

**Application Form for World Centre of Excellence on Landslide Risk Reduction**  
**2020-2023**

1. Name of Organization

Research Center of Cold Regions Landslide

2. Name of Leader

Wei Shan(Coordinator of ICL Landslides in Cold Regions Network, Professor of Northeast Forestry University, China)

Affiliation: position

Northeast Forestry University (NEFU), Harbin, China.

Contact: postal address, fax, phone, email

Add:No.26 Hexing Road, Harbin, China. P.C.:150040

Contact: Tel/Fax: +86 (0)451 8219 1477,

E-mail: shanwei456@163.com

Core members of the activities

Names/Affiliations: (4 individuals maximum)

Marui Hideaki /Research Institute for Natural Hazards and Disaster Recovery, Niigata University, Niigata, Japan.

Stephan Gruber / Geography and Environmental Studies Carleton University, Ottawa, Canada.

Marina Leibman/ Earth Cryosphere Institute SB RAS, Tyumen, Russia.

Vít Vilímek/Scientific Council of the Geography Section Charles University, Prague ,Czech.

3. Date of Submission of Application

July .30th. 2019

4. Activity scale and targeted region.

1) Global

5. Short Title (10 words maximum) characterizing past and planned activities

Formation mechanism research, disaster warning, and universal education of Cold Regions Landslide

6. Objectives for the initial 3 years: (5 lines maximum; what you expect to accomplish?)

The relationship between permafrost distribution and geological, geomorphologic conditions in different cold regions of the world.

The methods of landslide analysis and monitoring in cold regions.

Comparative study of landslide typical case in cold regions.

7. Background Justification: (10 lines maximum)

During the past 100 years, the global climate is changing and the geological disasters caused by it are growing. In the high-altitude permafrost regions, the degradation rate of glacier is accelerating, On the other hand, in the high-latitude permafrost regions, With permafrost degradation, the Southern boundary of permafrost is moving Northward gradually.

Many new geological problems are emerging with phenomena of permafrost degradation and extreme weather. Because repeated freeze-thaw cycle and the melting of surface and shallow slope, the geological disasters such as mountain collapse, mud-rock flow, and landslide are growing. All of above not only drastically changed the local geological and environmental conditions, but also caused huge losses to human lives and property, and threatened the security of local.

8. Resources available for WCoE activities

Personnel, Facilities, Budgets, and Affiliation and Contribution to ICL/IPL-GPC.

This research center was based on Northeast Forestry University in China, and cold region landslide network(CRLN-ICL) in ICL. Every core members of it both is in a related research institutions of geological hazards in cold region, both of them had funding and research experiences and research results of cold region landslide. Some members are leaders of ICL / IPL-GPC project.

9. Description of past activities related to risk reduction of landslides and other related earth system disasters (30 lines maximum)

At present, there still is a big difference about the definition of cold regions, after the comprehensive o these views, we define “cold region” as the area whose average monthly temperature in coldest month is lower than  $-10^{\circ}\text{C}$ . According this definition, the area of “cold region” is more than 50% of global land area. In cold mountainous and hilly areas, the stability of mountain slope not only affected by its own gravity, precipitation, coverage, geological and geomorphologic conditions, but also affected by permafrost degradation and surface seasonal freeze-thaw function, that made the factor of slope instability became more complicated. With the advancement of science and technology, the theory and practice about cold regions enriched continuously. By Geological Survey, using remote sensing tools, permafrost distribution maps from global scale has been obtained, and different temperature zones had been divided. Using a wireless sensing and GPS positioning technology, through the establishment of a monitoring station, surface deformation monitoring of cold area had achieved automation. Through laboratory experiments and computer simulation, the mechanism and movement of landslides in cold

region were studied further.

10. Planned future activities /Expected Results: (20 lines maximum; work phases and milestones)

Global permafrost classification, distribution and its impact on slope stability considering different geological, geomorphologic conditions in different regions.

The methods of landslide analysis and monitoring in cold regions.

The effect of seasonal temperature changing and global climate changing on the mechanisms and movement of cold region landslide.

Risk mapping and mitigation of cold region landslide.

11. Beneficiaries of WCoE: (5 lines maximum; who directly benefits from the work?)

The study results could provide mitigation consulting to international organizations, national governments. Through cold regions landslide network, could spread related knowledge and provide education and training.

12. References: 10 lines maximum, i.e. relevant publications, international/regional/national recognition supporting items 9-10.

1). Guo Ying , Zhang Chengcheng, Han Qunli, ShanWei (2019) . Seminar on “Engineering and environmental geology in the permafrost region along the Sino-Russian-Mongolian Economic Corridor under the background of climate change” and the Annual Academic Conference of 2018 of ICL-CRLN and the Cold Region Landslide Research of IPL-WCoE held in Harbin. Landslides 16(3):99–102. DOI 10.1007/s10346-019-01157-z

2). Guo Y, Zhang C, Han Q, et al. Seminar on “Engineering and environmental geology in the permafrost region along the Sino-Russian-Mongolian Economic Corridor under the background of climate change” and the Annual Academic Conference of 2018 of ICL-CRLN and the Cold Region Landslide Research of IPL-WCoE held in Harbin[J]. Landslides:1-5.

4). Guo Y, Xu S, Shan W. Development of a frozen soil dielectric constant model and determination of dielectric constant variation during the soil freezing process. Cold Regions Science and Technology, 2018 (151) : 28 - 33.

Note: Please fill and submit this form **by 15 August 2019** to ICL secretariat <[secretariat@iclhq.org](mailto:secretariat@iclhq.org)>