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The Wind as Heat Thief
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This column is provided as a public service by the Geophysical Institute, University of Alaska Fairbanks, in cooperation with the UAF research community. Dorte Dissing, a graduate student in climatology at the Geophysical Institute, got together with Ned Rozell to produce the following column. Ned Rozell, is a science writer at the institute.

This spring, I've been tricked by the brilliance of the sun into going outside wearing a sweater that I think will keep me nice and warm just to end up freezing cold because the wind is blowing through it. Instead of being toasty warm, I feel "wind-chilled."

What causes wind chill? To understand the effect of the wind on the human body, we first have to look at how the body keeps itself warm.

For the body to function normally, its temperature must be within a few degrees of 98.6 degrees Fahrenheit. Our bodies maintain this temperature by converting food to heat. Like a hot wood stove, our bodies continuously radiate heat.

We use the heat our body produces to warm a thin layer of air between our skin and our clothes. That's why even a thin layer of clothes gives you more protection than bare skin.

When the wind blows, it removes this warm layer of air and replaces it with colder air. The body reacts to this loss by

expending more energy to warm the layer of air above the skin. The heat needed to warm this layer is taken from the skin which then experiences a cooling.

Initially, more energy to keep warm can be generated by exercising or eating high-fat foods, such as chocolate or even frozen butter. However, if more clothes aren't found to wrap up in, and the wind continues to blow, the body soon will be unable to keep up with the heat loss.

At first, the body will try to keep its inner core warm by shutting off the blood circulation to the extremities, including fingers, nose, ears or toes. The result is frostbite.

If the body continues to cool, and its temperature drops even a few degrees, hypothermia can set in. Then, the brain and body functions start to fail; death will occur if the body cools down to about 76 degrees. It's important to note that hypothermia can occur at temperatures well above freezing if clothing becomes saturated with moisture.

The wind chill factor regularly reported by the National Weather Service can help skiers or any outdoor enthusiast better assess the cooling effect on the body caused by wind. For example, going for a ski might seem like a great idea when the thermometer reads 10 degrees below zero, but if the wind is blowing at 20 mph, our bodies will feel as if it is 53 degrees below zero.

According to the book, *Contemporary Climatology*, wind chill is derived from an equation based on a set of 89 measurements made by scientists in Antarctica who in 1945 recorded temperature, wind speed, and the time required to freeze a plastic cylinder of water. Current-day meteorologists pad this equation to make it more accurate at low and high wind speeds, mainly because the human body reacts differently than a plastic cylinder of water.

So next time it is windy, put on some more clothes or a windbreaker to conserve the warm layer of air our body so generously generates. Stay warm.

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