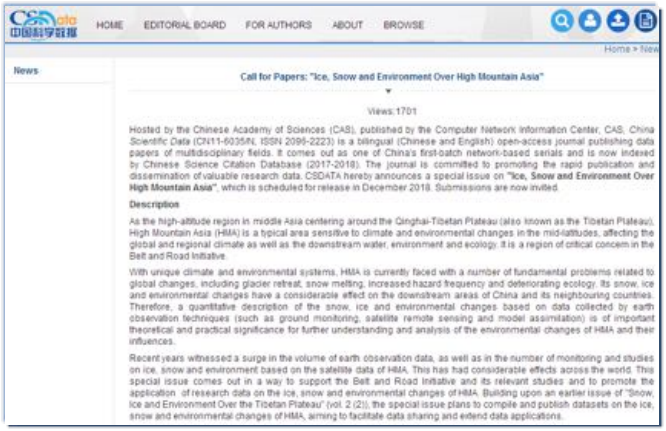
【高亚洲冰、雪和环境专题】发布时间：2018年4月25日 | 298 | 13

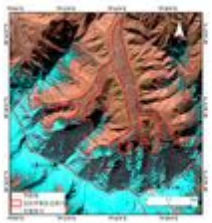
1971~2014年慕士塔格–公格尔地区冰川高程变化数据集

张震，刘时银，魏俊锋

关键词： 帕米尔；慕士塔格；公格尔；冰川高程变化；DEM

doi：10.11922/csdata.2018.0010.zh





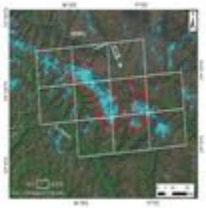
【高亚洲冰、雪和环境专题】发布时间：2018年4月19日 | 479 | 8

2015年东帕米尔高原跃动冰川数据集

张震，刘时银，魏俊锋

关键词： 帕米尔；跃动冰川；冰川表面运动；冰川高程变化；Landsat；ASTER

doi：10.11922/csdata.2018.0009.zh



【高亚洲冰、雪和环境专题】发布时间：2018年5月11日 | 109 | 4

1980~2015年岗日嘎布地区冰川分布数据集

吴坤鹏，刘时银，郭万钦

关键词： 冰川变化；岗日嘎布；1980~2015年；藏东南地区

doi：10.11922/csdata.2018.0013.zh

A New Journal : Big Earth Data

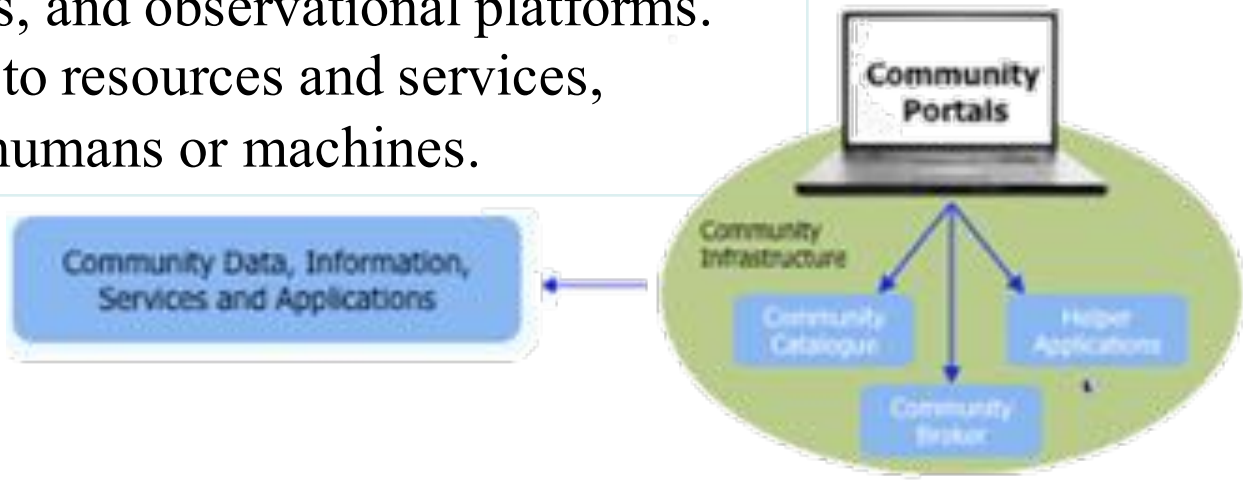
CAS-GMELT : A HMA Community Portal

CAS-GMELT : A HMA Community Portal

Concept of Community Portal

A **Community Portal** is "a community-focused 'website' that provides a human interface to content that may come from distributed resources."

- ✓ Portals provide **easy and open (free) access to data tools, and services**.
- ✓ **Data resources** may be **raw data and data products**, but also **metadata** about observational programs, projects, and observational platforms.
- ✓ **Externals access** to resources and services, Externals can be humans or machines.



CAS-GMELT : A HMA Community Portal

CAS-GMELT : HMA Community Portal

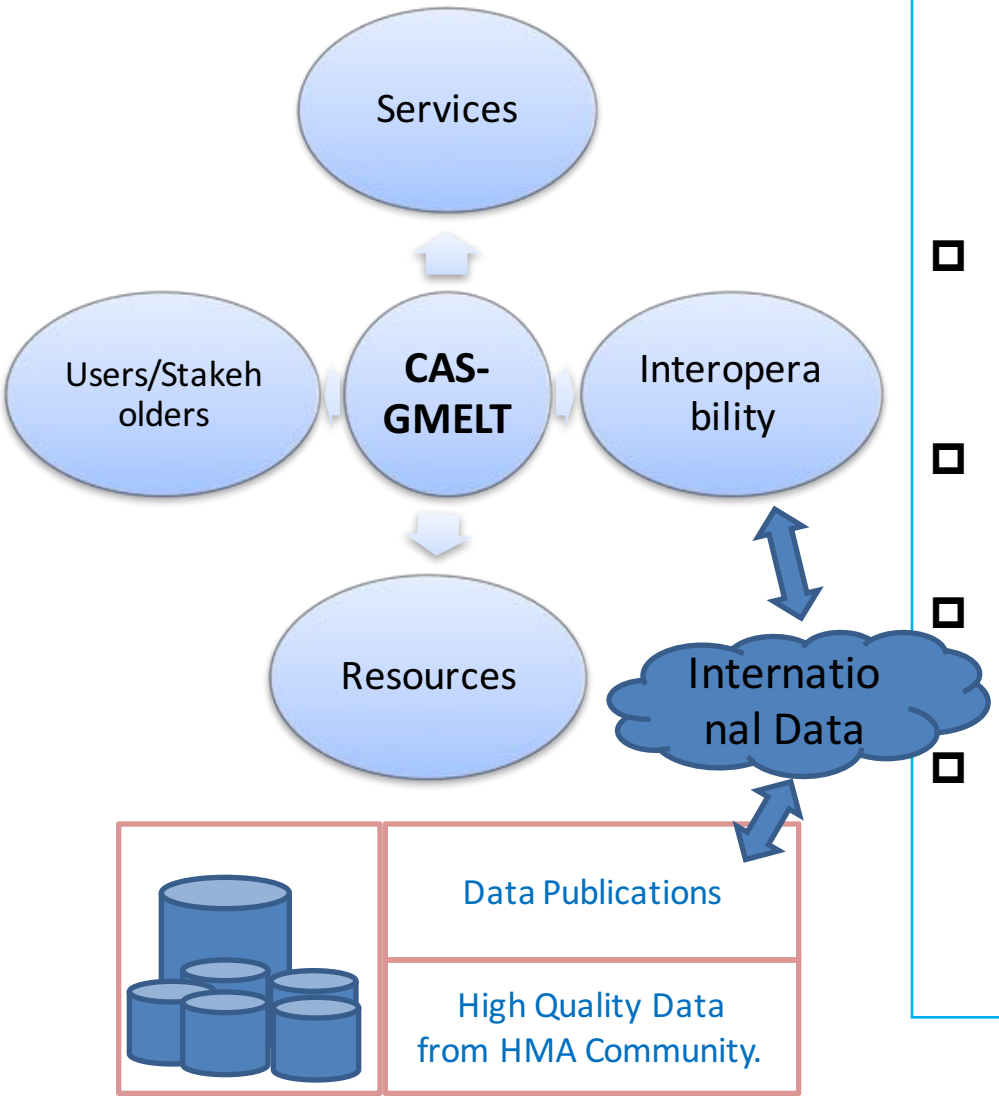
An online Community Portal for the Observations (**In-Situ**, **Satellite Data**, **Derived / Thematic Products**, **Re-Analysis Data**) , Tools/Algorithms, and Models for the research community of HMA, especially the glacier, snow, ice, and relevant water, energy and environmental data products.

To support the Research community of HMA, based an data sharing Policy and principle,

- ✓ Metadata management
- ✓ Store, Search and discovery of resources
- ✓ Harvesting remote resources - ***Interoperability***

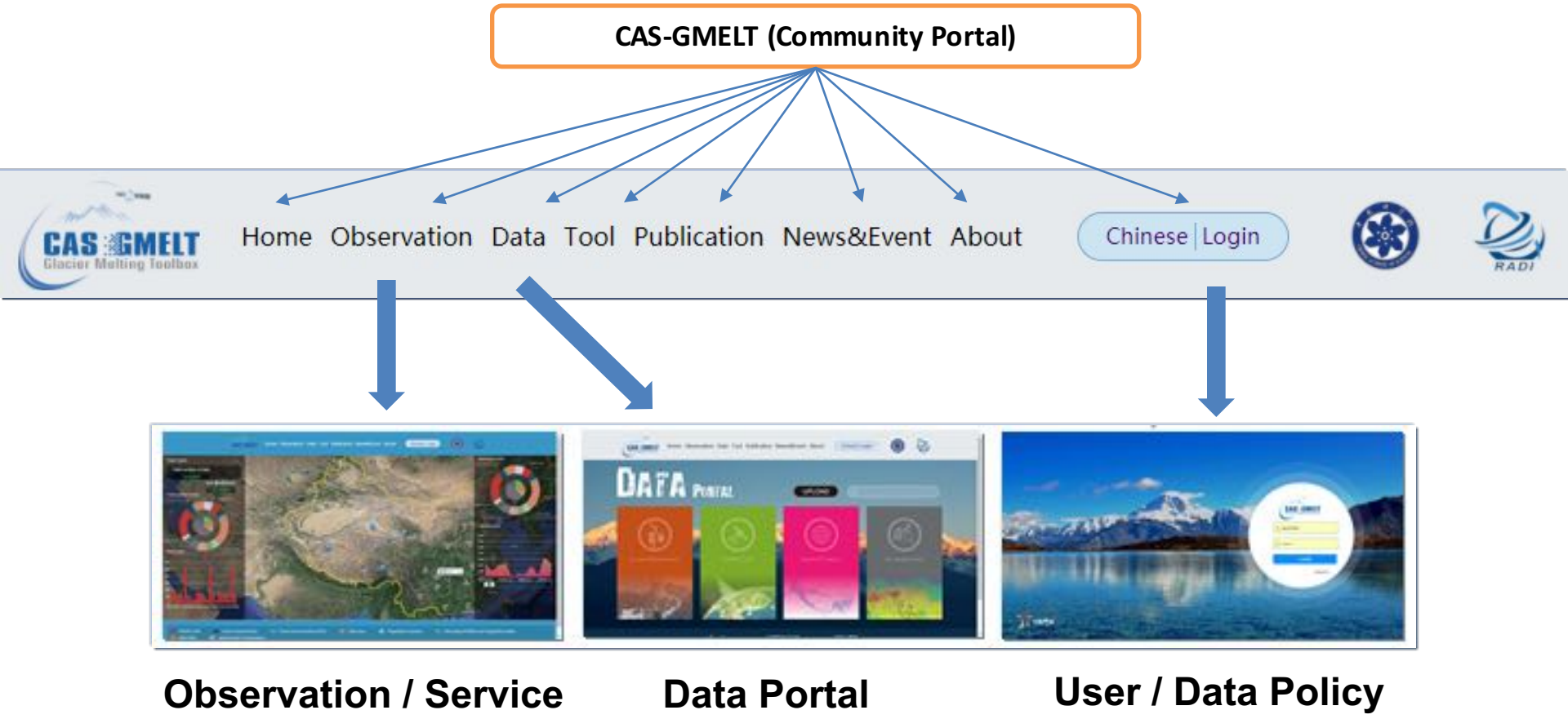
Design and Implementation of CAS-GMELT

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

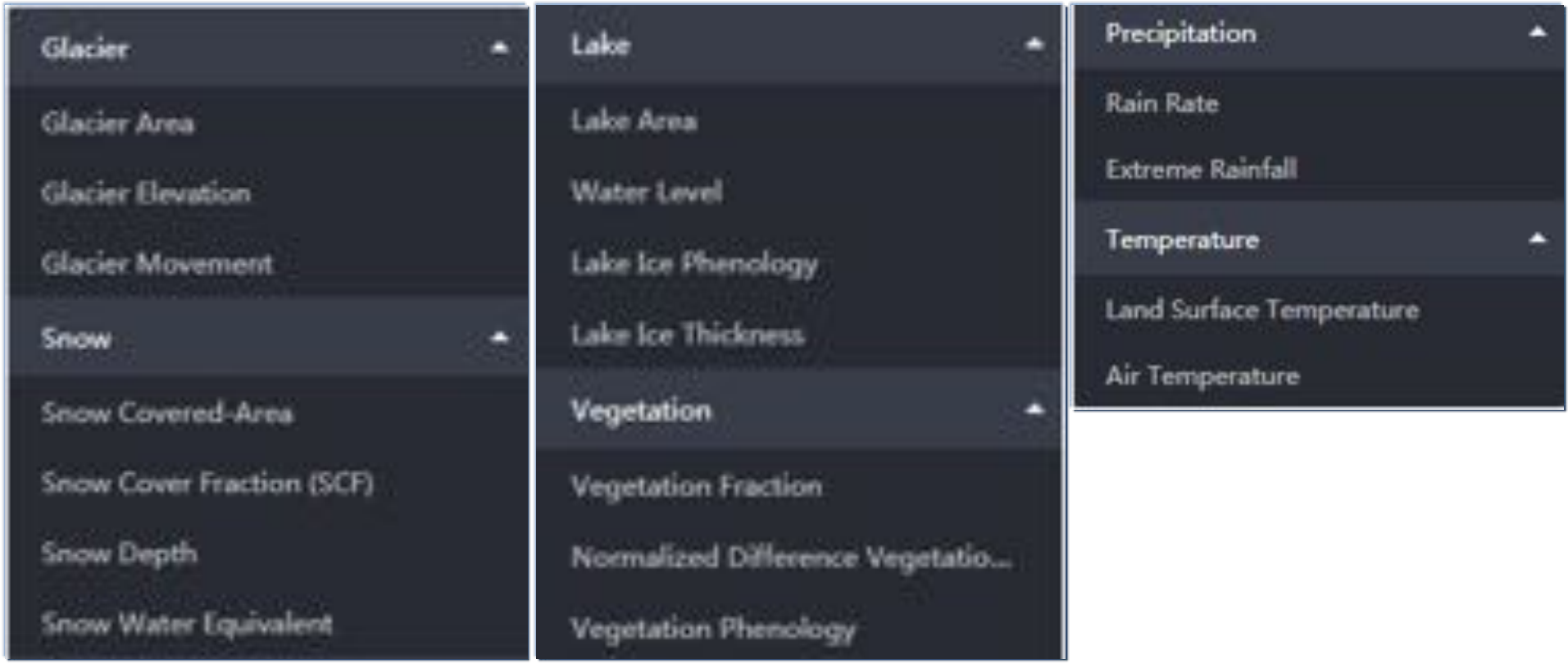


Design and Implementation of the GMELT

Data Portal: Website Elements

Design and Implementation of the GMELT

Data Portal: Data Portal for Users and Providers



Design and Implementation of the GMELT

Observation: Information Service and Data Viewer

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Thank You

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