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Sprawozdanie z uczestnictwa w XI. International Conference on Permafrost, Poczdam, Niemcy.

W dniach 18-23 czerwca 2016 roku uczestniczyłem w kolejnej światowej konferencji poświęconej badaniom środowiska przyrodniczego w kontekście występowania wieloletniej zmarzliny. W konferencji tej uczestniczyło około 900 naukowców z całego świata prezentując wyniki najnowszych badań naukowych, prac inżynierskich i plany badawcze na najbliższe lata. Na konferencji była okazja zapoznać się z prezentacjami ustnymi oraz posterami prezentującymi badania zmarzlinowe z zakresu szeregu subdyscyplin, m in. takich jak: Climate Change and the Permafrost Carbon Feedback: Past, Present and Future, Frozen ground properties. Field and laboratory testing, Integrating field and remotely sensed measurements of thaw-driven landscape change in permafrost regions, New frontiers in mountain permafrost research, Permafrost in History and Culture, oraz kilkoma wykładami plenarnymi. Konferencji towarzyszyły także inne imprezy i spotkania, takie jak: NASA Land-Cover and Land-Use Change (LCLUC) Yamal Synthesis Meeting, Permafrost Carbon Network (PCN) Meeting, Coastal Permafrost in Transition (CPiT), Yedoma Workshop (IPA Action Group), Rapid Arctic Transitions due to Infrastructure and Climate (RATIC), ESA GlobPermafrost project meeting, w których w miarę możliwości organizacyjnych mogłem także uczestniczyć.

Podczas konferencji zaprezentowałem dwa postery, gdzie zaprezentowałem wyniki badań nad relacją permafrostu i lodowca z północnej Szwecji, oraz propozycje definicji nowych terminów do międzynarodowego słownika zmarzlinowego. Ich tytuły to: Active and fossil permafrost in the glacier-permafrost system. Storglaciären, Kebnekaise, Northern Sweden, oraz Permafrost in Synthetic View of Glacial and Periglacial Domain: New Terms and Definitions.

Prowadzone rozmowy i dyskusje być może zaowocują nową współpracą międzynarodową w moich badaniach permafrostowych.

W obszernych abstraktach jakie opublikowałem w materiałach pokonferencyjnych (Proceedings...) znajdują się podziękowania dla instytucji finansujących projekt badawczy oraz ten wyjazd konferencyjny. Ze względu na obszerność tomu nie przesyłam go w załączeniu, lecz jedynie łącze elektroniczne: <http://icop2016.org/index.php/program>.

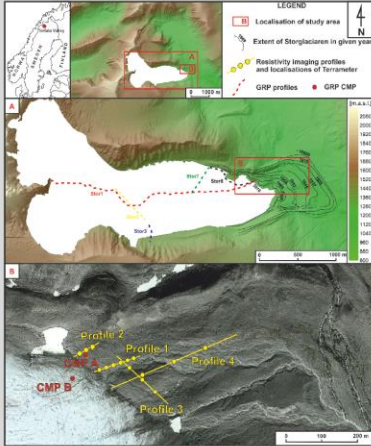
Wojciech Dobiński

Active and fossil permafrost in the glacier - permafrost system.

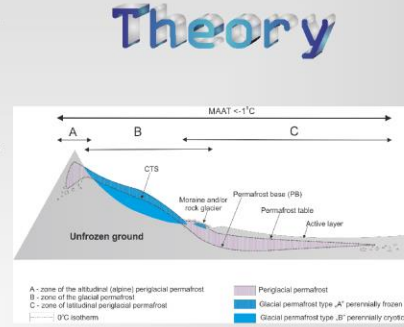
XI. International Conference on Permafrost
Potsdam, Germany 20-24 June 2016

Storglaciären, Kebnekaise, N. Sweden

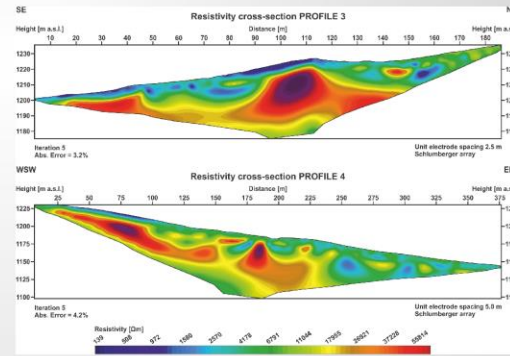
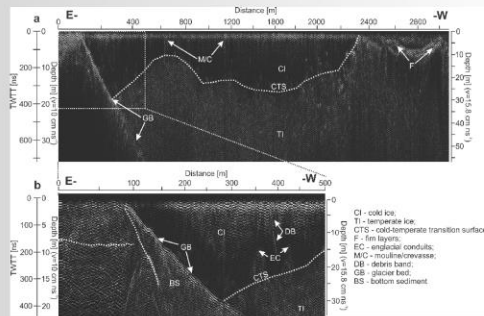
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Kebnekaise region of northern Sweden is a place where research on glacier and permafrost is conducted since 60. of the 20th century. The extrapolated results of ground temperature measurements indicate that the maximum depth of permafrost located there can reach the depth ca. 350 meters below the ground surface. The history of climate change shows that since the end of glaciation in the Tarfala valley favorable conditions for permafrost preservation always prevailed in this region in greater or lesser extent. The fluctuations of climate affect the evolution of permafrost occurring here as a result of the climate impact which change in a manner analogous to the change of air temperature. Those conditions led us to formulate hypothesis that permafrost currently occurring in this region may be associated both with the modern climate, as well as the early Holocene or past glacial period. Contemporary climatic conditions are responsible for existence of shallow located permafrost layer. It is possible however that permafrost from earlier geological periods may be located deeper in the ground.



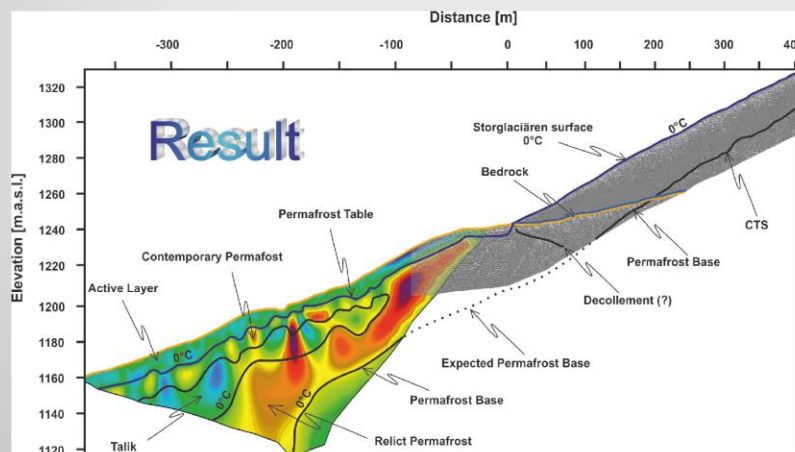
Theory



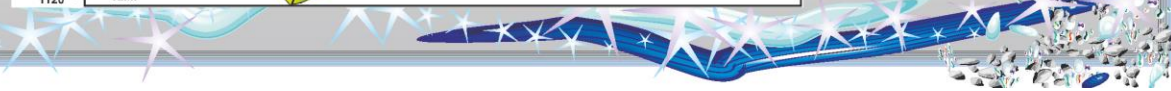
Conclusions

Described surfaces of 0°C that occur in the summer / ablation season on the glacier surface and in its forefield, as well as the CTS-PB surface constitute a specific environmental axis in relation to which ice and permafrost evolving as the elements of the same cryosphere. In this area not only the permafrost associated with currently existing climate was detected. Under the layer of shallow, contemporary permafrost much deeper layer of fossil permafrost is located, which is probably a remnant of the earlier cold periods. It may be at least partly beyond the reach of modern seasonal climate changes. It is difficult to calculate its age but it is not excluded that, if even for a short period in the Holocene when MAAT temperatures in the study area was positive, the permafrost of the last glacial period could survive this warming.

The CTS-PB surface can be seen as a specific axis in glacial / periglacial environments, which through thermophysical process of freezing / thawing affect the physical properties of both of them.



Result



Permafrost in synthetic view of glacial and periglacial domain:

new terms and definitions

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Revision of certain definitions is a need for holistic approach in research on the cryosphere on Earth and Space

Permafrost

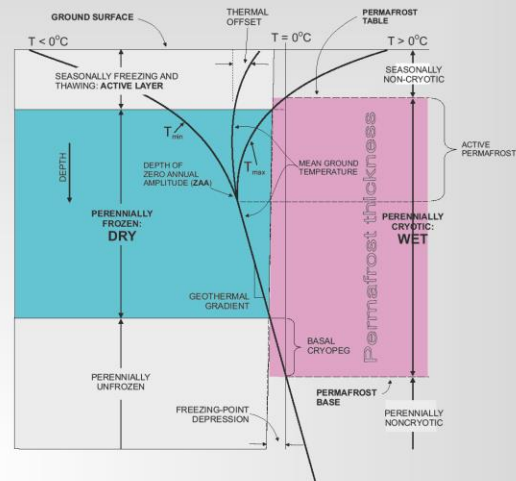
Definition of permafrost - suggested changes

Permafrost is defined as follows: "Ground: soil or rock and included ice and organic material, that remains at or below 0°C for at least two consecutive years". Permafrost is synonymous with perennially cryotic ground.

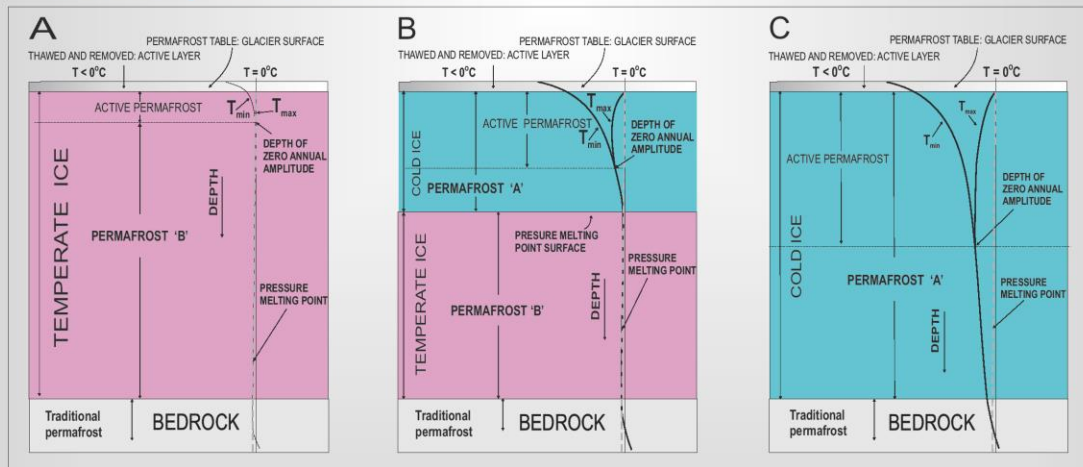
It should be improved as follows: permafrost as a geo-physical state of the lithosphere: its temperature, does not have a material manifestation and in the places of its occurrence it encompass the lithosphere. It encompass perennial ground ice, surface ice e.g.: glaciers and glacial ice-shelves.

Substantiation

Permafrost has been commonly associated with the physical state of the ground. It is still identified with the underground ice. Such understanding of permafrost is incorrect, in particular when the cryotic state is treated as the synonym for permafrost. Cryotic and noncryotic refer solely to the temperature of the material. Perennially cryotic ground refers to ground that remains at or below 0°C continuously for two or more years and is therefore synonymous with permafrost". Ice obviously is



Glacial permafrost



Term which is absent in the IPA dictionary is 'glacial permafrost'. This type of permafrost in the earlier period of study was present in the permafrost science. The definition of glacial permafrost may be as follows:

Glacial permafrost: permafrost encompassing a glacier, ice sheet or a shelf glacier.

Substantiation

Constitutive for the substantiation of the existence of glacial permafrost is the answers to the following questions: 1. whether ice is rock: part of the lithosphere and 2. whether it may freeze for more than two years. An active layer does appear in glacial permafrost, as ice during warm period of the year it melts, and it is removed from the surface of the glacier gravitationally. In the Earth sciences, ice is treated as a mineral, and the same should be applied to cryology in order to preserve the unity of science. Ice possesses all the characteristics of a mineral, hence its accumulation may be called rock. A.B. Dobrowolski, P. Shumskii, and others distinguishes ice as a sedimentary, metamorphic, magmatic rock. It is worth recalling this classification. In a glacier, a number of geological processes can be identified. Therefore it should be excluded from the hydrosphere and transferred to the lithosphere, wherein it belongs in fact.