A Big Earth Data Platform for Three Poles

**A biophysical permafrost zonation map in the Northern Hemisphere (2000-2016)**

1、Description

This biophysical permafrost zonation map was produced using a rule-based GIS model that integrated a new permafrost extent, climate conditions, vegetation structure, soil and topographic conditions, as well as a yedoma map. Different from the previous maps, permafrost in this map is classified into five types: climate-driven, climate-driven/ecosystem-modified, climate-driven/ecosystem protected, ecosystem-driven, and ecosystem-protected. Excluding glaciers and lakes, the areas of these five types in the Northern Hemisphere are 3.66×106 km2, 8.06×106 km2, 0.62×106 km2, 5.79×106 km2, and 1.63×106 km2, respectively. 81% of the permafrost regions in the Northern Hemisphere are modified, driven, or protected by ecosystems, indicating the dominant role of ecosystems in permafrost stability in the Northern Hemisphere. Permafrost driven solely by climate occupies 19% of permafrost regions, mainly in High Arctic and high mountains areas, such as the Qinghai-Tibet Plateau.

2、Keywords

Theme：Soil,Cryosphere remote sensing products,Surface Freeze-thaw Cycle/state Remote Sensing,Permafrost,Frozen Ground  
Discipline：Terrestrial Surface,Cryosphere  
Places：Global, Alaska, Northern Hemispheric, Arctic, The High Mountain Asia  
Time：2000-2016

3、Data details

1.Scale：None

2.Projection：

3.Filesize：29.1MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：85.0 | - |
| west：-180.0 | - | east：180.0 |
| - | south：25.0 | - |

5、Time frame:None--None

6、Reference method

References to data:

LI Xin, Li Ren, Wu Tonghua, RAN Youhua, JIN Huijun, CHENG Guodong. A biophysical permafrost zonation map in the Northern Hemisphere (2000-2016). A Big Earth Data Platform for Three Poles, doi:10.11888/Geocry.tpdc.2716592021

References to articles:

Ran, Y., Li, X., Cheng, G., Che, J., Aalto, J., Karjalainen, O., Hjort, J., Luoto, M., Jin, H., Obu, J., Hori, M., Yu, Q., & Chang, X. (2022). New high-resolution estimates of the permafrost thermal state and hydrothermal conditions over the Northern Hemisphere. Earth System Science Data, 14, 865–884. DOI: 10.5194/essd-14-865-2022.  
  
Ran, Y.H., M. Torre Jorgenson, Li, X., Jin, H.J., Wu, T.H., Li, R., Cheng, G.D. (2021). Biophysical permafrost map indicates ecosystem processes dominate permafrost stability in the Northern Hemisphere. Environmental Research Letters. https://doi.org/10.1088/1748-9326/ac20f3.

7、Supporting project information

8、Data resource provider

name: LI Xin  
unit:   
email: xinli@itpcas.ac.cn  
  
name: RAN Youhua  
unit:   
email: ranyh@lzb.ac.cn  
  
name: Li Ren  
unit:   
email: liren@lzb.ac.cn  
  
name: Wu Tonghua  
unit:   
email: thuawu@lzb.ac.cn  
  
name: CHENG Guodong  
unit:   
email: gdcheng@lzb.ac.cn  
  
name: JIN Huijun  
unit:   
email: hjjin@lzb.ac.cn  
  
name: M. Torre Jorgenson  
unit:   
email: ecoscience@alaska.net