Date of Submission	2023.04.10

IPL Project (IPL -203) Annual Report Form 2022

1 January 2022 to 31 December 2022

1. Project Title

   Analysis and identify of landslides based on species distribution and surface temperature difference (IPL 203)

2. Main Project Fields

   A. Monitoring and Early Warning, B. Hazard Mapping, Vulnerability and Risk AssessmentName of Project leader

   Ying Guo

   Affiliation:

   Institute of Cold Regions Science and Engineering, Northeast Forestry University, China.

   Contact: No.26 Hexing Road, Harbin, China.150040.

   Tel.86-451-82191590; E-mail:samesongs@163.com

   Core members of the Project
   Zhaoguang Hu, Institute of Cold Regions Science and Engineering Northeast Forestry University, China
   Chunjiao Wang, Institute of Cold Regions Science and Engineering Northeast Forestry University, China
   Chengcheng Zhang,Institute of Cold Regions Science and Engineering Northeast Forestry University, China
   Hua Jiang, Institute of Cold Regions Science and Engineering Northeast Forestry University, China

3. Objectives: (5 lines maximum)

   Under the permafrost, landslides and other complex geological conditions investigation, design, construction and monitoring technical of express way expansion project.

4. Study Area: (2 lines maximum)

   Beian - Heihe Expressway Extension Project K160~K182 Section

5. Project Duration (1 line maximum)
   2016.08-2024.12

6. Report

1) Progress in the project: (30 lines maximum)

Summarize typical regional cases, draw regional PF distribution maps, and plant distribution maps.

2) Planned future activities or Statement of completion of the Project (15 lines maximum)

Conduct large-scale geological surveys and tree core sampling, and draw high-resolution maps of permafrost distribution and vegetation distribution. Case Summary.

3) Beneficiaries of Project for Science, Education and/or Society (15 lines maximum)

Melting permafrost caused by climate change led to many landslide, which have a dramatic impact on the regional environment, ecology and construction project. It has important scientific and engineering significance to carry out long-term monitoring and analysis for this hot issue.

4) Results: (15 line maximum, e.g. publications)

Publication

1. Shan, W.; Zhang, C.; Guo, Y.; Qiu, L.; Xu, Z.; Wang, Y. Spatial Distribution and Variation Characteristics of Permafrost Temperature in Northeast China. Sustainability 2022, 14, 8178, doi:10.3390/su14138178.

2 Xu, Z.; Shan, W.; Guo, Y.; Zhang, C.; Qiu, L. Swamp Wetlands in Degraded Permafrost Areas Release Large Amounts of Methane and May Promote Wildfires through Friction Electrification. Sustainability 2022, 14, 9193, doi:10.3390/su14159193.

3. Shan, W.; Qiu, L.; Guo, Y.; Zhang, C.; Ma, M. Dynamic Analysis in Surface Water Area and Its Driving Factors in Northeast China from 1988 to 2020. Water 2022, 14, 2296, doi:10.3390/w14152296.

4.Guo, Y.; Du, Y.; Shan, W.; Liu, M.; Zhang, C. Numerical Analysis on the Stability of Sandstone-Covered Mudstone Cutting Slopes Considering Rainfall Infiltration. Appl. Sci.-Basel 2023, 13, 1802, doi:10.3390/app1303180

5. Guo, Y. Plant reinforcement engineering of soil cutting slope in Northeast frozen area.

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Two Master:

*Wei Qi – Master's Degree

School: School of Civil Engineering, Northeast Forestry University, Harbin, China

Title: Characteristics of Frozen Soil Changes and Stability Analysis of Highway Embankments in Great Khinggan and Lesser Great Khinggan Mountains

*Xiyi Yang– Master's Degree

School: School of Civil Engineering, Northeast Forestry University, Harbin, China

Title: Study on the Hydrothermal Characteristics and Soil Particle Migration of Sand Soil Replacement Roadbed under Freeze-thaw Cycling