



Sergeev Institute of Environmental Geoscience RAS (IEG RAS, Moscow, Russia)

Application of the geotemperature modeling to indicate the danger of geocryological processes in natural and disturbed landscapes

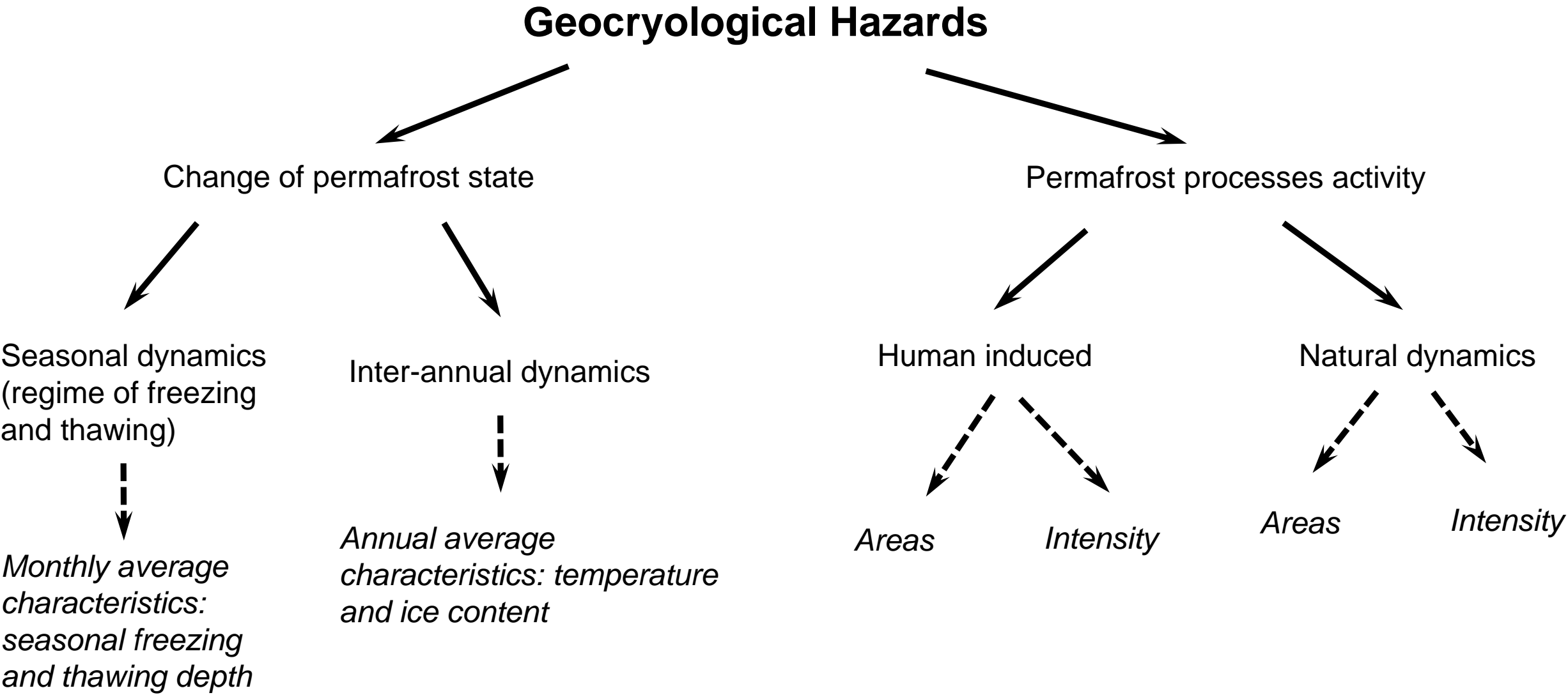
Sergeev Dmitrii

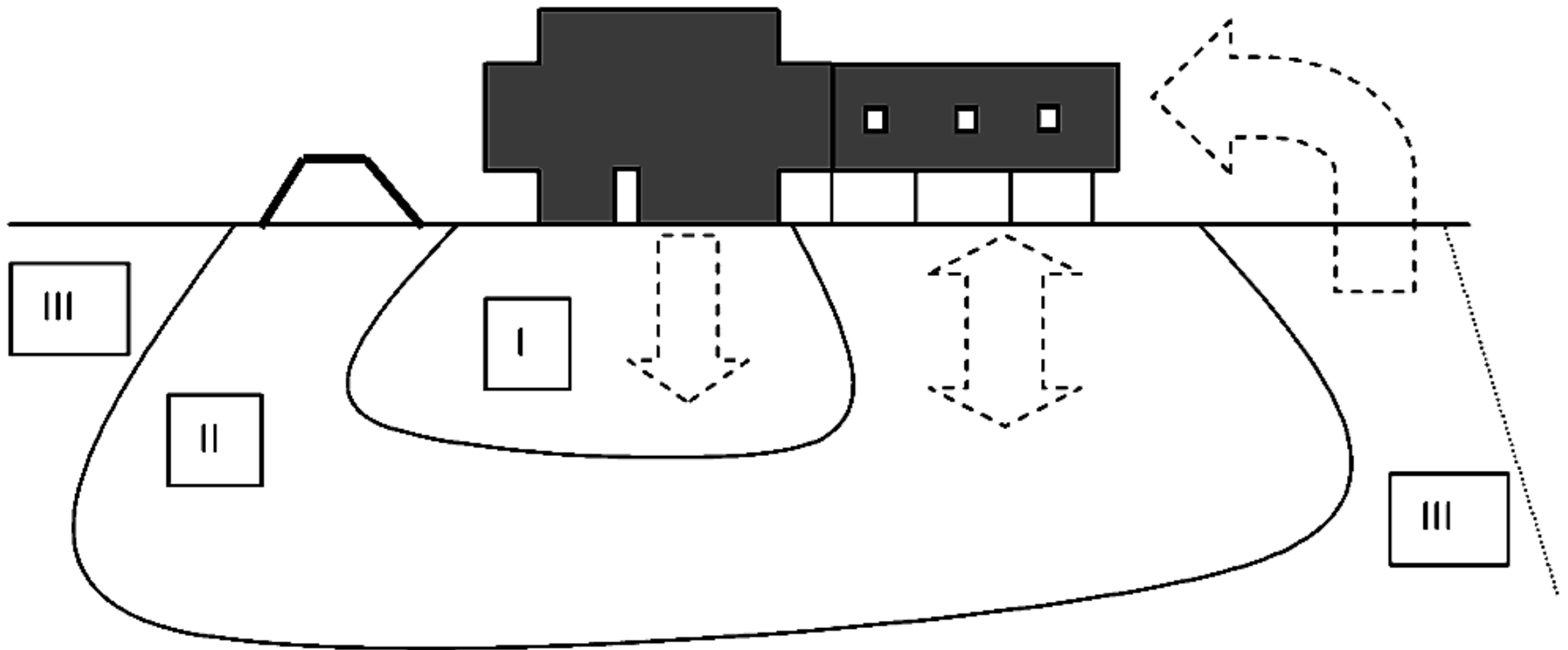
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The one of principal state projects of Institute of Environmental Geoscience is “*Analysis and assessment of environmental problems in the cryolithozone of Russia due to the structure and properties of frozen grounds*”.





The impact zones:

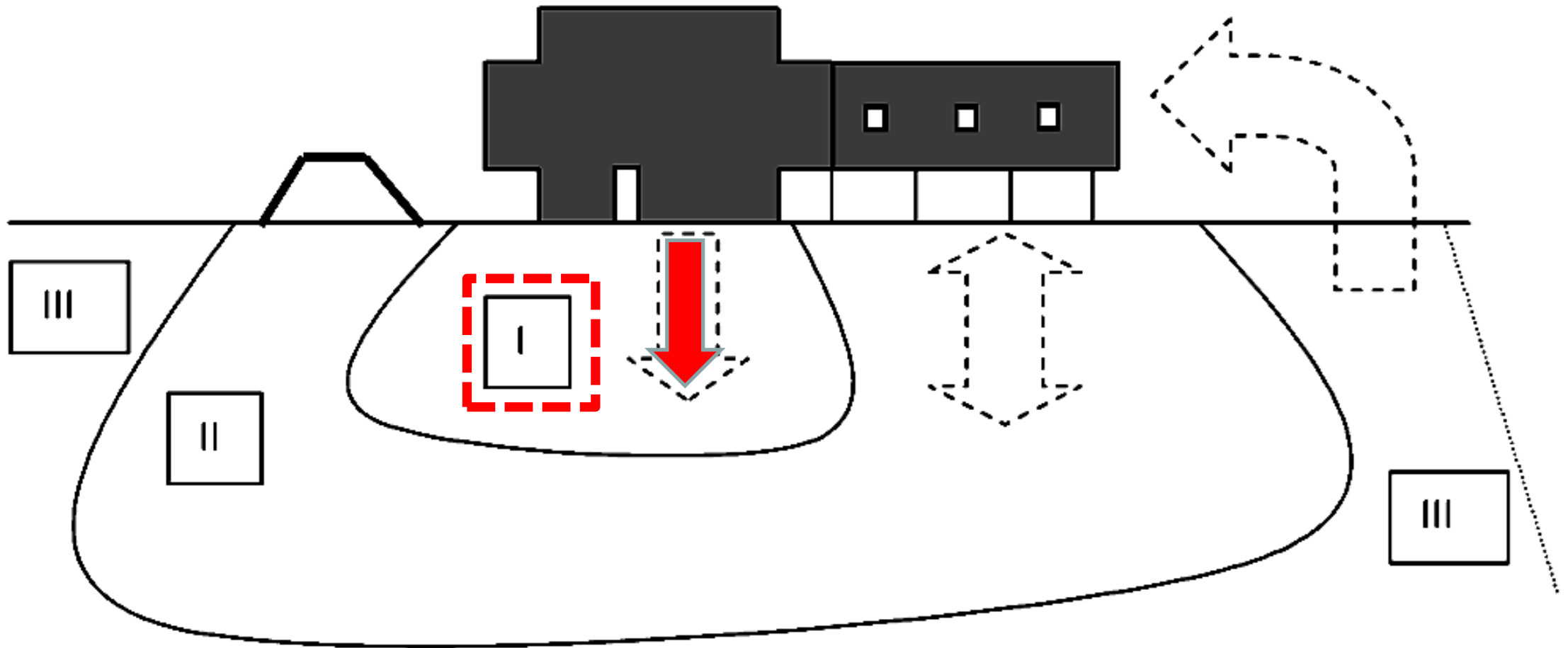
I - The zone which the impact of the object exceeds all natural influences (heat generating buildings and water reservoirs).

II - The influence of both man-made and natural factors affects the permafrost in this zone.

III - The zone where the natural factors and hazards are dominant.

[Golodkovskaya & Eliseev, 1989]

[Khimenkov et al., 2011]



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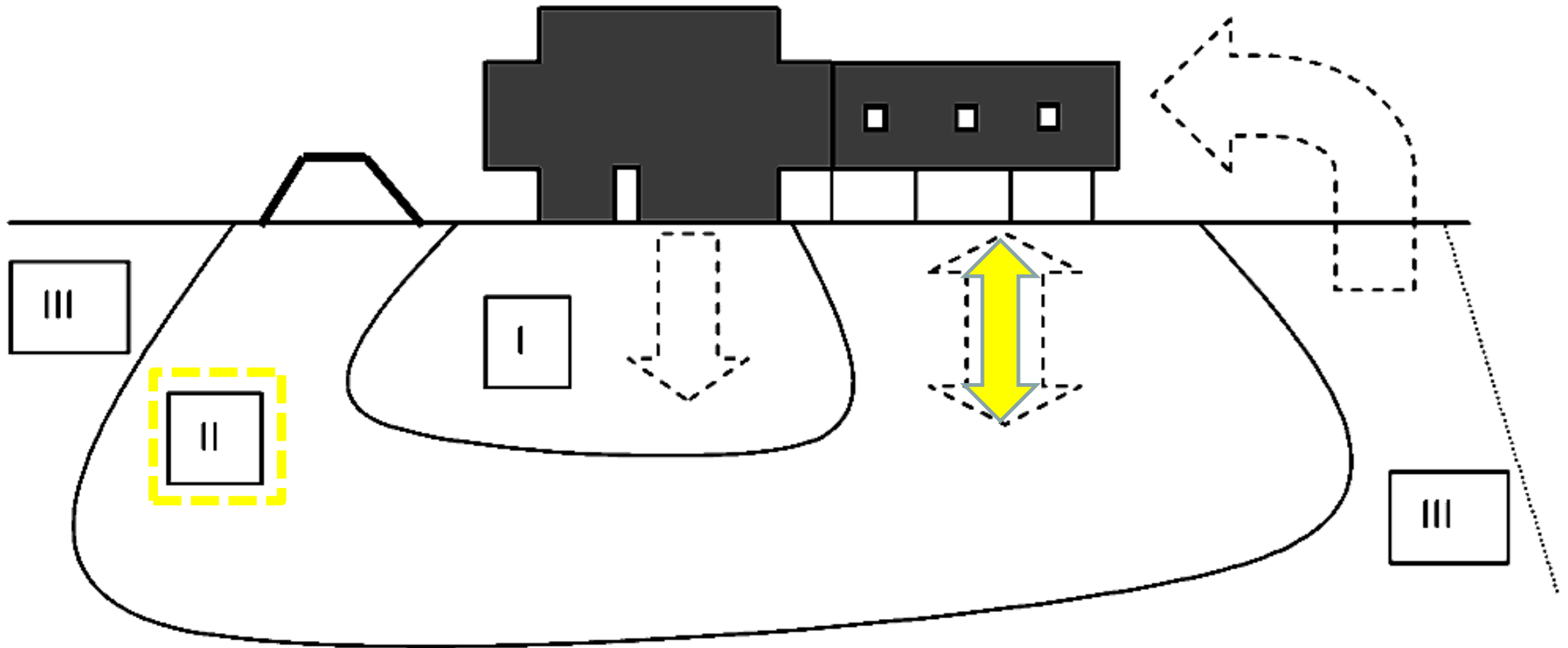
[Golodkovskaya & Eliseev, 1989]

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**Thaw settlement in
vicinity of working
borehole**

Photo
O.N.Koushnarenko



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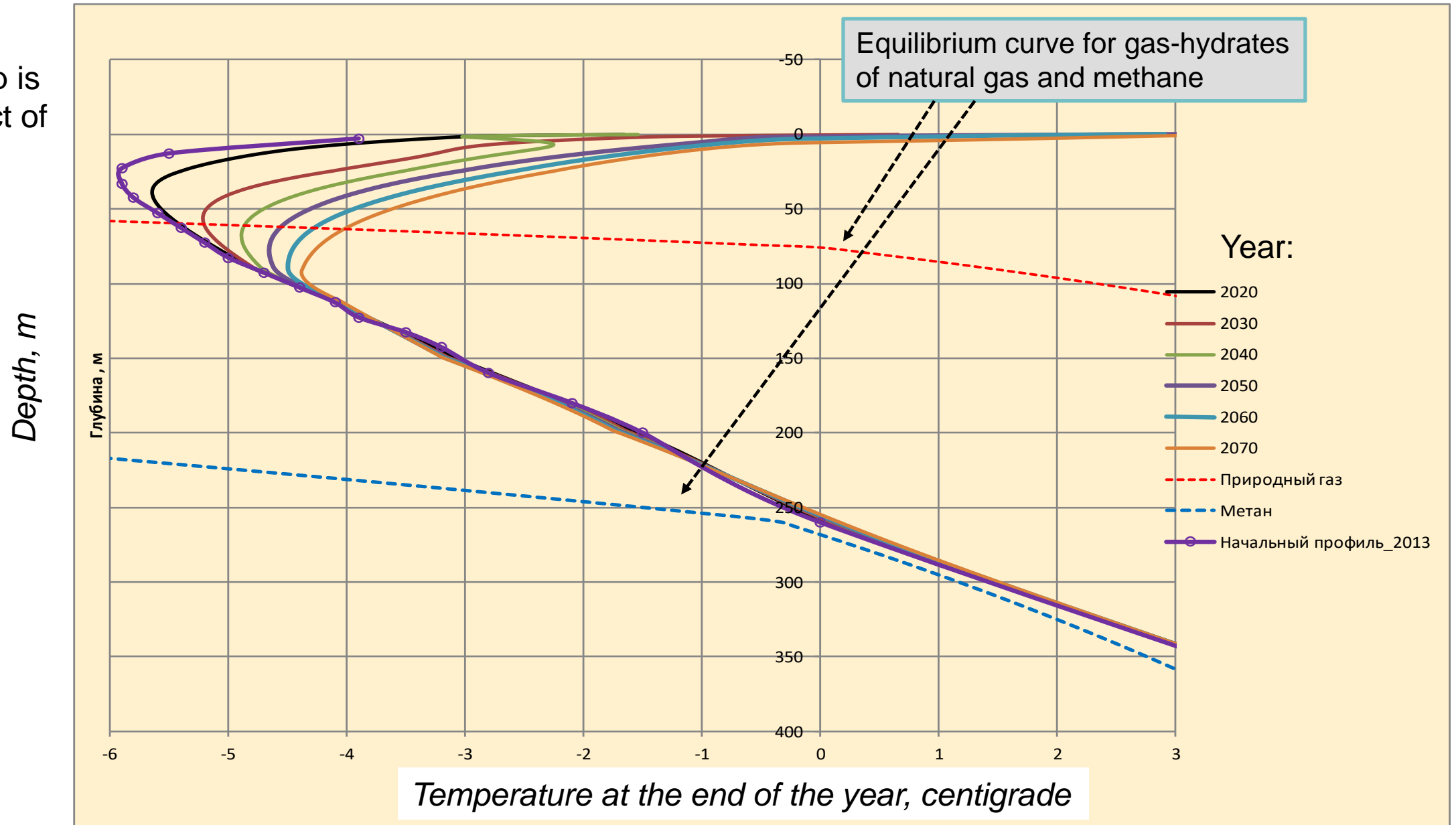
**Thaw settlement at Novaya
Chara – Cheena railroad**



**Frost
blister,
Southern
Yakutia**

The geotemperature forecast for different time. Central part of Yamal Peninsula, RCP 2.6

How deep is the impact of climate change?

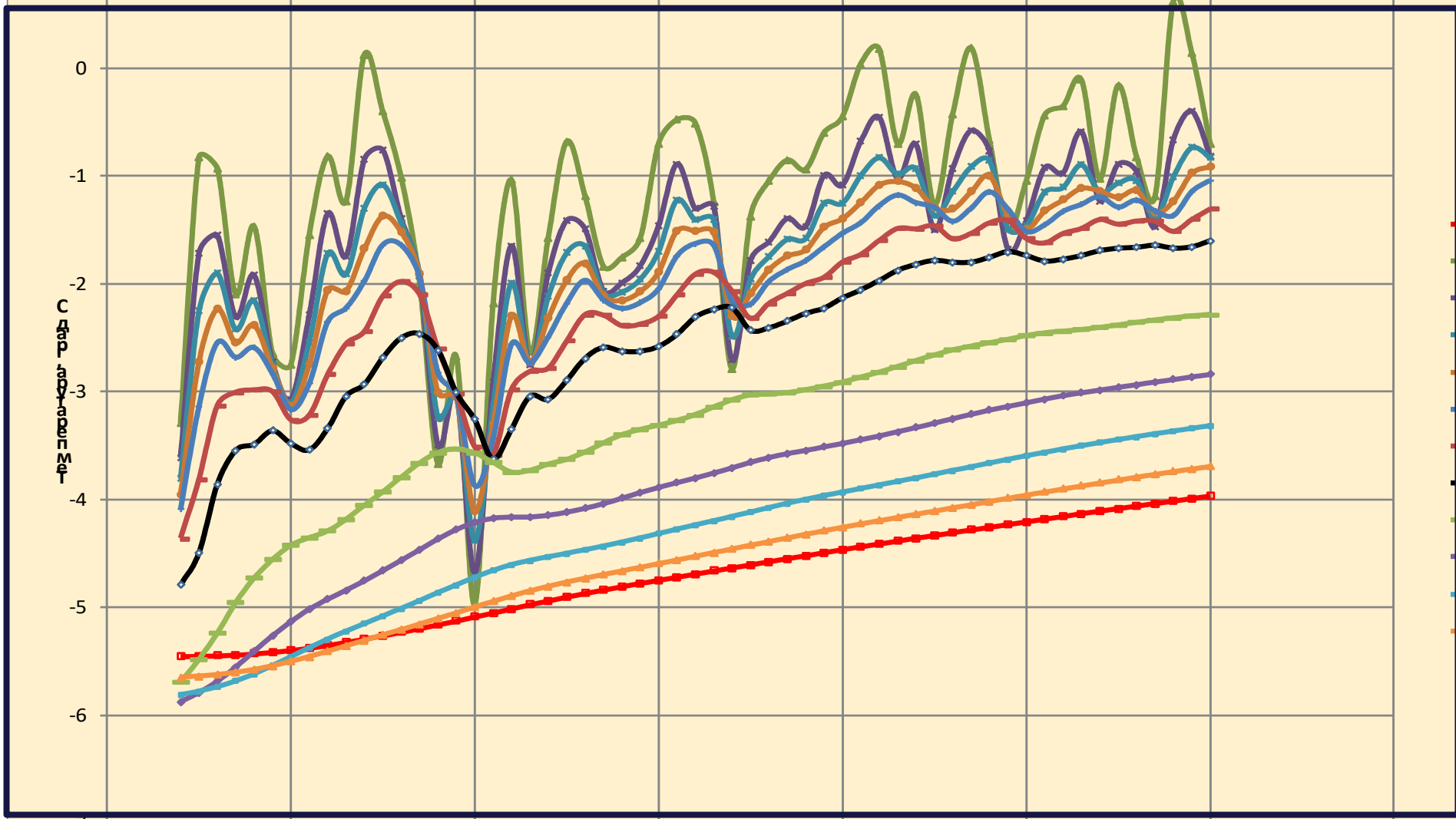


The geotemperature forecast for different time. Central part of Yamal Peninsula, RCP 2.6

How match ?

How fast and intensive the temperatures change at different depths?

Mean annual temperature, centigrade



Время, годы

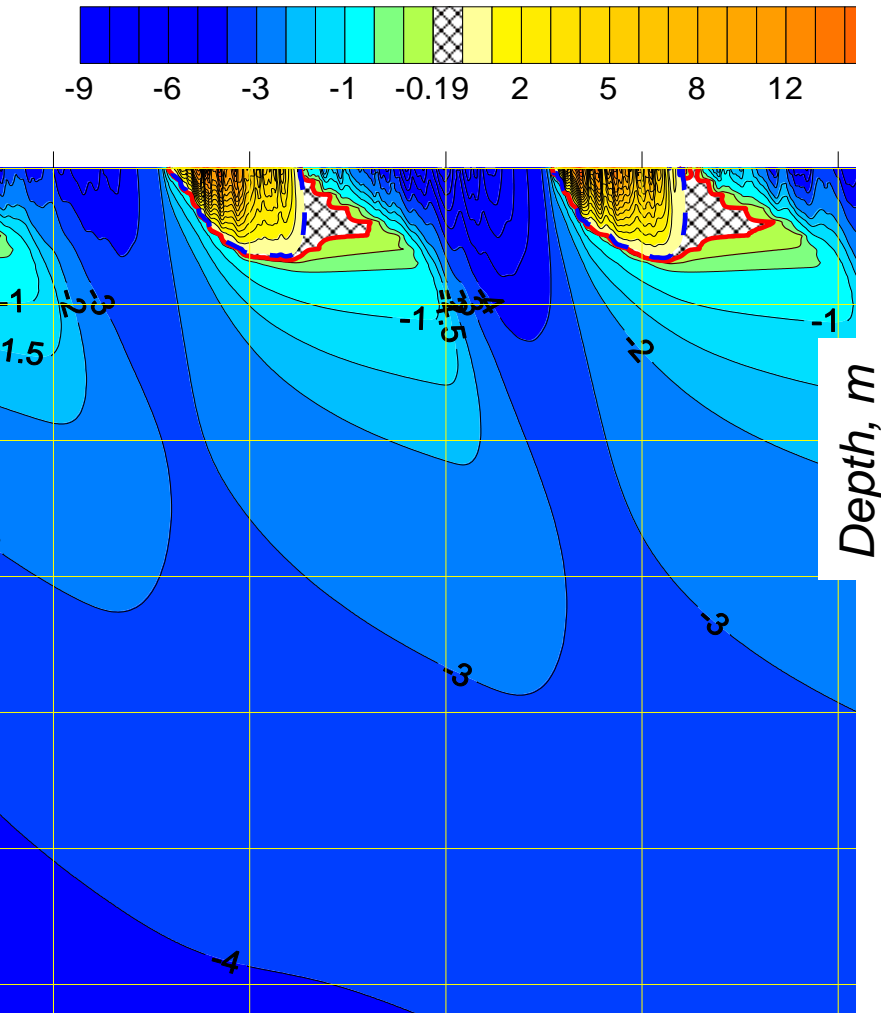
Years

Depth, m

Evolution
and
revolution.

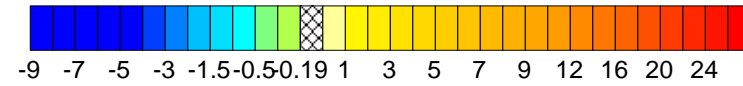
When ?

Active layer depth and position of the permafrost table

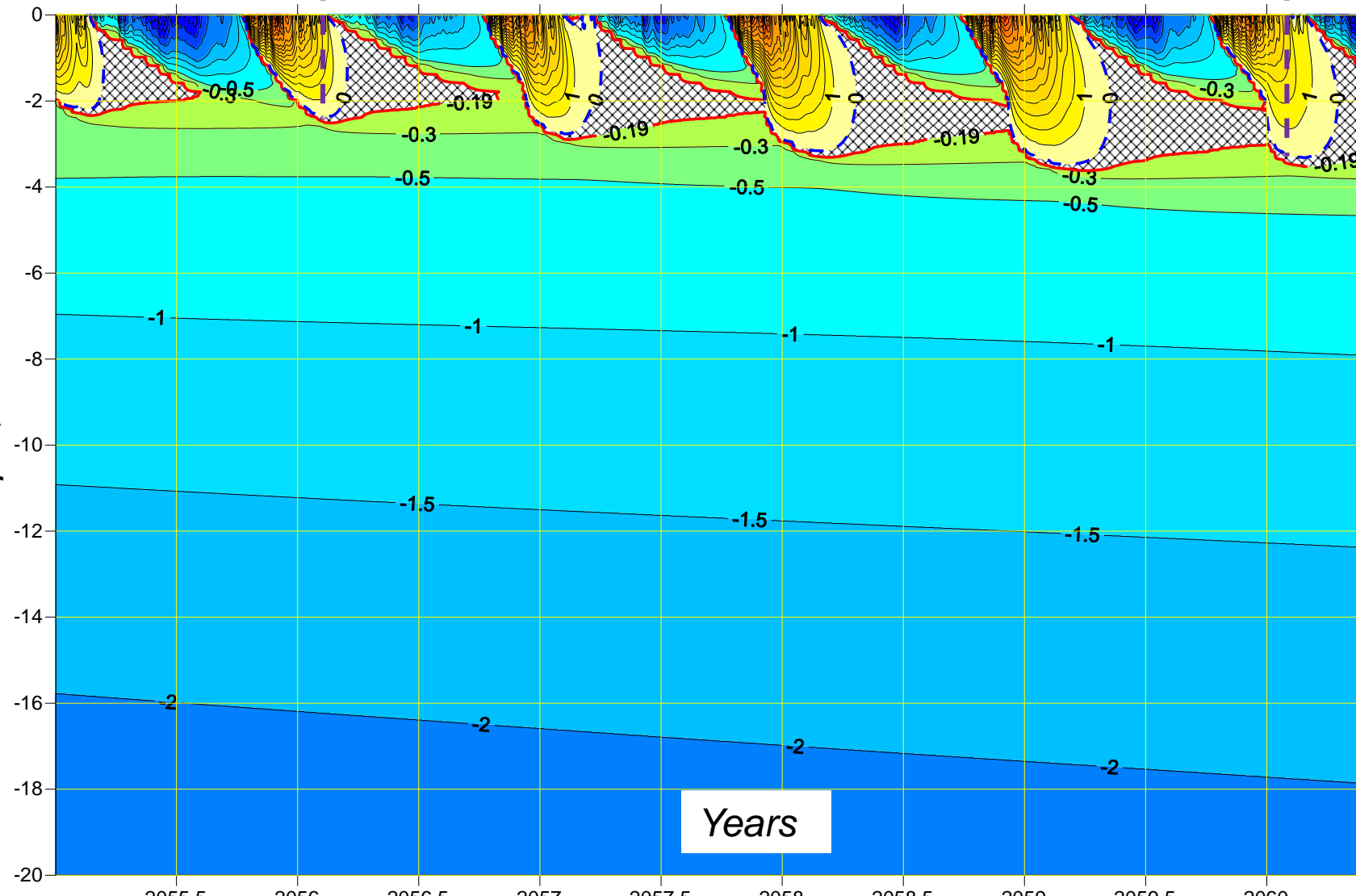


Active layer depth

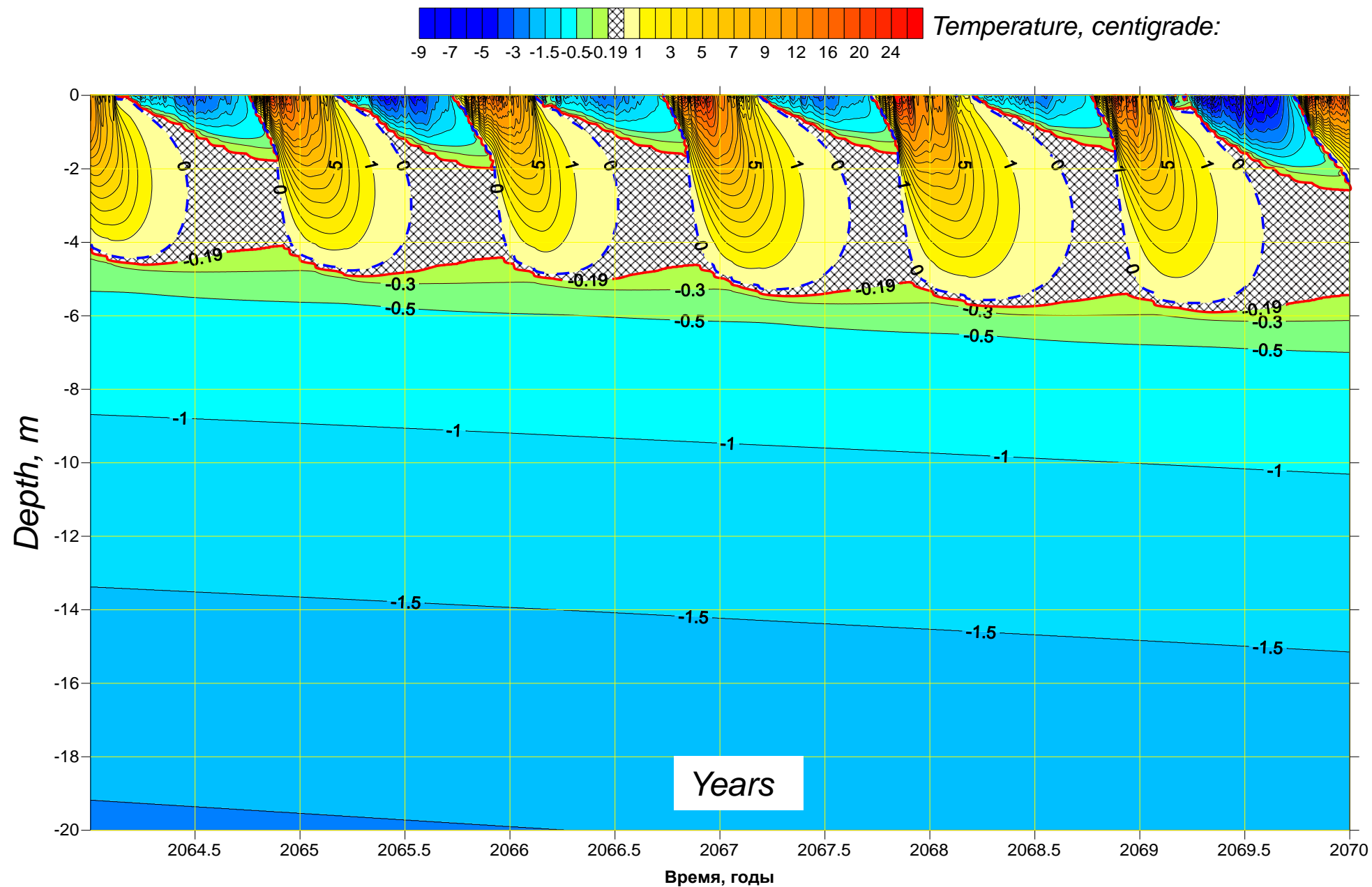
Temperature, centigrade:



Permafrost table depth



Permafrost degradation progress



Adaptation Levels:

National



Determination of territorial and time priorities based on the **regional scale** (***“background”***) ***geotemperature forecast.***

Regional



Compilation of a list of objects requiring the adaptation measures in priority areas.

Local



Local geotemperature forecast, determination of possible ways of adaptation; comparative analysis of the effectiveness of adaptation measures. It is based on mechanical stability estimation and the calculations of economic costs.

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*Boundary
conditions*