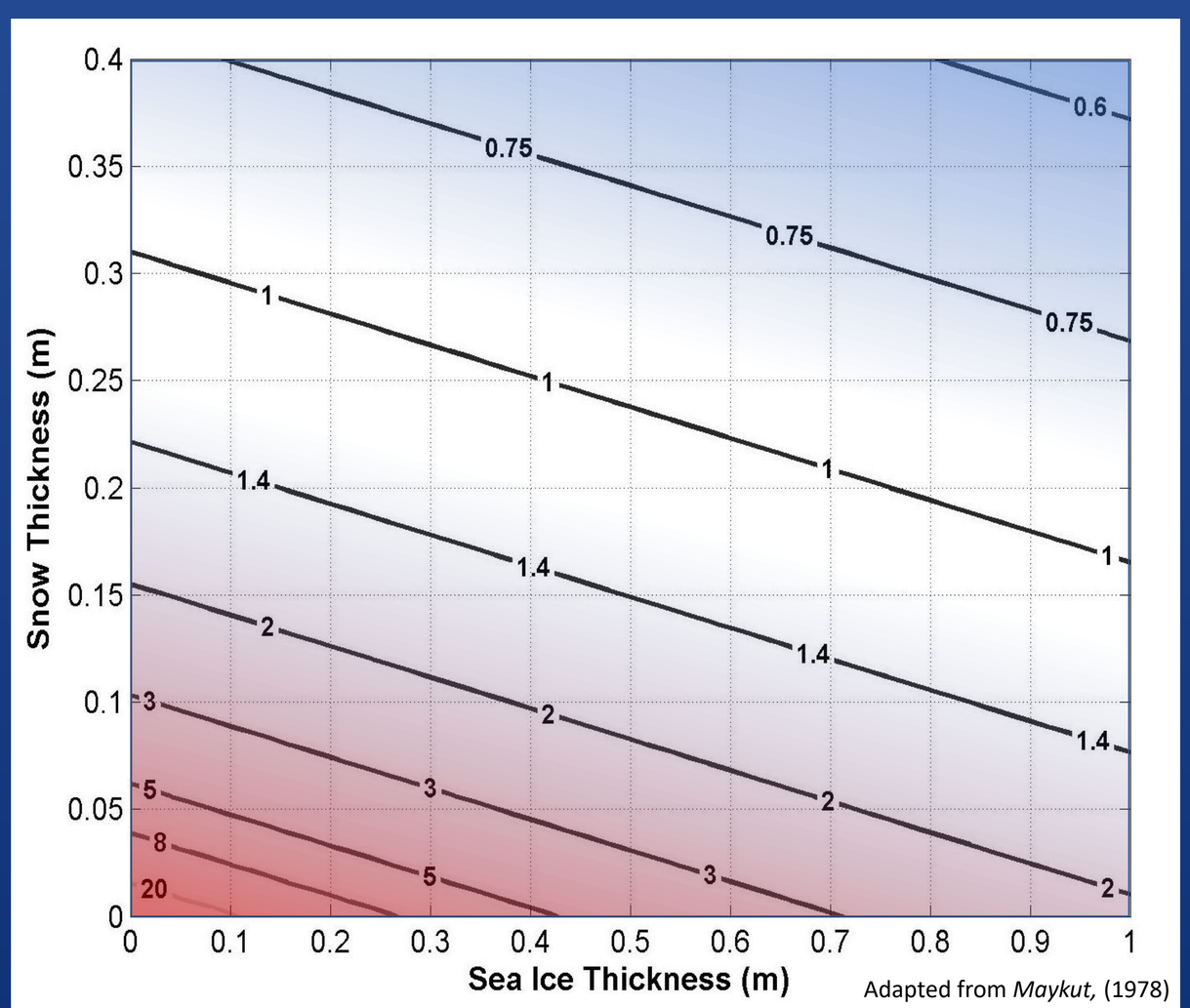
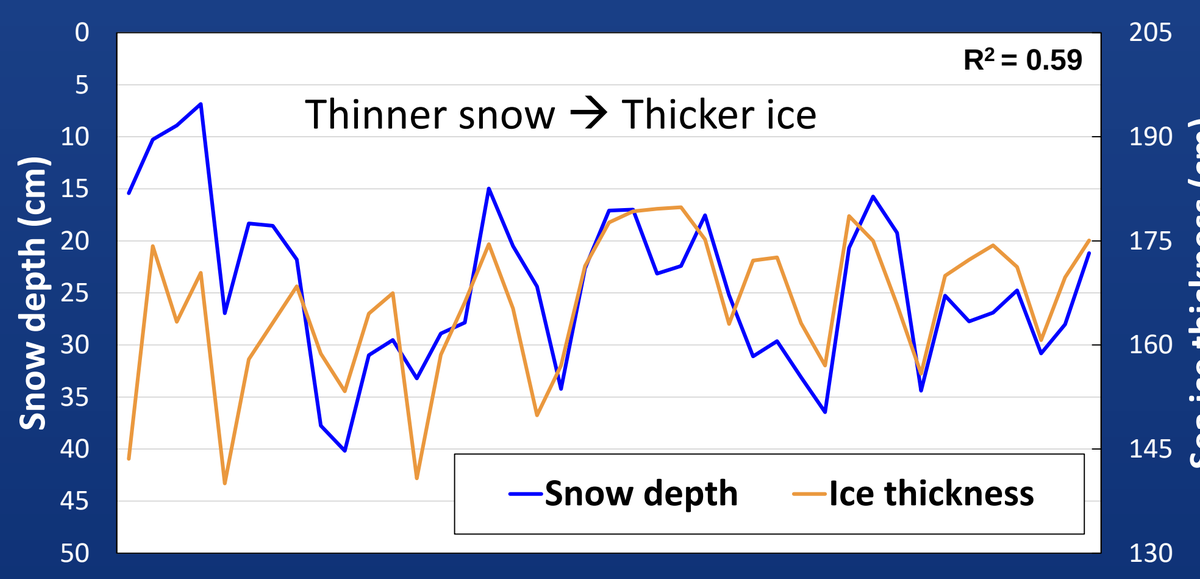
Is snow the enemy, or an ally?

Snow is the most reflective natural material on Earth, reflecting up to ~80% of incoming solar radiation back into space. Without snow, the Earth's surface, especially in polar latitudes, would gain solar radiation and warm.

What is the net effect of snow on sea ice mass balance, and how might this change in a warming climate? On one hand, snow's high albedo protects the sea-ice surface from solar radiation. On the other hand, snow's large insulating capacity inhibits sea-ice growth. As sea ice thins, it becomes increasingly sensitive to its snow cover. A model is the perfect tool for addressing this kind of question. I'd like to learn how to run a series of simplified model experiments to explore this big snow idea.





***Left**: Thermal conductance (W/m²) as a function of snow thickness (y-axis) and sea ice thickness (x-axis). **Right**: Thickness measurements of snow (blue) and sea ice (orange) from level, first-year sea ice near Utqiagvik, Alaska. Thinner snow allows sea ice to grow thicker, faster.*

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