A Big Earth Data Platform for Three Poles

**Frozen soil map of China (2000)**

1、Description

Overviewing the various frozen soil maps in China, there are great differences in the classification systems, data sources, and mapping methods. These maps represent the stage of understanding of the permafrost distribution of China in the past half century. To reflect the distribution and area of frozen soil in our country more reasonably, we have made a new frozen soil distribution map based on the analysis of the existing frozen soil maps. The map combines several existing maps of permafrost and the simulation results of a permafrost distribution model on the Tibetan Plateau. It unifies the acquisition time of data from various parts of the country and reflects the distribution of permafrost in our country around 2000.  
In the new frozen soil map, the distributions of various types of frozen soil are determined according to the following principles.  
1. The base map uses the Geocryological Regionalization and Classification Map of the Frozen Soil in China (1:10 000 000) (Guoqing Qiu et al., 2000). The distribution of permafrost and instantaneous frozen soil in the high mountains outside the Tibetan Plateau follows the original map; the boundaries of seasonal frozen soil and instantaneous frozen soil, instantaneous frozen soil and nonfrozen soil remain unchanged, too. The distribution of permafrost on the Tibetan Plateau and in the high latitudes of the Northeast is updated with the following results.  
2. The distribution of high-altitude permafrost and alpine permafrost in the Tibetan Plateau region is updated using the simulation results of Zhuotong Nan et al. (2002). This model uses the measured average annual ground temperature data of 76 boreholes along the Qinghai-Tibet Highway to perform regression statistical analysis and obtains the relationship between annual mean geothermal data with latitude and elevation. Based on this relationship, combined with the GTOPO30 elevation data (global 1-km digital elevation model data developed under the leadership of the US Geological Survey's Earth Resources Observation and Technology Center), the average annual ground temperature distribution over the entire Tibetan Plateau is simulated, the average annual ground temperature is 0.5 C, and it is used as the boundary between permafrost and seasonal frozen soil.  
3. The distribution of permafrost at high latitudes in the Northeast is based on the latest results from Jin et al. (2007). Jin et al. (2007) analyze the average annual precipitation and soil moisture in Northeast China over the past few decades and conclude that the relationship between the southern boundary of permafrost in Northeast China and the annual average temperature has not changed substantially in the past few decades.  
4. Alpine permafrost distribution in other regions is updated with the Map of the Glaciers, Frozen Ground and Deserts in China (1:4 million) (Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, 2006). In terms of classification systems, the current existing frozen soil maps use continuous standards for the division of permafrost, but the specific definition of continuity is very different. Many studies have shown that the continuity criterion is a concept closely related to scale, it is not suitable for the classification of permafrost at high altitude (Guodong Cheng, 1984; Cheng et al., 1992), and it cannot be applied to the permafrost distribution model that uses grid as the basic simulation unit. In this paper, we abandon the continuity criteria and take the existence of frozen soil in the mapping unit (grid or region). The new frozen soil map divides China's frozen soil into several categories:  
(1) High latitude permafrost;  
(2) High altitude permafrost;  
(3) Plateau permafrost;  
(4) Alpine permafrost;  
(5) Medium-season seasonal frozen soil: the maximum seasonal freezing depth that can be reached is >1 m;  
(6) Shallow seasonal frozen soil: the maximum seasonal freezing depth that can be achieved is <1 m;  
(7) Instant frozen soil: less than one month of storage time; and  
(8) Nonfrozen soil.  
For a specific description of the data, please refer to the explanatory documents and citations.

2、Keywords

Theme：Frozen ground distribution,Seasonally frozen ground,Frozen Ground  
Discipline：Cryosphere  
Places：China  
Time：2000

3、Data details

1.Scale：None

2.Projection：3410

3.Filesize：4.49MB

4.Data format：shp

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：53.9 | - |
| west：73.2 | - | east：135.5 |
| - | south：17.8 | - |

5、Time frame:2000-01-23 00:00:00+00:00--2001-01-22 00:00:00+00:00

6、Reference method

References to data:

LI Xin, RAN Youhua. Frozen soil map of China (2000). A Big Earth Data Platform for Three Poles, doi:10.11888/Geocry.tpdc.2705522018

References to articles:

Ran, Y., Li, X., Cheng, G., Zhang, T., Wu, Q., Jin, H. & Jin, R. (2012). Distribution of permafrost in China: an overview of existing permafrost maps. Permafrost and Periglacial Processes, 23(4), 322-333.

7、Supporting project information

8、Data resource provider

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