

Changes of permafrost environment and the response to the long term climate change

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Permafrost is soil and sediment that is frozen more than two consecutive years, most of which is located in high latitudes. Ground ice is not always present, as may be in the case of nonporous bedrock, but it frequently occurs and it may be in amounts exceeding the potential hydraulic saturation of the ground material. Permafrost accounts for 0.022% of total water and exists in 24% of exposed land in the Northern Hemisphere.

permafrost contains 1700 billion tons of organic material equaling almost half of all organic material in all soils. This pool was built up over thousands of years and is only slowly degraded under the cold conditions in the Arctic.

Most of the permafrost existing today formed during cold glacial periods, and has persisted through warmer interglacial periods, including the Holocene. The time scale of the thermal process is different depending on the depth (i.e. distance from the ground surface) and the soil thermal properties, while the vegetation processes such as accumulation of organic material have yet different time scales.

In this presentation, we discuss those complex character of permafrost and show the outlook on the future research needs, showing an example study on the relationship between permafrost distribution and long-term climate change.

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