**Rationale and Uniqueness of GEO Cold Regions Initiative**

## 1. Basic Information

* Full title of the Initiative: GEO Cold Regions Initiative - Service Practice
* Short Title or Acronym: GEOCRI
* Current category in the 2020-2022 GWP: New activity (follow-up activity initiated in 2017-2019
* Proposed category in the 2023-2025 GWP: Pilot Initiative
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## 2. Objective for GEOCRI - SP

To facilitate provision and standardization of satellite information products on the cryosphere-dominated cold regions to meet the needs of societies, including high elevation and high latitude cold regions.

The initiative will be providing information services based on high spatial and temporal resolution products to stakeholder’s communities focusing on snow and ice-related water stocks and flows, Arctic shipping advisory, and climate indicators relevant to cold regions SDGs.

## 3. Rationale for GEO CRI – Service Practice

**Undeniable Global Surface Temperature Rising by the middle of the century**

The Sixth IPCC Assessment Report (AR6) confirmed that human influence on the climate has warmed our atmosphere – water and land, and it will not be possible to see a reversal of this trend until at least the middle of the century with a continuing increase in global surface temperature. The cryosphere, i.e. snow, and ice, dominated areas will be the most influenced regions by dramatic changes in the water and energy exchange at the Earth surface. This is likely to lead to huge local impacts, e.g. increasing flooding, infrastructure instability, and in general more frequent natural disasters. At the same time the warming trend may create new opportunities in cold regions, such as increasing solar energy, opening waterways, and booming agriculture. Actions and services towards climate adaptation and sustainable development in cold regions will deserve high priority from now on and for decades to come. These challenges and opportunities call for an urgent response.

**Data openness for full fruition of information products in support of stakeholder services**

In the past years, massive Earth observation products have been produced by international and national projects about big earth data, with a focus on the synergy of in-situ and space-borne data. This development openedup free access to large data streams. The recently created databases and the open access to standard data products provide both the tools and historical data required for the full fruition of information services and the consolidation of the data value chain . Open science is leading the way forward to create data services consistent with the new stage of the development of the EOs market, this development deserves high priority in cold regions, where data are sparse and difficult to obtain by local communities. Space-based products effectively bridge multiple information gaps.

**National governments, multi-national agencies and private companies are calling for digital information services**

The United Nations push the digital commons to promote the digital benefits towards climate actions addressing the sustainable development goals. The digital services are at the end of the data stream into sustainable practices, with traditional agencies calling for the data to be applicable and cost-free, for instance, monitoring shipping lanes to adapt to new challenges. Both the emerging policy mandate and the needs of private actors call for the provision of information services to the cold regions.

## 4. Short description of the Initiative

The cold, high elevation and high latitude regions are inherently fragile, where environmental changes affect directly tens of millions and indirectly a few billions of human beings. Policies and economic drivers led to the growing exploitation of natural and environmental resources in these regions.

Timely and accurate information on the cryosphere (snow, glaciers, permafrost, high elevation lakes, freshwater ice, and sea ice) is necessary to protect the fragile ecosystems, facilitate sustainable exploitation of natural and environmental resources, and support the safe use of the land and ocean routes. This will be the pathway to achieve the Sustainable Development Goals (SDGs).

GEOCRI brings together the efforts of different communities currently active in the high elevation, and high latitude cold regions worldwide to address scientific and societal needs. The core interest of the GEOCRI community is to bring to fruition the information gathered continuously by the national and multi-national growing space-borne infrastructure acquiring very diverse and complementary observations on the global cold region environment. The contributors to the objectives of GEOCRI are currently operating observational infrastructure in the Arctic, Antarctic, and on the Himalayas and Tibetan Plateau. Likewise, data systems have been developed and are hosting rich data sets in the same regions.

The main practices will be priorities on the cold regions water stocks and flows, shipping advisory (with environment information services for arctic), emerging disaster warning/prediction services, and digital service to support progress towards cold regions SDGs.

We expect the initiative to generate continuous data streams on Essential Cold Regions Variables.4. **5. Uniqueness of GEO CRI**

The GEO CRI has a strong legacy of understanding cold regions environment through space observations, which is both relevant to GEO itself and accepted by users. Additional information about the information value to the different communities can be found at [www.geocri.org](http://www.geocri.org).

**Compared to the GEONOME, and ArcticGEOSS**

The GEOCRI is about the snow and ice (cryosphere) dominated cold regions in the world, a different global focus than mountain areas and the Arctic regions with observational networks.

We aim at creating and maintaining information services based on the synergy of in-situ and space-borne data, rather than the primary data collected by operational satellites.

**Mandate or Policy Requirement:**

The GEOCRI has been endorsed by YOPP in 2015, and in the process of gaining endorsements by the ISC bodies of science, private companies of COSCO other science programs and NGOs, e.g. International Polar Protection Association.