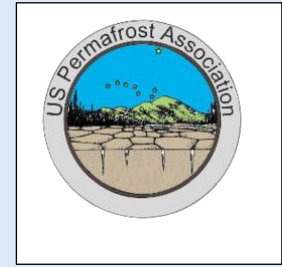


Vol 1, Issue 4

Thawing Ground

A Newsletter of the US Permafrost Association



The mission of USPA is to encourage sharing of knowledge and data in permafrost science.

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USPA Board Member and
Geophysical Institute
Emeritus
Vladimir Romanovsky
hard at work in the field

The Active Layer

Evaluating the Vulnerability and Dynamics of Permafrost Across Ecotypes

In their new paper, USPA Board Member Vladimir Romanovsky and his colleagues Sergey Marchenko (first author), Kevin Bjella, and Dmitry Nicolsky discuss their revised model of ecosystem-based spatially distributed permafrost dynamics. Understanding how permafrost interacts with and drives change in infrastructure, socioeconomic parameters, and the living environment is a tall order, but is exactly what's needed as we learn more about the broad effects of climate warming.

The authors used both ground-based observations and freeze-thaw models and verified the model using on the ground measurements of active layer thickness. With validation, one can compute ground temperature at various depths with daily resolution and track active layer thickness and talik formation. They have projected their model into the IPCC Representative Concentration Pathways 4.5 and 8.5 to help refine its predictions and believe the model can be applied to other regions of the Arctic. Not surprisingly, the RCP 8.5 model, incorporating their findings, could foresee disastrous effects across Alaska south of the Brooks Range, while the 4.5 model looks ahead to modest impacts.

Check out their article here:

<https://doi:10.20944/preprints202403.0927.v2> .

Spotlight on UAF Geophysical Institute

Led by Director Robert McCoy (at left) and Associate Directors Jessica Larsen and Laura Conner, the GI was founded in 1946 by an act of Congress and a hefty (back then) budget of \$975K. Among its many laboratory facilities is the Permafrost Lab, which was established in the 1960s by Professor Thomas E. Osterkamp. The GIPL focuses on an array of disciplines: modeling, process studies, monitoring, ecosystems and infrastructure. Learn more about the lab here: <https://permafrost.gi.alaska.edu/>

Thank You, GI, for supporting the work of USPA!



“Alaska is one great big laboratory we have a lot of geophysical phenomena that no other university no other research university has access to.”

Dr. McCoy from 75th GI Anniversary Speech

Quotes

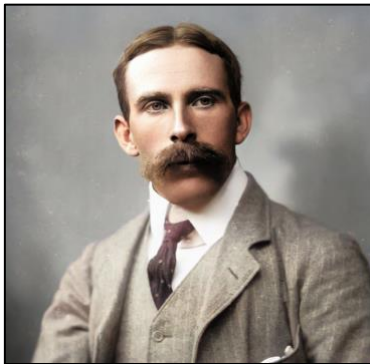
Whereas the University of Alaska, because of its unique location and the work it has accomplished in the past, is a logical site for a permanent geophysical research station ... there is hereby authorized to be appropriated ... \$975,000 for the construction and establishment of a geophysical institute.

US Govt Authorization of Geophysical Institute, 1946.

Spotlight on an Historian

Sir Arthur G Tansley

Starting out with an interest in ferns, Tansley went on to found the botany journal *New Phytologist* in 1902. The *British Ecological Society* saw Tansley serve as its first president, and he was the first editor of its *Journal of Ecology*, for 21 years. During WWII, he committed himself to conservation and was knighted in 1950, five years before his death.



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Interdisciplinary Research in Permafrost Science: When, Why and How?

In the 21st century, we all value research bringing in different perspectives, disciplines, and motivations. But it wasn't until the middle of the last century that the big picture gained a foothold in permafrost science in the US. Vincent's 2017 *Arctic Science* article on an Earth system approach (see link below) gave a quick history, citing 1940s studies in Alaska exploring wartime road construction, work in China in the 1950s with a view toward infrastructure and economic development, and Canadian research in the 1970s that elucidated themes in thermal dynamics and periglacial processes. Vincent also highlights recent work that ties in biogeochemical cycles, food webs, carbon and nitrogen cycling, and more.

While many researchers give attention to the wider ecosystem with an eye to the effects of climate warming and potential mitigation strategies, some maintain focus on national strategic drivers. A 2021 article out of St Petersburg State University by Makarieva *et al.* entitled "Perspectives of the development of complex interdisciplinary hydrological and geocryological research in the North-East of Russia," reflects this driver clearly. "Northeast Russia is an important strategic resource base, and according to the development plans of the Russian Federation it will soon become one of the most dynamically developing regions of Russia in the permafrost zone." (p. 75)

Vincent's article, in addition to its brief history lesson, provides a broad and comprehensive scheme for the "how" question. He and his colleagues outline four compartments from which we can delineate feedback loops and other complex interactions. These are Atmosphere, Hydrosphere, Solid Earth (includes the cryosphere), and Biota (includes human systems). There is abundant work being done in this "biggest picture" field which is and will continue to shed light on how we understand and can protect our planet.

Vincent: <https://doi.org/10.1139/as-2016-0027>

Makarieva: <https://doi.org/10.21638/spbu07.2021.105>

Permafun Corner

When did Arthur Tansley coin the term "ecosystem?"

1907? 1912? 1927? 1935?



Answer: It was in 1935 in a paper on terminology of vegetation. Learn more about Tansley: https://en.wikipedia.org/wiki/Arthur_Tansley

A HUGE THANK YOU TO OUR CORPORATE AND INSTITUTIONAL MEMBERS!



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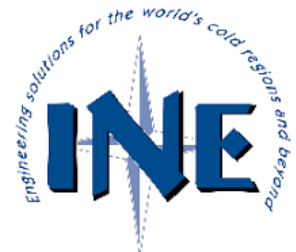
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