

The costs of damage of permafrost thawing in the Arctic will be about \$200 billion by mid-century

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The thawing of the permafrost in the Arctic is causing damage to the infrastructure and buildings of the Arctic states. According to model projections, the costs of this damage will be \$182 billion for all Arctic states combined by mid-century, under a moderate scenario of climate change. Under a high-end scenario of climate change the costs may rise to \$276 billion by mid-century.

Russia is expected to have the highest burden of costs, ranging from \$115 to \$169 billion depending on the scenario. For Scandinavia and Iceland, the estimated costs are \$36.4 billion (moderate scenario) to \$53.9 billion (high-end), while the range for North America is \$30.4 - \$53.1 billion. These are the mean values for the estimates; the uncertainty range of these costs is tens of percent.

In these model projections mid-century is defined as the period 2055–2064, and the damage is compared to the reference period 2015–2024.

The results show that under the moderate scenario of climate change 29% of the roads, 23% of the railroads, and 11% of the buildings will be affected by permafrost degradation. Under the high-end scenario, these numbers are 44% of the roads, 34% of the railroads, and 17% of the buildings.

Source: Streletskiy et al. (2023). Environmental Research Letters 18: 015006.