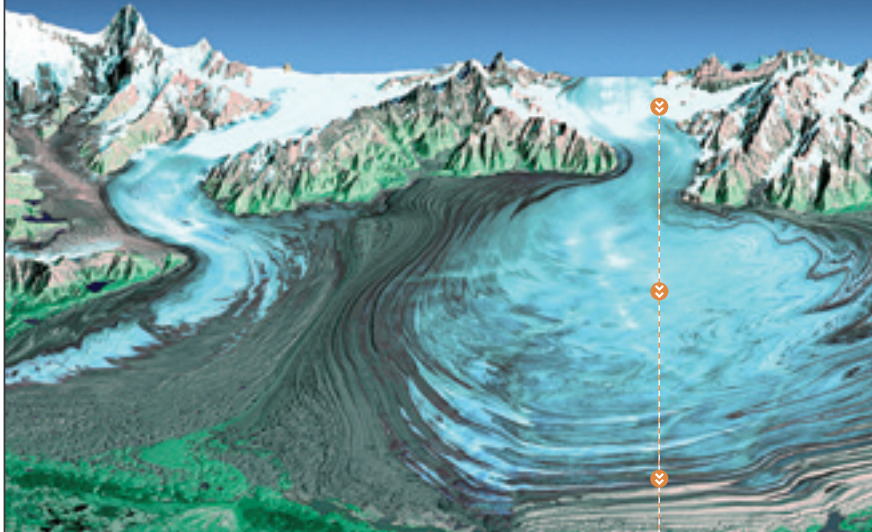


PHENOMENON [Glaciers]

Glaciers are all about power. They sculpt mountains, dredge valleys—and turn hikes into mettle-testing climbs. The secret to all that power? Ice—lots of ice. These masses of frozen H₂O are named after the different places where they form, including cirques, valleys, and piedmonts (bases of mountains). They can be long and narrow like Alaska's 100-mile Bering Glacier, or broad, like the Seward-Malaspina glacier system in Wrangell-St. Elias National Park (pictured), which covers nearly 2,000 square miles—an area larger than Rhode Island.



[SNOW TO ICE]

Glaciers form in areas where summer temperatures never rise enough to melt all of winter's snowfall. The powder settles, and subsequent storms pack it into dense layers. This consolidated snow, called firn, continues to compress each season. Gradually, it recrystallizes into glacial ice—a process that can take anywhere from 3 to 20 years, depending on climate and annual snowfall.

[ICE TO GLACIER]

If new snow and cold temperatures persist, the ice mass expands. When it is larger than a football field and exceeds 50 feet in depth, the weight of the ice and snow in the accumulation zone (the upper elevations) pushes the ice below it downhill. This movement, or glacial flow, transforms the ice mass into a glacier.

[GLACIAL SPEED]

Although a glacier appears static, it's actually a dynamic, flowing river of ice. Its progress hinges on two things: the grade of the slope and the amount of new glacial ice in the accumulation zone. The rate of movement—a foot a day for many glaciers—is called flow rate or ice velocity.

[EXPANDING OR SHRINKING]

The difference between flow rate and the amount of melting in the ablation zone (the lower section) determines if a glacier advances or retreats. If flow is a foot a day and melt is 6 inches, the glacier will advance 6 inches each day.

[MOVING ICE]

If an ice crystal forms today in the accumulation zone of a 30-mile glacier, and moves at a rate of 1 foot per day, it will reach the middle of the glacier in 217 years and the end 434 years from now, in 2439.

The **Cold, Hard Facts**

2	number of miles Alaska's Hubbard Glacier—a tidewater glacier—has advanced since 1890
166	current acreage of Glacier National Park's Grinnell Glacier (visible from its namesake trail), which has lost 90 percent of its volume since 1850
4	size, in square miles, of the Tulutson Glacier inside Mt. St. Helens, the only glacier that has formed in our lifetime

ILLUSTRATION COURTESY NASA / JPL-CALTECH